

# Exploring potential locations for a medium to large scale wind turbine

**This exercise is designed to get the group looking for potential locations to site a large-scale wind turbine (250kW or more, and between 30 and 100m tall at the hub). The exercise will either show that siting a wind turbine near your community is not possible, or that there are one or more sites that are worthy of further investigation.**

## Time needed

70 to 90 minutes (not including film time)

- Stage 1, Grouping and initial explanation (10 minutes)
- Stage 2, Explaining and doing the map work (30 mins)
- Stage 3, Collating the results (10 mins)
- Stage 4, Discussion and write-up (20 to 40 mins depending on the number of sites identified and complexity of issues)

## Films that accompany this exercise

- 'Wind: an introduction' (disc 1): required
- 'Things to consider before starting a wind project' (disc 1): required
- 'A community-owned wind turbine in Hockerton' (disc 1): optional
- And finally, the following film on disc 2 may be useful to watch *after* you have done this exercise: 'Consulting with the community: a cautionary tale'

## Materials needed

- 1) A 1:25,000 (Explorer) Ordnance Survey map showing your community. If your community happens to sit at the edge of a standard OS map, you may find it more convenient to order a bespoke map from (<http://leisure.ordnancesurvey.co.uk> (click on 'Create your own map'). This costs around £17.00. You will need to make photocopies of the map if you have more than one group, but **make sure that people don't take these away** as this would be in breach of copyright (see note in introduction to this section).

**NB** You will also need to check whether there is an Area of Outstanding Natural Beauty near you – these are not marked on OS maps, so you'll need to add this to the maps with a highlighter pen. Locations of the AONBs can be found at [www.aonb.org.uk](http://www.aonb.org.uk)

2. Measuring discs made of clear plastic. You can make these yourself from any clear material, such as acetate sheets that you can buy from high-street photocopy shops, or from the sort of clear plastic folders used for carrying documents.

You need two different sized discs. The smaller disc must have a **radius** of 500m on the **scale of the map**, so if you're using a 1:25,000 scale map, this disc will be  $500 \div 25,000 = 0.02$  i.e. 2cm, or 4cm in diameter. This represents an appropriate minimum distance of a modern large turbine from a domestic dwelling (though this isn't fixed in planning terms). Put a black dot in the exact centre of the disc.

The larger disc must have a radius of 4.8km on the **scale of the map**, so if you're using a 1:25,000 scale map, this disc will be  $4800 \div 25,000 = 0.192$  i.e. 19cm, or 38cm in diameter. This represents the distance within which you are so close to an airfield that getting planning permission might be difficult. The statutory radius for air traffic consultation is 9 miles, but many applications within this distance are granted permission.

You will need one large disc and three small discs per group.

3. A laptop with access to the NOABL wind speed database. *You will need internet access to use this.* Go to [www.decc.gov.uk](http://www.decc.gov.uk) and search for 'wind speed database'. Make sure you have familiarised yourself with this before running the exercise on the day (see end of Stage 3 for instructions).
4. Printed copies of the sheet entitled 'Things to consider when choosing a location for a wind turbine' (see below). You will need to make enough copies so that there are several per group.
5. Printed copies of the OS guide to giving a grid reference, which can be found in the reference section of the folder.
6. Images 36, 37 and 41 from the image bank in the PlanLoCaL folder (or website). These are to help people visualise the scale you are talking about.

7. At least one copy of '**Common concerns about wind turbines and wind farms**' which you can find elsewhere in the PlanLoCaL pack. This is quite long, so one per group may be better than one per attendee, and you can point people to [www.planlocal.org.uk](http://www.planlocal.org.uk) if they want more.
8. A flipchart or printed sheet marked up with **Tables 1 and 2** (below), big enough for everyone to read.
9. A flipchart sheet with the heading – 'Issues for future discussions'

### Arranging the room

Each group of six (or fewer) people should have a table that they can spread out their OS map on, and enough room for all to sit or stand round it.

Stick **Table 1** and **Table 2** on the wall where everyone can see them, and cover them with another sheet of flipchart paper until you are ready to reveal them at the right stage in the exercise.

Also stick to the wall, in a place that is visible to all:

- the flipchart sheet called 'Issues for future consideration'
- images from the image bank
- your own original OS map

### People needed to run the exercise

One person can manage to run this exercise alone, but if you have more than three groups you will probably want extra help, to float between groups.

### Running the exercise

#### *Stage 1) Grouping and explaining*

Explain to everyone that you are going to work in groups to assess whether there are any likely places for siting a *medium to large-scale* wind turbine in your community. Now show them images 36, 37 and 41 so they are clear about what size turbine this exercise is referring to:

- **Image 36** These medium-size (300kW) turbines are about 30m (90ft) at hub height and are at the smaller end of the scale you are talking about in this exercise,
- **Image 37** These large 2.3MW turbines are about 90m (300ft) at the hub: the biggest sort of turbine you are talking about in this exercise.
- **Image 41** These small 6kW turbines are not what you are talking about during this exercise.

Make it clear that the aim of the exercise is to identify possible sites for a *single* medium or large turbine (it will get too complicated if you start planning a whole wind farm at this stage).

Explain that the outcome is to generate a series of possible sites along with 'next steps' ideas, and that if people are interested in looking more into costs, income etc, that there is a separate exercise to cover that (which you may want to run later in this session, or in a future session specifically looking at finance).

Split the audience into groups of four to six.

Ask each group to gather around one of the tables. Give each group enough of the sheets entitled 'Things to consider when choosing a location for a wind turbine' and ask them to read it.

Setting up the groups and explaining this, then allowing them to read the guidance sheet should take not more than 10 minutes.

#### *Stage 2: Further explanation and explaining the map work*

Ensure that the groups have all had a chance to read the sheet then give each group their plastic discs, a map and some blu-tac.

Ask everyone to unfold their maps completely, so that the key of symbols is also visible. Then show where your community is by referring to your map which is stuck on the wall.

Then tell them that they are to try to find up to three potential sites for single wind turbines, which they will mark by sticking their small plastic disc to their map with blu-tac. In order to identify a site, they will need to take into account what is on the sheet they have just read, and then tell them to do the following (reminders of these points are in Table 1):

- Using the contour lines on the map, try to find a site that is reasonably elevated compared to the surrounding land. Take note of built up areas and areas of woodland, especially in the direction of the prevailing wind from the SW. Remember, you are trying to identify locations of 'clean wind'.
- Again using contour lines and looking at obstacles such as woodland, estimate where the turbine might be visible from. Might towns or villages that aren't part of your community be impacted visually? What

about sites of historic interest, such as estates and parkland, or Areas of Outstanding Natural Beauty?

- Use the small discs of clear plastic to ensure that locations are the requisite distance from homes and bridleways (400m and 200m respectively). What about electricity transmission lines and pylons?
- The large discs have a 3-mile radius. Use these to think about whether you would need to consult with airfield and communications operators.
- Grid connection. The electricity distribution network is shown on maps, but not substations. The lines are easy to confuse with some footpath symbols, so check the key carefully.

For each position they should give the turbine location a name (e.g. field to the north of junction between A4361 and M4), and work out the **six-figure numerical grid reference** for that position, using the OS guidance sheet. The reference for the site identified in the photograph below is **175771**.

'Unveil' Table 1, which should act as a reminder and prompt about these points, and then leave them to it. Explaining this should take 5 minutes. Then allow them 25 minutes to do the exercise.

#### *Stage 3: Transfer of data*

Unveil table 2 and then ask a pair of representatives from each group to come up to where your map is on the wall, and to transfer their small plastic disks onto the same location on the main map, filling in on the table the name of the location, and the grid reference (columns 1 & 2).

Stage 3 should take not more than 10 minutes, but could be very quick if you only have a couple of groups.

#### *Stage 4) Discussion and filling in the columns in Table 2*

#### **Column 1 (Location) and Column 2 (Grid reference)**

These will have already been filled in.

#### **Column 3: Landowner**

Discuss quickly whether anyone knows who owns the land for each of the locations. If that landowner happens to be in the room, don't put pressure on them to say, there and then, that they are interested in hosting a turbine. Rather, ask if they would be willing to discuss in more detail at a future date. If the landowners aren't known, ask for volunteers to find out who they might be and to help with contacting any landowners for further

discussion when the time comes. Put this in the 'next steps' column.

#### **Column 4: Access**

Think about and discuss the remoteness of the sites you have identified, and call on local knowledge. Are the sites only accessible by narrow, twisty or steep roads? If the turbines are in the middle of a field, is it one prone to waterlogging or very steep? Does anyone know the current land use etc? Large turbine components are transported on very large and very heavy articulated lorries. Poor access may not be the end of your project, but you need to think about the costs of road building or improvement, including loss of productivity to the farmer.

#### **Column 5: Nearest neighbours**

Are there houses, farms, residential homes or hospitals that are identifiable from the map? Who lives there, and do you know anything about their views on wind farms? Is there a school particularly close, and what opportunities does that provide for education and promotion? Think about set-back distances – 400m is a minimum really. Is the land around the proposed site a steep-sided valley? This can cause reverberation of noise meaning that the nearest neighbours could be too close. All of this will be modelled during any full planning process, but it's worth just thinking about the concerns that might be raised.

#### **Column 6: Wider stakeholders**

Start by listing all the people, places and organisations that you think could see the turbine – you've already discussed the nearest neighbours, now we are talking about historic estates and parkland (and who owns or manages it?), areas of landscape interest (and the managers and users, e.g. rambling groups). What about other communities or villages – would they be able to see it? Are there already other things of similar scale like telecoms masts within that view?

What about the 'statutory' stakeholders? Did you identify telecoms, TV, airfields etc? Where are the parish boundaries, and which parish councils should you therefore engage with? What about the local authority itself, or other planning authorities – are you on the border between two, or near a National Park or AONB?

What you may also find here is that, in their attempts to find a good site and avoid constraints such as airfields, your groups have identified sites that are nearer to other communities than your own; so who now is the community for this project? Do you discard such sites, or do you think about expanding the work you are doing to incorporate other communities?

### Column 7 and column 8: NOABL wind speeds

This is the last bit to fill in, and now you will need internet access and the NOABL wind speed database.

The NOABL database needs grid references, but in a slightly different form from the six-number references you have entered in column 2 of Table 2. This time you need the OS Sheet name (this is the two big letters in blue outlines), followed by the first two digits from your eastings and your northings. If there is more than one Sheet name, pick the nearest.

So, for the site identified in the photograph below, the sheet code is SU, the easting is 175 and the northing is 771. So the grid reference that the NOABL database needs for this proposed turbine location is **SU1777**.



Northing = 771

OS sheet code  
(in this case 'SU')

Easting = 175

If you enter this reference, NOABL returns three tables, of which examples of the first and second are shown here (the third table shows wind speeds at just 10m above ground level, so we'll ignore it).

The top table is for wind speeds at 45m above ground level, and shows that for this site it is on average 6.4m/s. Enter this wind speed estimate in Column 7 in your table. The middle table is for 25m above ground level, which you enter into column 8.

Wind speed at 45m agl (in m/s)		
6.4	6.4	6.5
6.4	6.4	6.4
6.6	6.3	5.9

Wind speed at 25m agl (in m/s)		
5.9	5.9	5.9
5.8	5.8	5.8
6.1	5.7	5.3

Note that NOABL is based on data collected between the 1970s and 1990s and is for a whole square km. You definitely need further detailed assessment, but it should at least show you where there are grounds for further investigation.

### Column 9: Next steps

Ask for agreement to delete any sites that NOABL returns very low wind speeds for. For the remaining sites, you are to ask what people think should be done next – e.g. need to contact the farmer who owns that land, need to go and check visibility from the National Trust stately home nearby etc. Ask for volunteers to help with this.

This whole discussion period should leave you with a big list of issues to consider, and the constraints for some sites will seem more onerous than for others. You may already be narrowing down the options.

Allow 20-40 minutes for this discussion stage, which will depend on how many sites you have.

### Concluding the exercise

It's likely that the issue of cost will arise early on, so you can make it clear that you have information on funding, and the financial support from the feed-in tariff, which you will be addressing either later in this event, or in a future event. This could include using the exercise on 'Identifying realistic sources of finance'. Record all the comments from this discussion as bullet points in Table 2, so make sure you have drawn the table as large as possible – you can ask a member of the audience to be the recorder if you are running this event alone. You should write up the flipcharts as soon as possible after the event, and post them on your website if you are using them, or send them to the email list of people attending the event

You should also ensure that you take a photograph (or series of photographs) that clearly show all the discs on the map with enough detail to see their surrounding features. You might want to post these on your website, send in email summary or use at other meetings to bring others up to speed.

**Table 1** for write-up onto flipchart paper (or print large on A3/A2 paper)

Feature	Why?
Contour lines	Need reasonably elevated site, 'clean' wind
Woodland, tree lines, hedge lines	'Clean' wind, probably prevailing from SW Away from bat navigation routes
Neighbouring communities	Who can see it? Who will it have an impact on?
Historic estates? Landscape designations?	Is it visible from, or within, a designated landscape area or historic estate?
Dwellings	Aim for 500m absolute minimum separation
Bridlepaths	200m minimum separation is required
Pylons	Falling distances from turbine to overhead lines
Airfields	9 mile statutory consultation distance. Within 3 miles could be tricky, especially if directly on flight path.
Communications towers, TV antennae	Need to consult with management,
Grid connection	Use local knowledge and map symbols to identify where power lines and substations are.

**Table 2** to write up onto flipchart paper, landscape orientation

1	2	3	4	5	6	7	8	9
Location	Grid reference **	Landowner?	Access?	Nearest neighbours? Are they here?	Wider stakeholders?	NOABL wind speed for that grid square at 45m above ground	NOABL wind speed for that grid square at 25m above ground	Next steps

## Handout Things to consider when choosing a site for a wind turbine

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- 1) What is the approximate average annual wind speed at your prospective site? You can find this out online using the NOABL wind speed database at [www.bwea.com](http://www.bwea.com). This is a rough guide only, but if it shows 6 metres per second or more, at 45m above ground level, then it's worth investigating further.
- 2) Is the site clear of trees or buildings? Remember you want 'clean' wind as far as possible but some woodland or other feature is probably OK if you are looking at a turbine that will be significantly taller than any obstacles.
- 3) Is it in a national park or Area of Outstanding Natural Beauty? This won't absolutely prevent you erecting a turbine, but it will make obtaining planning permission less likely.
- 4) Are there any domestic dwellings within 400m of the proposed site? If so, your wind project is probably not feasible because of planning restrictions that relate to noise and other impacts.
- 5) Are there any bridleways within 200m? Turbines cannot be closer than this.
- 6) Are there any overhead power cables within falling distance of the turbine. Falling distance is deemed to be the height of the turbine's hub, plus the length of the rotor plus another 30m for the sake of safety.
- 7) Are there any airfields, TV transmitters, or air traffic control towers within 3 miles? Again, not necessarily a deal-breaker, but you need to be aware of them and possibly take them into account in the design of the site. You will also need to consult with the people who own or manage these facilities.
- 8) Where is the nearest place you could connect into the National Grid? You obviously need to do this to export the electricity you generate. If the nearest sub-station is several miles away, the costs of transmission could be too high for all but the larger schemes. You need to negotiate as early as possible with the grid operator about this.
- 9) How easy is the site to access with large machinery? Articulated lorries will need to get up there with the turbine components. Will a new road access need building?
- 10) Finally, who owns the land?