Welcome

Welcome to this public exhibition of our proposals for a wind farm at Barrel Law. This display contains important information about our plans including visual material which shows what the wind farm would look like from several viewpoints.

This display is part of an ongoing consultation process with members of the local community and other interested parties which will continue up to the submission of a planning application and beyond.

If you have any questions about our proposals, please approach a member of the ABO Wind team who will be happy to help.

Details of how to contact us after the exhibition are also supplied. We hope you find the information presented here today informative and helpful.

Who is ABO Wind UK?

ABO Wind UK Ltd is a subsidiary of one of Europe’s most experienced wind energy developers. Originating in Germany, ABO Wind now has interests in France, Spain, Portugal, Ireland, Bulgaria, Belgium and Argentina and has successfully developed, constructed and maintained wind farms for over 15 years.

ABO Wind has now connected more than 270 wind turbines with a total capacity of 440 Megawatts and our first wind farm in the UK is currently under construction near Lairg in the Scottish Highlands.

From its early beginnings in Germany, the philosophy of ABO Wind has been to recognise the importance of neighbours and the local community around a wind farm site. A wind farm would be part of their environment for 25 years, so we design our projects to be as sympathetic as possible and manage construction to cause the least inconvenience for local people.

It is important to us that the surrounding community is involved early in the development process, so that suggestions and concerns can be taken on board. By doing this we hope that local people will embrace our wind farm proposals.

Our team has expertise covering all phases of wind farm development, from site selection and land acquisition to assessing the specific wind yield for a project, technical wind farm design, planning and environmental impact assessment, bank financing, wind farm construction and operational maintenance.
Climate change is recognised widely as the most serious environmental threat facing our planet. UK policy in this area is set through the Climate Change Act 2008, which reflects the Energy Policy for Europe established in 2007, which sets out the EU’s vision for Energy in the period to 2020.

The UK Climate Change Programme has set targets which exceed the binding targets required by the EU, whereby the UK is committed to reducing carbon dioxide emissions by 20% over 1990 levels by 2010 and by 80% by 2050.

The Scottish Government’s policy framework for addressing climate change is the Climate Change (Scotland) Act 2009. This mirrors the UK target of reducing emissions by 80 per cent by 2050, but with a higher interim target for a 42 per cent cut in emissions by 2020. The Act also set targets for renewable energy to meet 80% of Scottish electricity demand from renewable sources by 2020, with an interim milestone of 31% by 2011. The First Minister has since committed to a new target for renewable sources to generate the equivalent of 100 per cent of Scotland’s gross annual electricity consumption by 2020.

Onshore wind power is a mature and relatively low cost renewable technology with a large supply chain already established and capable of being deployed at a high rate. The 2020 Routemap for Renewable Energy in Scotland states that the Scottish Government is committed to the continued expansion of a portfolio of onshore wind farms to help meet renewables targets. The Routemap notes that Scotland’s onshore wind resource has given favourable load factors to generation from wind, in line with the UK mean load factor and better than other more extensive adopters of onshore wind in Europe such as Germany and Denmark.

The main driver behind renewable electricity development in Scotland, now and over the coming years, is the Renewables Obligation (Scotland), or ROS. This mechanism places an obligation on electricity suppliers to provide an increasing amount of their electricity supplied from eligible renewable sources.
How Does a Wind Turbine Produce Electricity?

The main components of a wind turbine are the tower, nacelle and three rotor blades attached to the hub. Put simply, the energy in the wind turns the three blades around the rotor. The rotor is connected to the main shaft, which spins a generator to create electricity.

The diagram below is an illustration of the mechanical and electrical components of a wind turbine which are housed in the nacelle, with a description of how each component works.

The power output from a wind farm largely depends on the strength of the wind blowing across the site. Wind turbines start to generate electricity at a windspeed of about 4 metres per second (m/s) or roughly 9 miles per hour (mph) with output increasing up to their maximum rated power at a windspeed of about 12m/s (roughly 27mph). If the wind speed reaches 25m/s (56mph) the wind turbine shuts down automatically.

The proportion of time that the turbines will be generating electricity is therefore dependent on the time that the windspeed is between 4m/s and 25m/s. Generation output from a wind farm is also seasonally dependent, such that approximately two thirds of the total annual energy yield from the wind farm is expected to be delivered in the six months between October and March, with the remaining six months delivering the other third.

The electricity generated from a commercial scale wind farm such as the Barrel Law proposal would feed into the national grid. From here the electricity would be distributed around the country.
A Wind Farm at Barrel Law

Site Selection and Site Attributes

Barrel Law was identified as a suitable site due to the following attributes:

- Site elevation up to 375m - allowing for high wind speeds;
- Few known environmental sensitivities;
- Availability of connection to the national grid; and
- Relatively isolated location away from large communities.

A wind monitoring mast was installed on the site in January 2011 and results so far have been encouraging, indicating average windspeeds of around 8 m/s.

The Proposal

The proposed Barrel Law Wind Farm would consist of 7 turbines with a capacity of up to 3 Megawatts (MW) each. Turbines would have a hub height of 80m and a rotor diameter of 90m, giving an overall ‘blade tip height’ of 125m.

Ancillary developments would include access tracks, a permanent meteorological mast, underground cabling and a small control building to connect to the national grid. Connection to the national grid would be at Hawick Substation, via a mixture of underground and overhead power lines, and would be developed by ScottishPower.

The final turbine layout for the wind farm proposal will not be finalised for some months, dependent on the outcome of our environmental assessments, consultation programme and further data analysis. The final layout will ensure a separation of at least 1km from the nearest residential properties and we are committed at all times to working with layouts sympathetic to local viewpoints. The design process will also be complementary to the nearby Langhope Rig Wind Farm, which is to be constructed in the coming years.

The proposed access to the Barrel Law site for construction traffic is from the B711, via Hyndhope/Alemoor Forest to the west of the site, using the access track for the Langhope Rig Wind Farm.

The total installed generation capacity of this scheme would be 21 MW. If the wind farm performs as well as the UK average, it could:

- Produce electricity equivalent to the annual demands of approximately 13,000 households;
- Assist in achieving the Scottish Government’s target to generate 100% of the country’s electricity demand from renewable sources by 2020; and
- Displace the emission of approximately 678,000 tonnes of carbon dioxide over its 25 year life. *

*Calculations assume 7 x 3MW turbines with a 30% capacity factor and static UK grid energy mix carbon emission factor of 430g CO2/ Kwh. Calculations also assume average UK household electricity consumption of 4700 kW hours (calculation method specified by the British Wind Energy Association (http://www.bwea.com/edu/calcs.html))

Typically, wind farms operate for 25 years. At the end of this period, the wind farm will either be decommissioned, taken away and the site restored or repowered with new generation turbines, for which a new planning permission would be required.
The Barrel Law Wind Farm requires planning permission from Scottish Borders Council. Independent consultant Golder Associates (UK) Ltd is undertaking an environmental impact assessment (EIA) of the proposal. EIA is the formal process through which the effects a development may have on the environment can be identified and assessed. The findings of an EIA are reported in an Environmental Statement which will also outline how the assessment process will lead to the final project design and reduce any potential negative environmental impacts.

Planning Policy

The proposed development stands to be determined against the policies contained within the Development Plan for the Scottish Borders which comprises:

- Approved Scottish Borders Consolidated Structure Plan 2001-2018;
- Adopted Scottish Borders Consolidated Local Plan 2011 and;
- Supplementary Planning Guidance.

Scottish Borders Council Wind Energy Supplementary Planning Guidance (May 2011) updates development plan policy in line with national requirements and the Barrel Law Wind Farm proposal will be assessed against criteria set out in the SPG.

Noise

Mechanical noise from modern turbines is considered to be almost undetectable. The main source of noise is from the ‘swoosh’ of air passing over the turning blades and the sound of a wind turbine from 300 metres away is likely to be at the same level as noise from a flowing stream about 50-100 metres away. This is similar to the sound level inside a typical living room with a gas fire switched on.

There is strict guidance on noise emissions from wind turbines, to ensure the protection of residential amenity. A noise assessment for the Barrel Law proposal is being undertaken including background noise monitoring at properties near to the wind farm site. Preliminary calculations indicate that predicted noise levels at the closest properties are within the range of levels determined by the guidance for the protection of outdoor amenity. Noise generated from wind farm construction activities will occur only for short periods of time.

Landscape and Visual

The ongoing landscape and visual impact assessment follows guidelines promoted by the Landscape Institute and Scottish Natural Heritage. The main objectives of the assessment are to determine the potential landscape and visual effects of the proposed development on the existing landscape resource and visual amenity of people. A cumulative landscape and visual impact assessment, taking into account existing wind farms and proposals in the planning system, is also being carried out.

The potential Zone of Theoretical Visibility (ZTV) displayed here is a computer generated image which shows areas where there may be a view of the wind farm. The ZTV shows the area of potential visibility of any part of the proposed wind farm turbines to a blade tip height of 125m. It is important to note that the ZTV does not take account of existing built development and vegetation which can significantly reduce the area and extent of actual visibility.
Environmental Impact Assessment - Continued

Ornithology
Surveys of breeding and wintering birds and flight activity at the Barrel Law site were completed from April 2010 to March 2011. A variety of common birds were recorded and surveys indicated there were no regular commuting flights through the wind farm area for any bird species. There is no evidence that Barrel Law lies on an important route for migratory birds and habitats at the site are generally not considered of high value for birds.

Surveys indicated that the Barrel Law site supports low numbers of Black Grouse, though the birds do not appear to be lekking. Potential disturbance to Black Grouse during the wind farm construction period would be mitigated if required.

For any protected species which are recorded on the site, a ‘collision risk model’ will be completed to determine whether the wind farm poses any risk to these species, though the wind farm is not expected to have adverse impacts on bird populations.

Ecology
In order to demonstrate that ecological considerations have been taken into account with respect to wildlife legislation and the commitment of Scottish Borders Council to meeting local policies and biodiversity targets, an agreed package of ecological survey work is underway. The focus of this is on establishing the nature conservation value of the upland terrain where the wind turbines are proposed. Also, it will be necessary to consider any potential effects on the local catchments, including the Ale Water, which form part of the River Tweed catchment.

Surveys completed so far include a Phase 1 Habitat Survey and more detailed vegetation classification of mire habitats found at the wind farm site. With respect to mammals, badger and bat surveys have been initiated, which so far reveal the presence, in low numbers, of badgers and bats outside the wind farm site. Surveys of water vole and otter are also underway. Fish and aquatic invertebrate surveys have shown the Ale Water and its tributaries to have an in-stream fauna typical of the area and associated with good water quality. Reptile surveys are underway, which indicate the presence of common (viviparous) lizard in small numbers, but widely distributed across the wind farm site.

Cultural Heritage
An assessment of any direct effects on features of cultural heritage interest as well as effects on the setting of off-site features is being conducted. The assessment is being carried out in accordance with the principles laid down in the Institute of Field Archaeologists (IFA) Standards and Guidance for Archaeological Desk-Based Assessments (IFA, 2001). Preliminary findings indicate that no designated features lie within the site or will be directly affected by the proposed wind farm. The nearest scheduled monuments and listed buildings lie approximately 1.75 km and 2 km from the site boundary respectively.
Environmental Impact Assessment - Continued

Geology, Hydrogeology and Hydrology

An initial review of published geological mapping indicates that the underlying geology of the proposed site is characterised by Hawick Wacke. The superficial geology is variable with lenses of alluvium and till apparent within the areas surrounding the site, providing a reasonable indication that local groundwater reserves may be present which may represent an important water source for nearby properties, and will therefore require protection to avoid an interruption in supply and/or a degradation of the quality of water available. Peat is also evident, however this appears to be a relatively small and isolated deposit to the west of the site. While existing geological mapping does not appear to indicate a presence of peat within the site itself, site surveys indicate isolated pockets of peat located on the Barrel Law ridge.

The northern and western boundaries of the site form the watershed for Bleakhill Burn. The Burn flows through the site, flowing in a south easterly direction towards Ale Water, a tributary of the River Teviot, which in tum forms part of the River Tweed system (a designated Special Area of Conservation). Gowdie Sike truncates the southern corner of the site, flowing into Ale Water approximately 2 km upstream of the Bleakhill Burn confluence. These streams support local ecosystems, and they are likely to provide a valuable source of water for nearby homes. Retaining the natural flow regime (quality and quantity) throughout the development process is therefore a key objective.

The wind farm layout has been designed to minimise the potential for any adverse effects by avoiding, where practicable, watercourse crossings and any development in close proximity to water features on site.

Telecommunications

Wind turbines, as with any large structure, can potentially interfere with electromagnetic signals. Consultations with telecommunications operators have been undertaken to determine whether telecommunications links will be affected. All fixed radio link transmitter and receiver sites, broadcast television transmitter sites and aeronautical radio facilities within a 30 km radius of the site will be included in the study, sufficient to cover all radio links, television signals and aeronautical radio facilities with the potential to be affected by the development.

Aircraft Safety and Radar

The assessment will identify all air traffic control and air defence radars and all airports and airfields within 30 km of the wind turbine site. Preliminary review of the Barrel Law site location indicates that the following aviation/defence features require review as part of the assessment:

- Ministry of Defence air traffic control radar – RAF Spadeadam;
- Ministry of Defence air defence radar – RAF Brizlee Wood;
- Ministry of Defence mobile threat emitter sites – RAF Spadeadam;
- Ministry of Defence low flying – Borders Tactical Training Area;
- Ministry of Defence Eskdalemuir seismic array; and
- NATS En Route Lowther Hill and Great Dun Fell radars.
Socio Economics

The socio-economic impacts of the proposed wind farm, in terms of its effects on economic activity, land use and amenity, are currently under examination.

VisitScotland and Scottish Borders Council will be consulted on visitor numbers to the wider area around the Barrel Law Wind Farm site, and on the most popular tourist attractions in the area. Available data on local employment related to tourism will also be sought from these sources.

The development, if consented, would represent a large investment in the area by ABO Wind UK Ltd creating the opportunity for both direct and indirect economic benefits within the local economy. For example, where possible, the developer intends to maximise the use of local labour sources and suppliers. Local businesses should also benefit from increased spend by the construction workforce during the construction period.

The proposed development will provide an appreciable positive contribution to tackling global warming, through reducing greenhouse gas emissions in line with national policy objectives. The development will contribute to the Government’s targets for reducing carbon dioxide (CO2) emissions and increasing the proportion of energy generated from renewable sources.

Traffic & Transport

The main transport impacts will be associated with the movements of heavy goods vehicles to and from the site during the construction phase of the development. In order to establish the baseline situation traffic counts on the existing local roads will be obtained.

A transport impact assessment is underway adopting the methodologies set out in the ‘Guidelines for the Environmental Assessment of Road Traffic’, Institute of Environmental Assessment (1993). Constraints to development in relation to traffic and transport could include traffic volumes, restricted road widths, vertical alignments, weight limits and height limits.

Construction

The construction of the wind farm would take around 12 months. The proposed route for deliveries of large turbine components from Edinburgh Port to the site is via the A720, A68, A698 to Hawick; then the A7, B711 and through Hyndhope/Alemoor Forest to the west and northwest of the site.

The delivery of turbine components would take place intermittently over a 4-6 week period and deliveries would be timed to minimise impacts on local traffic.

Additional HGV traffic would be generated during the construction period from the following activities:

- Movement of staff and machinery to site for site preparation works;
- Delivery of road aggregate in the event this cannot be won from the site; and
- Delivery of concrete batching material, sand, fuel and other materials.

Decommissioning

The decommissioning process will include removal of the turbines and restoration of the site to its condition prior to the construction of the wind farm.
**Construction Issues**

The proposed access route for construction traffic to the Barrel Law site is via the B711 through Roberton and Hyndhope/Alemoor Forest. The B711 is currently used by forestry lorries, local domestic traffic, farm traffic and recreational users like horse riders.

The large turbine components, namely; towers, blades and nacelles, are delivered over a 4-6 week period with abnormal load movements controlled with police escort. It is the heavy goods vehicles accessing the site over a 6 month period which causes the main increase in temporary traffic during the construction of the wind farm.

Prior to the construction phase of the wind farm, ABO Wind would establish a liaison committee to ensure that the concerns of local people are incorporated into a traffic management plan, such as avoiding market days where possible. We would also work with the forestry businesses to minimise disruptions.

**Community Benefit Fund**

Over the past decade, local communities across Scotland have benefited tremendously from financial contributions from wind farm developers. These community benefit funds have supported a wide range of different types of projects. Examples include everything from the provision of new leisure and recreational facilities and supporting existing community facilities to local energy efficiency projects, such as insulating community buildings and homes to reduce heat loss.

To ensure that the local community gains direct benefit from the Barrel Law Wind Farm, ABO Wind proposes to contribute an annual payment of £4,000 per MW of installed capacity to a community trust fund. The fund would be allocated to benefit local projects and, based on the final size of an approved project, would result in well over £2 million being invested locally during the life of the wind farm.

**Suggested Projects**

ABO Wind would certainly encourage sustainable projects for local communities such as insulating community buildings and homes to reduce heat loss and so reduce energy bills.

Several members of the local community around Barrel Law have already approached ABO Wind with project ideas for the community benefit fund. We encourage people to approach us with any suggestions which would benefit the community.

**How Would the Funds be Distributed?**

In line with standard, accepted practice, ABO Wind proposes to provide a fund to be used to create new community projects and support existing community initiatives and activities in these areas around the wind farm site.

Core to ABO Wind’s approach on community funds is extensive consultation with local community representatives to determine the best way forward to meet the needs of local communities.

Initial thoughts for consideration by local community representatives include the establishment of a community trust to manage and distribute the funds. In this scenario, local people would then be asked to nominate an advisory panel, made up of community representatives, and then groups and organisations working in the area would be able to apply for grants from the fund. The key aspect is that decisions about grants and how the money is used would be made by local community representatives.

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At our Lairg Wind farm, now under construction in the Highlands, ABO Wind staff are in regular contact with local community bodies about traffic disruptions and other concerns. Newsletters have also been issued to local residents to keep them updated about the construction process. The site construction works at Lairg are almost complete and ABO Wind has shown itself to be an open and reliable operator. We would work toward a similar relationship with the community around Barrel Law.
Frequently Asked Questions About Wind Farms

While most people support the development of renewable energy, many have voiced concerns about the development of onshore wind turbines for a number of reasons. ABO Wind believes that people should make up their own minds on wind turbines based on the body of factual evidence that has built-up since the first commercial wind farm in the UK became operational in 1991. We have identified a number of key facts about wind turbines, which we hope will assist local people in forming their own opinion about the Barrel Law Wind Farm.

FAQ: Do wind farms help tackle climate change?
Fact: Wind power is a clean, renewable source of energy which, in operation, produces no greenhouse gas emissions or waste products. Power stations are the largest contributor to carbon emissions, producing 170 million tonnes of CO₂, the key greenhouse gas each year. Current government targets support the need to switch to forms of energy that do not produce CO₂. Just one modern wind turbine can save over 4,000 tonnes of CO₂ emissions annually.

FAQ: Does building a wind farm take more energy than it ever makes?
Fact: The average wind farm will pay back the energy used in its manufacture within 3-6 months of operation. Over its lifetime a wind turbine will produce over 20-25 times more energy than was used in its manufacture.

At the end of its working life, the area containing a wind farm can be restored at low financial and environmental costs. Wind energy is a form of development which is essentially reversible -- in contrast to fossil fuel or nuclear power stations.

FAQ: Are wind farms inefficient, working only 30% of the time?
Fact: A modern wind turbine produces electricity 70-85% of the time. It generates different outputs, depending on the wind speed. Over the course of a year, it will typically generate about 30% of its theoretical maximum output. This is known as its load factor. The load factor of conventional power stations is on average 50%. A modern wind turbine will typically generate electricity equivalent to the demands of more than a thousand homes over the course of a year.

FAQ: Does wind energy need back-up to work?
Fact: All forms of power generation require back up and no energy technology can be relied upon 100%. The UK's transmission system already operates with enough back-up to manage the instantaneous loss of a large power station. Variations in the output from wind farms are barely noticeable over and above the normal fluctuation in supply and demand.

FAQ: Does installing wind farms mean that power stations will be shut down?
Fact: The simple fact is that power plants in the UK are being shut down, either through European legislation on emissions or sheer old age. We need to act now to find replacement power sources. wind is an abundant resource, indigenous to the UK and therefore has a vital role to play in the new energy portfolio.

FAQ: Is wind power expensive?
Fact: Offshore wind energy is already cost competitive with conventional large scale generation, even before any environmental costs of fossil fuel and nuclear generation are taken into account. The wind is a free and widely available fuel source and once a wind farm is in place, there are no fuel or waste related costs. Increasing fossil fuel prices mean the relative price of wind energy is likely to become cheaper.

FAQ: Should the UK invest in other renewable energy technologies and energy efficiency instead of wind power?
Fact: Wind energy's role in combating climate change is not a matter of either/or. The UK needs a mix of new and existing renewable energy technologies and energy efficiency measures, and as quickly as possible. However, wind energy is the most cost effective technology available to generate clean electricity and help combat climate change right now.

Developing a strong wind industry also helps other renewable technologies which have not reached commercialisation yet, accumulating valuable experience in dealing with issues such as grid connection, supply chain and finance.

FAQ: Why aren't wind farms all put out at sea?
Fact: We need a mix of both onshore and offshore wind energy to meet the UK's challenging targets on climate change. At present, onshore wind is more economical than development offshore. More offshore wind farms are now appearing around our coastlines but they do take longer to develop, as the sea is inherently a more hostile environment.

FAQ: Aren’t wind farms generally ugly and unpopular?
Fact: Beauty is in the eye of the beholder, and whether you think a wind turbine is attractive or not will always be your personal opinion. However, studies regularly show that most people find turbines an interesting feature of the landscape. On average, 80% of the UK public support wind energy, less than 10% are against it, with the remainder undecided.

FAQ: Do wind farms harm property prices?
Fact: There is currently no evidence of any trend in the UK showing that wind farms impact negatively on house prices. However, there is evidence that those living nearest to wind farms are their strongest advocates.

FAQ: Do wind farms cause health problems?
Fact: Wind energy is a benign technology with no associated emissions, harmful pollutants or waste products. In over 25 years and many tens of thousands of machines installed around the world, no member of the public has ever been harmed by the normal operation of wind turbines. In response to unscientific accusations that wind turbines emit infrasound and cause associated health problems, a leading expert on Noise Vibration and Acoustics said: “I can state quite categorically that there is no significant infrasound from current designs of wind turbines”

FAQ: Are wind farms noisy?
Fact: The evolution of wind farm technology over the past decade has rendered mechanical noise from turbines almost undetectable with the main sound being the aerodynamic swoosh of the blades passing the tower. There are strict guidelines on wind turbines and noise emissions to ensure the protection of residential amenity. The best advice for any doubter is to go and hear for yourself!
ABO Wind expects to submit the planning application for the wind farm in late 2011
Approval of planning application – 2012
Construction of wind farm – 2013
Wind farm operation – 2014
(the above dates represent the best case scenario)

A Big Thank You

Thank you for taking the time to attend this Public Exhibition. Your views are important to us and we hope that the information provided today will encourage you to get involved in the project as well as influence the project design. Near the entrance to the hall are some questionnaires which you might like to complete and please provide any additional comments.

For further information about the Barrel Law Wind Farm proposal please see our website
www.abo-wind.co.uk/projects
The web sites listed below are useful sources of additional general information about wind farms.
The Scottish Renewables Forum
www.scottishrenewables.com
RenewableUK
www.renewable-uk.com
The Government’s independent advisory body on sustainable development
www.sd-commission.org.uk
The Royal Society for the Protection of Birds
www.rspb.org.uk/policy/windfarms/index.asp
The Scottish Government renewable energy site
www.scotland.gov.uk/topics/business-industry/infrastructure
Site sponsored by Friends of the Earth and Greenpeace
www.yes2wind.com

Contact

For further information on ABO Wind please visit www.abo-wind.co.uk or if you are interested in our Barrel Law proposal please email barrellaw@abo-wind.com. Or contact Jenny Walsh or Matt Braund on 0800 066 5631.

Lead consultants for the EIA are Golder Associates. Contact Duncan Scott on 0131 314 5900.