



Department for
Communities and
Local Government

Planning practice guidance for renewable and low carbon energy

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Planning practice guidance for renewable and low carbon energy

Introduction

1. This guidance provides advice on the planning issues associated with the development of renewable energy. It will be kept under review and should be read alongside other planning practice guidance and the National Planning Policy Framework. This guidance is being published in advance of the Department for Communities and Local Government's beta planning practice guidance web-based resource, and will be integrated into this web-based resource later in the year.
2. Government planning practice guidance can be a material consideration in planning decisions and should generally be followed unless there are clear reasons not to. 'Planning for Renewable Energy: A Companion Guide to PPS22' is cancelled.

Why is planning for renewable and low carbon energy important?

3. Increasing the amount of energy from renewable and low carbon technologies will help to make sure the UK has a secure energy supply, reduce greenhouse gas emissions to slow down climate change and stimulate investment in new jobs and businesses. Planning has an important role in the delivery of new renewable and low carbon energy infrastructure in locations where the local environmental impact is acceptable.

Are all energy developments handled by the local planning authority?

4. Local planning authorities are responsible for renewable and low carbon energy development of 50 megawatts or less installed capacity (under the Town and Country Planning Act 1990). Renewable and low carbon development over 50 megawatts capacity will be considered by the Secretary of State for Energy¹, under the Planning Act 2008, and the local planning authority will be a statutory consultee. Microgeneration is often permitted development and may not require an application for planning permission².

¹ <https://www.gov.uk/government/policies/providing-regulation-and-licensing-of-energy-industries-and-infrastructure/supporting-pages/planning-and-consents-for-national-energy-infrastructure>

² <https://www.planningportal.gov.uk/permission/house>

How can local planning authorities develop a positive strategy to promote the delivery of renewable and low carbon energy?

5. The National Planning Policy Framework explains that all communities have a responsibility to help increase the use and supply of green energy, but this does not mean that the need for renewable energy automatically overrides environmental protections and the planning concerns of local communities. As with other types of development, it is important that the planning concerns of local communities are properly heard in matters that directly affect them.
6. Local and neighbourhood plans are the key to delivering development that has the backing of local communities. When drawing up a Local Plan local planning authorities should first consider what the local potential is for renewable and low carbon energy generation. In considering that potential, the matters local planning authorities should think about include:
 - the range of technologies that could be accommodated and the policies needed to encourage their development in the right places
 - the costs of many renewable energy technologies are falling, potentially increasing their attractiveness and the number of proposals
 - different technologies have different impacts and the impacts can vary by place
 - the UK has legal commitments to cut greenhouse gases and meet increased energy demand from renewable sources. Whilst local authorities should design their policies to maximise renewable and low carbon energy development, there is no quota which the Local Plan has to deliver
7. There is information in the rest of the guidance on how to identify suitable areas, criteria-based policies and buffer zones/separation distances.

How can local planning authorities identify suitable areas for renewable and low carbon energy?

8. There are no hard and fast rules about how suitable areas for renewable energy should be identified, but in considering locations, local planning authorities will need to ensure they take into account the requirements of the technology (see paragraphs 12-13) and, critically, the potential impacts on the local environment, including from cumulative impacts (see paragraphs 43-44). The views of local communities likely to be affected should be listened to.
9. There is a methodology available from the Department of Energy and Climate Change's website on assessing the capacity for renewable energy development which can be used and there may be existing local assessments. However, the impact of some types of technologies may have changed since assessments were drawn up (e.g. the size of wind turbines has been increasing). In considering impacts, assessments can use tools to identify where impacts are likely to be acceptable. For

example, landscape character areas could form the basis for considering which technologies at which scale may be appropriate in different types of location. Landscape Character Assessment is a process used to explain the type and characteristics of landscape in an area. Natural England has used Landscape Character Assessment to identify 159 National Character Areas in England which provide a national level database. Landscape Character Assessment carried out at a county or district level may provide a more appropriate scale for assessing the likely landscape and visual impacts of individual proposals. Some renewable energy schemes may have visual impacts on the marine and coastal environment and it may be appropriate to also to assess potential impacts on seascape character.

10. Identifying areas suitable for renewable energy in plans gives greater certainty as to where such development will be permitted. For example, where councils have identified suitable areas for onshore wind or large scale solar farms, they should not have to give permission outside those areas for speculative applications involving the same type of development when they judge the impact to be unacceptable.
11. When identifying suitable areas it is also important to be clear on the factors that will be taken into account when considering individual proposals in these areas. These factors may be dependent on the investigatory work underpinning the identified area. The expectation should always be that an application should only be approved if the impact is (or can be made) acceptable³.

What technical considerations relating to renewable energy technologies affect their siting?

12. Examples of the considerations for particular renewable energy technologies that can affect their siting include proximity of grid connection infrastructure and site size, and:
 - for biomass, appropriate transport links
 - for hydro-electric power, sources of water,
 - for wind turbines, predicted wind resource, considerations relating to air safeguarding, electromagnetic interference and access for large vehicles
13. Discussions with industry experts can help to identify the siting requirements and likely impacts of technologies. The National Policy Statements⁴ on the Department of Energy and Climate Change's website give generic and technology specific advice relevant to siting particular technologies. The Environment Agency has published advice showing which areas may be suitable for open loop ground source heat pumps⁵, as well as advice on the technologies it regulates.

³ See National Planning Policy Framework paragraph 98:

<https://www.gov.uk/government/publications/national-planning-policy-framework--2>

⁴ <https://www.gov.uk/consents-and-planning-applications-for-national-energy-infrastructure-projects>

⁵ <http://www.environment-agency.gov.uk/business/topics/128133.aspx>

Do criteria based policies have a role in planning for renewable energy?

14. Policies based on clear criteria can be useful when they are expressed positively (i.e. that proposals will be accepted where the impact is or can be made acceptable). In thinking about criteria the National Policy Statements⁶ published by the Department of Energy and Climate Change provide a useful starting point. These set out the impacts particular technologies can give rise to and how these should be addressed.
15. In shaping local criteria for inclusion in Local Plans and considering planning applications in the meantime, it is important to be clear that:
 - the need for renewable or low carbon energy does not automatically override environmental protections
 - cumulative impacts require particular attention, especially the increasing impact that wind turbines and large scale solar farms can have on landscape and local amenity as the number of turbines and solar arrays in an area increases
 - local topography is an important factor in assessing whether wind turbines and large scale solar farms could have a damaging effect on landscape and recognise that the impact can be as great in predominately flat landscapes as in hilly or mountainous areas
 - great care should be taken to ensure heritage assets are conserved in a manner appropriate to their significance, including the impact of proposals on views important to their setting
 - proposals in National Parks and Areas of Outstanding Natural Beauty, and in areas close to them where there could be an adverse impact on the protected area, will need careful consideration
 - protecting local amenity is an important consideration which should be given proper weight in planning decisions

Are buffer zones/separation distances appropriate between renewable energy development and other land uses?

16. Local planning authorities should not rule out otherwise acceptable renewable energy developments through inflexible rules on buffer zones or separation distances. Other than when dealing with set back distances for safety, distance of itself does not necessarily determine whether the impact of a proposal is unacceptable. Distance plays a part, but so does the local context including factors such as topography, the local environment and near-by land uses. This is why it is important to think about in what circumstances proposals are likely to be acceptable and plan on this basis.

What is the role for community led renewable energy initiatives?

17. Community initiatives are likely to play an increasingly important role and should be encouraged as a way of providing positive local benefit from renewable energy

⁶ <https://www.gov.uk/consents-and-planning-applications-for-national-energy-infrastructure-projects>

development. Further information for communities interested in developing their own initiatives is provided by the Department of Energy and Climate Change. Local planning authorities may wish to establish policies which give positive weight to renewable and low carbon energy initiatives which have clear evidence of local community involvement and leadership.

18. Neighbourhood plans are an opportunity for communities to plan for community led renewable energy developments. Neighbourhood Development Orders and Community Right to Build Orders can be used to grant planning permission for renewable energy development. To support community based initiatives a local planning authority should set out clearly any strategic policies that those producing neighbourhood plans or Orders will need to consider when developing proposals that address renewable energy development. Local planning authorities should also share relevant evidence that may assist those producing a neighbourhood plan or Order, as part of their duty to advise or assist. As part of a neighbourhood plan, communities can also look at developing a community energy plan to underpin the neighbourhood plan.

How can decentralised energy⁷ opportunities be identified?

19. There is an important contribution to be made by planning that is independent of the contribution from other regimes such as building regulations. For example, getting the right land uses in the right place can underpin the success of a district heating scheme. Similarly, planning can influence opportunities for recovering and using waste heat from industrial installations.
20. Planning can provide opportunities for, and encourage energy development which will produce waste heat, to be located close to existing or potential users of the heat. Planning can also help provide the new customers for the heat by encouraging development which could make use of the heat.
21. Information on local heat demand is published by the Department of Energy and Climate Change to assist planners and developers in identifying locations with opportunities for heat supply.⁸ This information will be supplemented in future by further work, including detailed mapping, on the potential for combined heat and power and district heating and cooling.

⁷ See National Planning Policy Framework glossary: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

⁸ See <http://tools.decc.gov.uk/nationalheatmap/> and <http://chp.decc.gov.uk/developmentmap/>

What are the planning considerations that relate to specific renewable energy technologies?

22. Renewable energy developments should be acceptable for their proposed location. In addition to the factors that should be considered regarding the acceptability of a location for any form of renewable energy development (see paragraph 15) there are particular considerations for the following technologies: hydropower (see paragraphs 23), active solar technology (photovoltaics and solar water heating) (see paragraph 24-25), solar farms (see paragraphs 26-28) and wind turbines (see paragraphs 29-45). Also, local planning authorities may wish to consider how planning conditions or planning obligations can mitigate the impacts described.

What are the particular planning considerations that relate to hydropower?

23. Planning applications for hydropower should normally be accompanied by a Flood Risk Assessment. Early engagement with the local planning authority and the Environment Agency will help to identify the potential planning issues, which are likely to be highly specific to the location. Advice on environmental protection for new hydropower schemes has been published by the Environment Agency⁹.

What are the particular planning considerations that relate to active solar technology (photovoltaic and solar water heating)?

24. Active solar technology, (photovoltaic and solar water heating) on or related to a particular building is often permitted development¹⁰ (which does not require a planning application) provided the installation is not of an unusual design, or does not involve a listed building, and is not in a designated area.

25. Where a planning application is required, factors to bear in mind include:

- the importance of siting systems in situations where they can collect the most energy from the sun
- need for sufficient area of solar modules to produce the required energy output from the system
- the effect on a protected area such as an Area of Outstanding Natural Beauty or other designated areas
- the colour and appearance of the modules, particularly if not a standard design

What are the particular planning considerations that relate to large scale ground-mounted solar photovoltaic farms?

⁹ <http://www.environment-agency.gov.uk/business/topics/water/32022.aspx>

¹⁰ <https://www.planningportal.gov.uk/permission/house>

26. The deployment of large-scale solar farms can have a negative impact on the rural environment, particularly in very undulating landscapes. However, the visual impact of a well-planned and well-screened solar farm can be properly addressed within the landscape if planned sensitively.

27. Particular factors a local planning authority will need to consider include:

- encouraging the effective use of previously developed land, and if a proposal does involve greenfield land, that it allows for continued agricultural use¹¹ and/or encourages biodiversity improvements around arrays¹²
- that solar farms are normally temporary structures and planning conditions can be used to ensure that the installations are removed when no longer in use and the land is restored to its previous use
- the effect on landscape of glint and glare (see guidance on landscape assessment at paragraphs 39-40) and on neighbouring uses and aircraft safety
- the extent to which there may be additional impacts if solar arrays follow the daily movement of the sun
- the need for, and impact of, security measures such as lights and fencing
- great care should be taken to ensure heritage assets are conserved in a manner appropriate to their significance, including the impact of proposals on views important to their setting. As the significance of a heritage asset derives not only from its physical presence, but also from its setting, careful consideration should be given to the impact of large scale solar farms on such assets. Depending on their scale, design and prominence, a large scale solar farm within the setting of a heritage asset may cause substantial harm to the significance of the asset
- the potential to mitigate landscape and visual impacts through, for example, screening with native hedges
- the energy generating potential, which can vary for a number of reasons including, latitude and aspect

28. The approach to assessing cumulative landscape and visual impact of large scale solar farms is likely to be the same as assessing the impact of wind turbines (see paragraphs 41-44). However, in the case of ground-mounted solar panels it should be noted that with effective screening and appropriate land topography the area of a zone of visual influence could be zero.

What are the particular planning considerations that relate to wind turbines?

29. The following questions should be considered when determining applications for wind turbines:

¹¹ See National Planning Policy Framework paragraph 112:

<https://www.gov.uk/government/publications/national-planning-policy-framework--2>

¹² See also <https://www.gov.uk/government/speeches/gregory-barker-speech-to-the-large-scale-solar-conference>

How are noise impacts of wind turbines assessed?

30. The report, 'The assessment and rating of noise from wind farms' (ETSU-R-97)¹³ should be used by local planning authorities when assessing and rating noise from wind energy developments. Good practice guidance on noise assessments of wind farms has been prepared by the Institute Of Acoustics. The Department of Energy and Climate Change accept that it represents current industry good practice and endorses it as a supplement to ETSU-R-97. It is available on the Department of Energy and Climate Change's website.¹⁴

Is safety an issue when wind turbine applications are assessed?

31. Safety may be an issue in certain circumstances, but risks can often be mitigated through appropriate siting and consultation with affected bodies:

- *Buildings* - Fall over distance (i.e. the height of the turbine to the tip of the blade) plus 10% is often used as a safe separation distance. This is often less than the minimum desirable distance between wind turbines and occupied buildings calculated on the basis of expected noise levels and due to visual impact
- *Power lines* - National Grid, and/or the relevant Distribution Network Operators will be able to advise on the required standards for wind turbines being separated from existing overhead power lines
- *Air traffic and safety* - Wind turbines may have an adverse affect on air traffic movement and safety. Firstly, they may represent a risk of collision with low flying aircraft, and secondly, they may interfere with the proper operation of radar by limiting the capacity to handle air traffic, and aircraft instrument landing systems. There is a 15 kilometre (km) consultation zone and 30km or 32km advisory zone around every civilian air traffic radar, although objections can be raised to developments that lie beyond the 32km advisory zone. There is a c.15km statutory safeguarding consultation zone around Ministry of Defence aerodromes within which wind turbine proposals would be assessed for physical obstruction. See the Town and Country Planning (safeguarded aerodromes, technical sites and military explosives storage areas) direction 2002. Further advice on wind energy and aviation can be found on the Civil Aviation Authority¹⁵ and National Air Control Transport Services websites¹⁶
- *Defence* - Wind turbines can adversely affect a number of Ministry Of Defence operations including radars, seismological recording equipment, communications facilities, naval operations and low flying. Developers and local planning authorities

¹³ https://whitehall-admin.production.alpha.gov.co.uk/government/uploads/system/uploads/attachment_data/file/49869/ETSU_Full_copy_Searchable.pdf

¹⁴ <https://www.gov.uk/government/policies/increasing-the-use-of-low-carbon-technologies/supporting-pages/onshore-wind>

¹⁵ <http://www.caa.co.uk/>

¹⁶ <http://www.nats.co.uk/>

should consult with the Ministry of Defence¹⁷ if a proposed turbine is 11 metres (m) to blade tip or taller, and/or has a rotor diameter of 2m or more

- *Radar* - In addition to air traffic radar, wind turbines may affect other radar installations such as weather radar operated by the Meteorological Office
- *Strategic Road Network* - The Highways Agency / Department for Transport¹⁸ have produced advice for siting wind turbines safely in relation to the strategic road network.

Is interference with electromagnetic transmissions an issue for wind turbine applications?

32. Wind turbines can potentially affect electromagnetic transmissions (e.g. radio, television and phone signals). Specialist organisations responsible for the operation of electromagnetic links typically require 100m clearance either side of a line of sight link from the swept area of turbine blades. OFCOM acts as a central point of contact for identifying specific consultees relevant to a site.

How can the risk of wind turbines be assessed for ecology?

33. Evidence suggests that there is a risk of collision between moving turbine blades and birds and/or bats. Other risks including disturbance and displacement of birds and bats and the drop in air pressure close to the blades which can cause barotrauma (lung expansion) in bats, which can be fatal. Whilst these are generally a relatively low risk, in some situations, such as in close proximity to important habitats used by birds or bats, the risk is greater and the impacts on birds and bats should therefore be assessed. Advice on assessing risks is available from Natural England's website.¹⁹

How should heritage be taken into account in assessing wind turbine applications?

34. As the significance of a heritage asset derives not only from its physical presence, but also from its setting, careful consideration should be given to the impact of wind turbines on such assets. Depending on their scale, design and prominence a wind turbine within the setting of a heritage asset may cause substantial harm to the significance of the asset.

Is shadow flicker and reflected light an issue for wind turbine applications?

35. Under certain combinations of geographical position and time of day, the sun may pass behind the rotors of a wind turbine and cast a shadow over neighbouring properties. When the blades rotate, the shadow flicks on and off; the impact is known as 'shadow flicker'. Only properties within 130 degrees either side of north, relative to the turbines can be affected at these latitudes in the UK – turbines do not cast long shadows on their southern side.

¹⁷ <https://www.gov.uk/mod-safeguarding>

¹⁸ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/73173/strategic-road-network-policy.pdf

¹⁹ <http://www.naturalengland.org.uk/ourwork/planningdevelopment/spatialplanning/default.aspx>

36. Modern wind turbines can be controlled so as to avoid shadow flicker when it has the potential to occur. Individual turbines can be controlled to avoid shadow flicker at a specific property or group of properties on sunny days, for specific times of the day and on specific days of the year. Where the possibility of shadow flicker exists, mitigation can be secured through the use of conditions.
37. Although problems caused by shadow flicker are rare, where proposals for wind turbines could give rise to shadow flicker, applicants should provide an analysis which quantifies the impact. Turbines can also cause flashes of reflected light, which can be visible for some distance. It is possible to ameliorate the flashing but it is not possible to eliminate it.

How to assess the likely energy output of a wind turbine?

38. As with any form of energy generation this can vary and for a number of reasons. With wind turbines the mean wind speed at hub height (along with the statistical distribution of predicted wind speeds about this mean and the wind turbines used) will determine the energy captured at a site. The simplest way of expressing the energy capture at a site is by use of the 'capacity factor'. This though will vary with location and even by turbine in an individual wind farm. This can be useful information in considering the energy contribution to be made by a proposal, particularly when a decision is finely balanced.

How should cumulative landscape and visual impacts from wind turbines be assessed?

39. Cumulative landscape impacts and cumulative visual impacts are best considered separately. The cumulative landscape impacts are the effects of a proposed development on the fabric, character and quality of the landscape; it is concerned with the degree to which a proposed renewable energy development will become a significant or defining characteristic of the landscape.
40. Cumulative visual impacts concern the degree to which proposed renewable energy development will become a feature in particular views (or sequences of views), and the impact this has upon the people experiencing those views. Cumulative visual impacts may arise where two or more of the same type of renewable energy development will be visible from the same point, or will be visible shortly after each other along the same journey. Hence, it should not be assumed that, just because no other sites will be visible from the proposed development site, the proposal will not create any cumulative impacts.

What information is needed to assess cumulative landscape and visual impacts of wind turbines?

41. In assessing the impact on visual amenity, factors to consider include: establishing the area in which a proposed development may be visible, identifying key viewpoints, the people who experience the views and the nature of the views.
42. In identifying impacts on landscape, considerations include: direct and indirect effects, cumulative impacts and temporary and permanent impacts. When assessing the significance of impacts a number of criteria should be considered including the sensitivity of the landscape and visual resource and the magnitude or size of the predicted change. Some landscapes may be more sensitive to certain types of change

than others and it should not be assumed that a landscape character area deemed sensitive to one type of change cannot accommodate another type of change.

43. The English Heritage website provides information on undertaking historic landscape characterisation and how this relates to landscape character assessment.

44. Figure 1 sets out the type of information that can usefully inform assessments.

Figure 1 – Information to inform landscape and visual impact assessments

- a base plan of all existing windfarms, consented developments and applications received, showing all schemes within a defined radius of the centre of the proposal under consideration
- for those existing or proposed windfarms within a defined radius of the proposal under consideration, a plan showing cumulative 'zones of visual influence'. (A zone of visual influence is the area from which a development or other structure is theoretically visible). The aim of the plan should be to clearly identify the zone of visual influence of each windfarm, and those areas from where one or more windfarms are likely to be seen
- the base plan and plan of cumulative zones of visual influence will need to reflect local circumstances, for example, the areas covered should take into account the extent to which factors such as the topography and the likely visibility of proposals in prevailing meteorological conditions may vary
- maps of cumulative zones of visual influence are used to identify appropriate locations for visual impact studies. These include locations for simultaneous visibility assessments (i.e. where two or more schemes are visible from a fixed viewpoint without the need for an observer to turn their head, and repetitive visibility assessments (i.e. where the observer is able to see two or more schemes but only if they turn around)
- sequential effects on visibility occur when an observer moves through a landscape and sees two or more schemes. Common routes through a landscape (e.g. major roads; long distance paths or cycle routes) can be identified as 'journey scenarios' and the proposals impact on them can be assessed
- photomontages showing all existing and consented turbines, and those for which planning applications have been submitted, in addition to the proposal under consideration. The viewpoints used could be those identified using the maps of cumulative zones of visual influence. The photomontages could be annotated to include the dimensions of the existing turbines, the distance from the viewpoint to the different schemes, the arc of view and the format and focal length of the camera used
- at the most detailed level, description and assessment of cumulative impacts may include the following landscape issues: scale of development in relation to landscape character or designations, sense of distance, existing focal points in the landscape, skylining (where additional development along a skyline appears disproportionately dominant) and sense of remoteness or wildness

Decommissioning wind turbines

45. Local planning authorities should consider using planning conditions to ensure that redundant turbines are removed when no longer in use and land is restored to an appropriate use.