Department of the Environment PPG22
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PLANNING POLICY GUIDANCE NOTE:

RENEWABLE ENERGY

Planning Policy Guidance notes set out the Government's policies on different aspects of planning. They are to be taken into account by local authorities as they prepare their development plans, and they may be material to decisions on individual planning applications and appeals.

This PPG describes the various renewable forms of energy; explains renewable energy's potential role in tackling greenhouse gas emissions; sets out the relevant instruments of policy, including the Non-Fossil Fuel Obligation; outlines relevant environmental protection legislation; gives a statement of general planning aims; explains how local planning authorities should include renewable energy policies in their plans, and advises them to consider what contribution their area might make; notes the considerations which should apply when it is intended to locate renewable energy installations in designated areas; explains when environmental assessment is required; sets out the environmental implications of renewable energy; and refers to planning conditions, temporary permissions and other consents/permissions.

The Annex on Wind Energy has two main sections: *the technology*, encompassing wind turbine characteristics; wind farms; grid connection; siting; and degree of disturbance; and *planning implications*, covering safeguarding; precedent; standards; safety; icing; proximity to power lines, airports and roads and railways; shadow flicker; noise; electromagnetic interference; siting and the landscape; ecology; archaeology and listed buildings; construction disturbance; and conditions.

INTRODUCTION

1. Renewable energy is the term used to cover those energy flows that occur naturally and repeatedly in the environment - energy from the sun, the wind and the oceans, and the fall of water. The heat from within the earth itself, geothermal energy, is usually regarded as renewable, although locally it cannot always sustain continuous extraction. Plant material is an important source of renewable energy. Combustible or digestible industrial, agricultural and domestic waste materials are also regarded as renewable sources of energy.

2. In industrialised countries there has been a tendency for energy to be supplied from increasingly large and centralised fossil-fuel and nuclear generating sources via transmission and distribution systems to homes, offices, industrial and other premises. Planning procedures have evolved to deal with these centralised systems: in the case of electricity generating stations and overhead lines in England and Wales they are explained in DOE Circular 14/90 (Welsh Office 20/90, Department of Energy 1/90).

3. Renewable energy sources offer the hope of increasing diversity and security of supply, and of reducing harmful emissions to the environment. Technologies involving the conversion of waste to energy may help alleviate the problems associated with waste treatment and disposal. Some renewable energy sources, such as hydro-power, have already been commercially exploited while others, such as wind, are on the verge of wide-spread commercial application. A better understanding of the technologies involved and of the planning policies and procedures which apply is needed if their introduction is to proceed smoothly in the coming decades. Accordingly, this guidance note sets out the Government's planning policy advice about developing renewable energy sources, against the background of the Government's policies for the environment and for exploiting such sources.

4. Renewable energy systems differ from fossil-fuel and nuclear energy systems in their relationship to land-use and the environment. Renewable energy sources tend to be of lower energy output for an equivalent area of land used, when compared with conventional sources, and capital plant requirements may be more expensive. A variety of factors peculiar to the technology involved have to be taken into account in assessing planning applications for renewable energy systems. The main characteristics of renewable energy systems likely to be deployed on a significant scale in the United Kingdom in the near future are outlined in the Annexes dealing with the individual technologies. (There will initially be only one, covering wind, but subsequently others, on other types.) These Annexes also describe the main environmental impacts which should normally be considered, and any relevant control standards embodied in UK/EC legislation, certification standards or general environmental objectives.

Greenhouse Gas Emissions

5. A main advantage of using renewable energy is its contribution to limiting emissions of greenhouse gases (the gases which cause global warming). The main greenhouse gas is carbon dioxide (CO_2), produced principally from the burning of fossil fuels. At present power generation accounts for around one third of CO_2 emissions. Some renewable energy sources (eg solar, wind and tidal power) produce no CO_2 or other gaseous emissions at all. Others, such as combustion of naturally arising waste materials or energy crops (eg fuel from coppiced woodland), emit CO_2 but, since the CO_2 has recently been extracted from the atmosphere, there is no net addition to atmospheric concentrations of greenhouse gases - the carbon dioxide is simply recycled.

6. The second most important man-made greenhouse gas is methane, a more powerful greenhouse gas than CO_2. One of the principal sources of emissions is anaerobic digestion of waste in landfill sites. The combustion of this methane to produce energy reduces the global warming potential of emissions to the atmosphere both by converting the methane to the less harmful CO_2 and by displacing the CO_2 that might otherwise have been emitted from the combustion of fossil fuels in conventional power stations.

7. Renewable energy is not the only solution to limiting emissions of greenhouse gases. On the demand site, energy efficiency can also make a substantial impact on reducing our demand for energy. The Government is taking measures to encourage the exploitation of these potential savings. It is estimated that by using cost-effective energy efficiency methods and technology, up to one-fifth of the UK's energy bill could be saved. Energy efficiency measures are already having an effect. Since 1979, the UK's Gross Domestic Product has increased by 25% with little change in our total energy consumption.

Government and European Community Policy

8. Government policy is set out in Department of Energy Paper 55 - "Renewable Energy in the UK: The Way Forward". It is to stimulate the exploitation and development of renewable energy sources wherever they have prospects of being economically attractive and environmentally acceptable.

9. Energy Paper 55 also outlines an estimated contribution to UK energy supplies of up to 70 TWh/y[1] (around 25% of current electricity use) from those renewable technologies which produce electricity, and a further 20 Mtce/y[2] from those which produce heat, by the year 2025 if all developments were successful and could be commercially exploited. The UK has now signed the United Nations Framework Convention on Climate Change which commits all developed country parties to take measures aimed at returning emissions of each greenhouse gas to their 1990 levels by 2000. The Environment White Paper 'This Common Inheritance' published in September 1990, described the Government's strategy for limiting CO_2 and other greenhouse gas emissions.

10. As part of this strategy the White Paper stated that the Government would work towards a figure of 1,000 Megawatts of new electricity generating capacity from renewable energy sources by the year 2000. 1,000 Megawatts of electricity from renewable energy sources would produce about 4 TWh/y of electricity annually, resulting in a saving of 1 Mtce/y. A review of the Government's renewable energy strategy is now in train. The Government is also working on possible energy-from-waste targets for incineration and landfill gas recovery as part of its encouragement of recycling.

11. The Community has given expression to its general policy towards renewable energy sources in several Regulations and Recommendations. The four main ones are in Table A below.

TABLE A:

(a) Council Regulation 2618/80 of 7 October 1980 which instituted a specific Community Regional Development measure contributing to improving security of energy supply in certain community regions by improved use of new techniques for hydro-electric power and alternative energy sources;

(b) Council Regulation 218/84 of 18 January 1984 amending Regulation 2618/80;

(c) Council Resolution of 26 November 1986 (86/C316/01) on a community orientation to develop new and renewable energy sources;

(d) Council Recommendation of 9 June 1988 (88/349/EEC) on developing the exploitation of renewable energy sources in the Community.

12. A Communication from the European Commission to the European Council on 'Energy and the Environment' of 8 February 1990 gave further clear encouragement to energy sources which will diversify the Community's energy supplies and contribute to limiting emissions into the atmosphere

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[1] Terawatt hours per year.

[2] Million tonnes coal equivalent per year.

from fossil-fuel combustion. The current Promotion of Energy Technology for Europe Programme (THERMIE) is partly geared to encouraging solar, biomass[3], geothermal, wind and hydro-electric renewable energy sources. In addition, the Commission recently published a Communication to the Council, A Community Strategy to Limit Carbon Dioxide Emissions and Improve Energy Efficiency, 1 June 1992 COM(92)246, proposing strengthening the Community's renewable energy programmes and the introduction of a combined carbon/energy tax which would encourage switching to renewable sources of energy by exempting them from it. These proposals are currently under discussion.

13. The UK Government's policy is being pursued through:

(a) a continuing programme of research, development and demonstration in collaboration with industry;

(b) ensuring the establishment of a legal, administrative standards and certification framework which allows renewable energy promoters to compete equitably in the market with conventional sources of energy.

14. The Electricity Act 1989 contributes to establishing this equitable framework. It empowers the Secretary of State to make orders requiring the Regional Electricity Companies in England and Wales to secure specified amounts of electricity generation capacity based on renewable sources of energy. Under this requirement, known as the Non-Fossil Fuel Obligation (NFFO), two orders have been made - the first[4] in September 1990 was set at 102 Megawatts (MW) of declared net capacity from 75 projects. The second[5], announced on 5 November 1991, was set at 457 MW of declared net capacity from 122 projects, divided into the technology bands set out in Table B.

TABLE B

Technology Band	Size of Obligation MW	No of Projects	Premium Electricity Price (until 1988) p/KWh
Landfill Gas	48.00	28	5.7
Sludge Digestion Gas	26.86	19	5.9
Municipal & General Industrial Waste	261.48	10	6.55
Hydro-Electricity	10.36	12	6.0
Wind	82.43	49	11.0
Other Waste	28.15	4	5.9

[3] For example, energy forestry or other energy crops.

[4] The Electricity (Non-Fossil Fuel Sources) (England and Wales) (No. 2) Order 1990 (SI 1990/1859).

[5] The Electricity (Non-Fossil Fuel Sources) (England and Wales) Order 1991 (SI 1991/2490).

TOTALS	457	122	-

Details of the background to the 1991 order are given in Renewable Energy Bulletin No 4 published in December 1990 by the Department of Energy (now part of the Department of Trade and Industry).

Environmental Protection Legislation

15. The Environmental Protection Act 1990 (the EPA) provides an improved substantive and procedural system of control of specified substances and processes which are capable of damaging the environment.

16. Part III of the EPA requires local authorities to serve an abatement notice on a person responsible for a statutory nuisance. Alternatively, an individual may lay a complaint direct to a magistrates' court which can order the person responsible to abate the nuisance; the effect of this is broadly similar to that of a notice served by the local authority.

17. The existence of a planning permission for development provides no defence against the service of a statutory nuisance notice or order under the EPA. The potential impact of Part III of the EPA on the development and commercial viability of renewable energy projects from which a specified statutory nuisance may arise makes it important that the developer should realistically and carefully assess the potential environmental emissions in planning a renewable energy project.

18. Part II of the EPA is relevant to landfill gas and bio-gas projects. It requires anyone occupying land on which the treatment of waste takes place to obtain a waste management licence, which sets out the conditions under which operations on the land must be carried out.

19. Where a renewable energy project has an impact on the water environment, the provisions in the Water Resources Act 1991 may be relevant. This Act regulates discharges to water to prevent pollution, and regulates abstractions from water sources. Any polluting discharge to surface waters will require a consent from the National Rivers Authority (NRA) (unless it is from a process which falls within the remit of Her Majesty's Inspectorate of Pollution under the provisions of the Environmental Protection Act 1990, relating to Integrated Pollution Control). This will include flue gas treatment effluent from bio-fuel combustion projects. The NRA will also be concerned with the effects on water quality and flows of any hydro-electric or tidal project, and together with English Nature and the Countryside Council for Wales, it also has responsibilities for wildlife conservation.

Land-Use Planning Matters

20. The aim of the planning system is to secure economy, efficiency and amenity in the use of land in the public interest. Planning decisions have to reconcile the interests of development with the importance of conserving the environment. In planning for the use of land by energy-generating installations, the Government's general aims are:

(a) to ensure that society's needs for energy are satisfied, consistent with protecting the local and global environment;

(b) to ensure that any environmental damage or loss of amenity caused by energy supply and ancillary activities is minimised; and

(c) to prevent unnecessary sterilisation of energy resources.

21. Sites proposed for the development of renewable energy sources will often be in rural areas or on the coast, and such development will almost always have some local environmental effects. The Government's policies for developing renewable energy sources must be weighed carefully with its continuing commitment to policies for protecting the environment. It will always be important that a particular proposal should cause the minimum harm to the countryside or the coast. Details of policies in that respect are set out in the Planning Policy Guidance notes on the countryside (PPG7) and Coastal Planning (PPG20).

DEVELOPMENT PLANS

22. Development plans set the framework for development control decisions. Planning applications for renewable energy projects should be determined in accordance with the development plan unless material considerations indicate otherwise. The development plan comprises structure plans in which county councils set out strategic policies as a framework for local planning, and local plans, containing district councils' and National Park Authorities' more detailed development control policies and proposals affecting specific sites. In metropolitan areas the function of structure and local plans is combined in Parts I and II of a unitary development plan (UDP). Counties and National Park Authorities must also prepare minerals local plans and, in England, waste local plans. Further guidance on development plans, their preparation, form and content, is given in PPG12 and for Wales, in PPG12 (Wales).

23. Development plan policies should take account of local, regional and national requirements. Renewable energy resources can usually only be developed where they occur, and each authority should consider the contribution their area can make to meeting need on a local, regional and national basis. This contribution should reflect the nature and extent of resources in a particular area and other relevant planning considerations. Planning authorities should also bear in mind that investment in renewable energy development can make an important contribution to the national economy, and can help to meet our international commitments on limiting greenhouse gas emissions.

24. Structure plans and UDPs Part I must have regard to national and regional policies (including Strategic Planning Guidance for Wales). Authorities preparing these plans should include their general policies and proposals on providing renewable energy in their areas, including the general location of any individual project likely to have a significant effect on their areas. They should indicate in the explanatory memorandum/reasoned justification what account they have taken of renewable energy, and the potential for exploiting it, in formulating their general policies and proposals on the key topics listed in PPG12 and PPG12 (Wales).

25. Local plans and UDPs Part II in turn must conform generally with structure plans and UDPs Part I. Authorities should include their detailed policies for developing renewable energy sources and should identify broad locations, or specific sites, suitable for the various types of renewable energy installations.

26. All development plans are required to include policies about conserving wildlife species and their habitats, the natural beauty and amenity of the land, and improving the physical environment.

Plans should also take account of environmental, economic and social considerations more generally. In formulating the policies and proposals in their development plans, authorities should take account of the Government's policy for renewable energy sources along with those on such topics as Green Belts, conservation areas in town and country, and industrial and commercial development. Authorities will need to consider both the immediate impact of renewable energy projects on the local environment and their wider contribution to reducing emissions of greenhouse gases.

Designated Areas

27. The Government continues to recognise the fundamental importance of policies to protect the landscape and wildlife and certain areas are designated in which stricter planning controls are applied.

28. Particular care should be taken, in assessing proposals for developing renewable energy projects, in National Parks, Areas of Outstanding Natural Beauty, the Broads and Sites of Special Scientific Interest. Similar considerations arise in areas of archaeological or historic importance and on the coast. Guidance on planning policies for the countryside is given in PPG7, on Green Belts in PPG2 (England only), on archaeology and planning in PPG16 (there is a separate Welsh version of PPG16), and on the coast in PPG20. PPGs are pending on nature conservation and listed buildings/conservation areas.

29. In assessing proposals in designated areas, the Government's policy on renewable energy, summarised in paragraphs 1 to 14 of this guidance note, requires to be balanced with the need to take full account of the specific features or qualities which justified designation and the guidance contained in Section 3 of PPG7.

Green Belts

30. In line with PPG2 very special circumstances are needed to justify development in the Green Belt, unless the particular proposal constitutes a use appropriate to a rural area. Any development should not injure the visual amenities of the Green Belt.

Environmental assessments and environmental implications

31. Local planning authorities and others should consider at an early stage whether environmental assessment (EA) should be undertaken in accordance with the relevant environmental assessment regulations[6]. The Regulations implement the requirements of European Community Directive 85/337/EEC about assessing the effects on the environment of certain public and private projects.

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[6] The Town and Country Planning (Assessment of Environmental Effects) Regulations 1988 (SI 1988 No 1199) or The Electricity and Pipeline Works (Assessment of Environmental Effects) Regulations 1990 (SI 1990 No 442): the 1990 Regulations apply where an application is made under Section 36 of the Electricity Act 1989 to construct or extend a generating station of more than 50MW.

32. The 1988 Regulations set out two lists of projects. For those in Schedule 1, including certain thermal power stations and other combustion installations, environmental assessment is required in every case. For projects listed in Schedule 2, EA is required if the particular development proposed would be likely to have significant effects on the environment by virtue of factors such as its nature, size or location.

33. Where EA is required, the applicant must prepare and submit an environmental statement with his planning application. DOE Circular 15/88 (WO 23/88) gives advice on procedures and the circumstances in which EA may be necessary for Schedule 2 projects. The Department's view is that wind turbines are not currently covered by the 1988 EA Regulations (or the EA Directive). However, it was announced in a written statement by Sir George Young on 16 December 1992, that as a result of a consultation exercise, wind generators will shortly be added to the categories of projects in Schedule 2 of the 1988 Regulations. The effect of this will be that applications for wind generators will have to be accompanied by an environmental statement if the particular development proposed is likely to have significant environmental effects.

34. No form of energy is without environmental implications, and every effort should be made to ameliorate adverse effects. The principle is now well established that the polluter should pay the cost of meeting acceptable environmental standards and the EPA provides that effects should be minimised by use of the best available techniques not entailing excessive cost (BATNEEC). These standards are set at a given level, although site-specific interpretations of such standards may be agreed. However, the national standards should generally be regarded as the minimum. Applicants should build into the appraisal of new investment projects the costs of meeting required environmental standards.

35. Where environmental assessment is not required, applicants and local planning authorities will be expected to have full regard to the environmental implications of proposals to develop renewable energy sources. Schedule 3 to the EA Regulations notes that relevant developments may have impact on human beings, flora, fauna, soil, water, air, climate, the landscape, material assets, and the cultural heritage. Since the development of renewable energy sources is a relatively unfamiliar issues for the planning system, local planning authorities and members of the public will be particularly concerned to ensure that their interests are taken into account. A co-operative approach by all parties at the local level, and appreciation of the wider environmental benefits of renewable energy, should help achieve a better understanding of the environmental implications.

Conditions; Temporary Planning Permissions

36. DOE/WO Circular 1/85 gives advice about imposing conditions on planning permissions. DOE Circular 16/91 (WO 53/91) contains guidance about regulating development by using planning obligations under Section 106 of the Town and Country Planning Act 1990, as substituted by Section 12 of the Planning and Compensation Act 1991. Renewable energy projects may involve novel or unusual considerations for development control. It may be difficult to impose conditions which anticipate successfully the environmental and planning issues which may arise on a particular project. Where local authorities are satisfied that a condition cannot be imposed, they may seek to enter into a planning obligation with a developer, following the advice in DOE Circular 16/91 (Welsh Office Circular 53/91).

37. Where the impact of renewable energy projects on the local environment is particularly uncertain, local planning authorities may consider granting a temporary planning permission. Paragraph 85 of Circular 1/85 advises that it may be appropriate to grant temporary planning

permission in order to give a potential 'bad neighbour' development a trial run, but that authorities should consider the capital expenditure necessary to carry out the development. In the case of commercial renewable energy projects, expenditure is likely to be substantial, and so granting a temporary planning permission may be unrealistic.

38. Many renewable energy projects will be in the early stages of technical development, and some may prove unsuccessful. If there is concern about a particular development remaining in perpetuity, the local planning authority may consider imposing a condition, for example that if a wind turbine generator is not in operation producing electricity for six months it would be deemed to have ceased to be needed and must be dismantled with the land restored unless the local planning authority agree otherwise.

Other Consents/Permissions

39. In certain circumstances other consents or permissions may be needed in addition to planning permission. For example, if common land is involved, the consent of either the Secretary of State for the Environment or for Wales may be required under section 194 of the Law of Property Act 1925.

RENEWABLE ENERGY: ANNEX ON WIND ENERGY

1. The Annex aims to give guidance about the technology of harnessing wind energy, to help in framing policies within development plans and in the context of development control.

2. Wind power is on the verge of widespread commercial exploitation as a source of electricity. The United Kingdom has one of the windiest climates in Europe and is therefore well placed to exploit wind energy. Department of Energy Paper 55 indicated that in the UK wind energy might be used to generate up to 30 TWh/year of electricity (equivalent to around 10% of current electricity consumption) by the year 2025, if research and development programmes are successful and the technology can be commercialised.

3. The principle of harnessing wind energy by windmills is well established, but modern wind turbines have some distinctive features which must be taken into account in planning and development control. These are:-

(a) the need to site the machines in open exposed locations often in rural areas which may also be in attractive landscapes;

(b) the nature of noise emissions from the turbines;

(c) the movement of the blades; and

(d) considerations relating to safety and electro-magnetic interference.

(A) THE TECHNOLOGY

4. Wind turbines use the wind to generate mechanical power for water pumping and for electricity generation. This Annex deals only with the electricity-producing variety. It is also limited to consideration of land-based machines. While recognising that in the long-term, activity off-shore may prove commercially viable it is likely to be more costly and technically riskier than on-shore development. On-shore wind energy has already emerged as one of the more promising renewable energy sources of electricity generation in the UK, following experience in the USA and Denmark and the Netherlands where several thousands of wind turbines are currently operating. Apart from the need to demonstrate adequate reliability throughout the life-time envisaged for a wind turbine, which can only be achieved by operation for 15-20 years, there is no doubt about the technical feasibility of wind power.

Wind Turbine Characteristics

5. There are essentially two types of wind turbine, and they look very different: vertical axis machines with rotors which rotate about a vertical axis, and horizontal axis machines whose rotating shafts are horizontal. The majority of commercial machines currently available or likely to be so in the foreseeable future are of the horizontal axis type. Within this category there are various further technical differences. The most obvious difference is in the number of blades. Most machines have three blades, but there are many two-bladed and even a few one-bladed machines.

6. Wind turbines are available in a wide range of sizes, from small battery charging units with rotor diameters of less than a metre to very large wind turbines with rotor diameters greater than 50

metres rated at several megawatts. Wind turbines proposed for wind farm development in the UK are generally rated at several hundred kilowatts. These medium-sized horizontal axis machines have a rotor diameter of between 25 and 35 metres and a hub height of between 30 and 35 metres. The trend for the future is likely to be towards larger machines for commercial wind farming activities, although there is also a market for individual machines which may be of smaller size for private users such as farmers.

7. Most grid-connected machines operate at a constant rotational speed which is independent of the speed of the wind. Typical rotational speed for a medium-sized wind turbine is in the range of 30-50 revolutions per minute. Medium-sized wind turbines typically start rotating ("cut-in") when the wind speed at hub height exceeds 5 metres per second and stop automatically ("cut-out") when the wind speed exceeds 25 metres per second. The turbines usually have steel towers (lattice or cylindrical) supporting the nacelle, which contains the mechanical machinery and a device known as a 'yaw mechanism' which allows the machine to turn itself towards the prevailing wind. The rotors can be made of glass re-inforced plastic, wood epoxy, aluminium or steel. The majority of machines use glass reinforced plastic or wood epoxy. The turbine is controlled by its own computer system which provides both operational and safety functions.

8. Wind turbines can be deployed singly, in small clusters, or in larger groups known as wind farms. Factors which may influence the size of a development include the physical nature of the site, the capacity of the local electricity distribution network and the organisation undertaking the development. It is likely that the wind resource of the UK will be harnessed most satisfactorily using a mixture of these types of development.

Wind Farms

9. A medium-sized wind farm might consist of 10-25 wind turbines as described above. Wind farms will generally need to be located in open, exposed areas with reasonably high annual mean wind speeds. Sites with annual wind speeds of typically greater than 7.5 metres per second at hub height are currently being considered for development. A wind farm of 25 turbines might produce around 20 million kWh per year of electricity (enough for about 6,000 homes) and, if this took the place of electricity generated by currently-operating fossil fired power stations, it would save the emission of around 17,000 tonnes per year of CO_2, as well as around 220 tonnes per year of SO_2 and 40 tonnes per year of NO_x.

10. Wind turbines need to be positioned so that the distances between them are around 5-10 rotor diameters (about 150-300 metres). This spacing represents a compromise between compactness which minimises capital cost and the need for adequate separations to lessen energy loss through wind shadowing from upstream machines. Turbines should be sited in sympathy with local features and should respect the grain and form of the land. Turbine siting will always be a compromise between maximising energy capture and minimising visual impact (see also paragraphs 59 to 69 of this Annex).

11. The towers of the turbines are fixed to a concrete foundation whose surface will normally be flush with the surrounding ground. This foundation pad is likely to be hexagonal in shape and about 7 metres in diameter. The land area actually used by the turbines is therefore very small. On land where public access is allowed, people might walk right up to the base of the towers without interfering with turbine operation. On land normally used for agricultural purposes, agricultural use could continue right up to the edge of the foundations.

12. A wind farm is often equipped with a central monitoring system. This consists of a computer which supervises the operation of the farm and can communicate with a remote headquarters. Wind farms are likely to be un-manned, and their operational status regularly checked through the central monitoring system and remote link. Such a checking system may be housed in a small building somewhere on a wind farm site. There is also likely to be a slender mast with anemometers and wind vanes to provide control information for the wind farm.

13. Well-specified and well-designed wind farms should be located so that increases in ambient noise levels around noise-sensitive developments are kept to acceptable levels. This will normally be achieved through good design of the turbines and through allowing sufficient distance between the turbines and any existing noise-sensitive development so that noise from the turbines will not normally be significant. Noise levels from turbines are generally low and, under most operating conditions, it is likely that turbine noise would be completely masked by wind-generated background noise.

14. The impact of a wind farm on the local ecology should be minimal. A typical wind farm will usually leave the land between the turbines totally unaffected. Evidence suggests that neither domesticated nor wild animals will be affected by a wind farm: indeed, there are examples of cows grazing right up to the base of turbines. Evidence also suggests that there is minimal danger to bird life from the turbines.

15. When a wind farm reaches the end of its design life, the turbines can easily be removed and the foundations could be re-used for the installation of new turbines (subject to planning permission) or, if required, the land could be reinstated.

16. A wind farm is likely to be connected to the electricity distribution network just like any other power station. The farm's turbines would be likely to generate electricity at a voltage of 415 or 690 volts. Small transformers will be required within the site to increase the voltage locally from single turbines or groups of turbines. The output from the turbines in a farm is normally connected to a single point via underground cables. At this point a small sub-station is required to transform the electricity to grid voltage (usually 11 or 33 kiloVolts). The sub-station would then be connected to the nearest suitable point of the local electricity distribution network either by a standard 3-wire system mounted on wooden poles or by lines laid underground. It should be noted, however, that laying high voltage cables underground is much more expensive (by a factor of around 6-10) than pole-mounted overhead systems and would be likely to be used only for limited lengths and in special circumstances. The distance between the sub-station and the connection point will be of critical commercial relevance because of the relative costs of overhead and underground lines and the impact such costs have on total site development costs.

Grid Connection

17. Where the works required to connect the wind farm to the local electricity distribution network are not permitted under the General Development Order it will be necessary to submit either a separate planning application or, in the case of an overhead line, an application for consent of the Secretary of State for Trade and Industry under section 37 of the Electricity Act 1989 (in which event the local planning authorities are statutory consultees). Such an application may be made by either the wind farm developer or the local electricity distribution company. However, notwithstanding that a separate application to a separate decision-maker may be necessary, electricity companies are encouraged to co-operate with the local planning authorities during consultations about the application to construct the wind farm, in order that any preference or need

for overhead or underground connection may be demonstrated.

Siting Issues

18. The power produced by wind turbines depends on two key factors: the strength of the wind, and the area swept by the rotor. The energy produced by a wind turbine is strongly dependent on the annual mean wind speed at the site: a machine located on a site which has an annual mean wind speed of 6 metres per second will typically produce only half as much energy as the same machine on a site where the annual wind speed is 8 metres per second. The area swept by the rotor increases with the square of the rotor diameter, so a machine with a 15 metre diameter rotor will produce only a quarter of the power of a machine with a 30 metre diameter rotor.

19. Assessing whether a particular site will harness wind power satisfactorily entails using historical meteorological data (available from the Meteorological Office) and information derived from anemometers placed on site. Anemometry masts, typically 30 metres tall, will be required on a site for about 12 months. The measurements from the anemometers help to determine whether or not a candidate site is suitable and, if it is, the measurements help to determine the best position for the wind turbines within the site's boundary. Planning permission is required to station an anemometer mast where such development is not permitted by the General Development Order.

DEGREE OF DISTURBANCE

20. The degree of disturbance caused by the construction phase of a wind farm will depend on the number of turbines and the length of the construction period. Public perception of the construction phase will derive mainly from physical impact and traffic movements. The traffic movements to be expected will involve:

(a) vehicles removing spoil from the site;

(b) vehicles bringing concrete (for foundations) to the site;

(c) vehicles (which may be articulated) bringing turbine components to the site;

(d) the vehicles of those working on the site;

(e) a crane to erect the turbines.

Advice about the impact of such traffic movements is given in paragraph 73 below.

21. Once turbines are in operation, traffic movements to and from the site will be very light, probably averaging one visit a week by a light commercial vehicle or car. The need to replace machine components will generate heavier commercial vehicle movements, but these are likely to be infrequent.

(B) PLANNING IMPLICATIONS

22. There will always be pressure to achieve planning permission for sites which enjoy high mean wind speeds, because the power generated by a turbine is entirely dependent on wind capture. Because the precise wind regime on any site cannot be predicted with absolute accuracy, local planning authorities may consider granting planning permission in terms which will permit the siting

of individual machines within carefully defined areas rather than within precisely defined positions. Such an approach may not be possible in areas of special visual sensitivity where minor variations in the position of machines may be critical.

23. The successful harnessing of wind energy, and the continuing exploitation of wind for existing electricity generation, depend in part on the character of neighbouring uses. The purpose of the planning system is to regulate the development and use of land in the public interest, not to protect the private interests of one person against the activities of another. Although in a particular case considerations of public interest may serve to protect private interests, the material question is not whether a particular development would cause financial or other loss to owners and occupiers of neighbouring property, but whether the proposal would have a detrimental effect on the locality generally, and on amenities that ought, in the public interest, to be protected.

24. The successful exploitation of wind energy always entails detailed consideration of a number of factors, such as average wind speed, the practicable availability of a connection to the electricity distribution network, and adequate means of vehicular access, the price currently available for purchase of electricity, and the need for planning permission. Accordingly, local planning authorities should give only the broadest locational guidance in development plans, although pressure to exploit the wind will always be directed to areas which enjoy high mean wind speeds.

Safeguarding

25. Where planning permission for a turbine or turbines has been implemented, local planning authorities should safeguard the installation as an electricity generation plant by controlling subsequent development, such as the building of tall structures which could reduce local wind speeds and hence impair the operation of wind turbines through a reduction in electrical power output. This will be a material consideration when authorities consider any planning application for a proposed potentially non-conforming development.

Precedent

26. It may be argued that a local planning authority should refuse planning permission for a wind-power plant because to allow the proposed development would set a precedent. However, the merits of particular cases will vary widely, and the argument that granting permission might lead to another application is unlikely to be a sufficient reasons for refusal.

Standards and Certification

27. There is no British or European standard against which to certify wind turbines or wind farms at present, although such documents are being prepared. Until such standards are introduced, certificates are issued by national test stations and classification societies. (These organisations undertake independent engineering appraisals of projects involving large financial investments; historically they have concentrated on shipping). It is possible to obtain certificates of manufacturing quality control and installation from classification societies.

28. It is desirable to obtain certificates for all wind turbines proposed for the purpose of generating electricity. Where such a certificate is provided, applicants for planning permission should provide evidence that they have properly assessed the wind regime on the site, that this information has been used in the certification process, and that it was passed to the manufacturer of the machine who has ensured that the machine offered for the site is fit for the duty.

29. Where it is intended to use machines carrying a certificate, the detailed nature of the certificate's basis and contents should be disclosed to the local planning authority.

Safety

30. Experience indicates that properly designed and maintained wind turbines are a safe technology. The very few accidents which have occurred involving injury to humans have been caused by failure to observe manufacturers' and operators' instructions for the operation of the machines. There has been no example of injury to a member of the public, only to operational staff.

31. The only source of possible danger to human or animal life from a wind turbine would be the loss of a piece of the blade or, in most exceptional circumstances, of the whole blade. Many blades are composite structures with no bolts or other separate components. Blade failure is therefore most unlikely. Even for blades with separate control surfaces on or comprising the tips of the blade, separation is most unlikely.

32. The minimum desirable distance between wind turbines and occupied buildings calculated on the basis of expected noise levels and visual impact will always be greater than that necessary to meet safety requirements.

Icing

33. The build-up of ice on turbine blades is unlikely to present problems on the majority of sites likely to be developed in the near future. In those areas where icing of the blades does occur, fragments of ice might be released from the blades when the machine is started. Most wind turbines are fitted with vibration sensors which can detect any imbalance which might be caused by icing of the blades; so operation of machines with iced blades could be inhibited. However, the expense involved in icing prevention or direct ice detection would be prohibitive.

Proximity to Power Lines

34. Wind turbines should be separated from overhead power lines in accordance with the Electricity Council Standard 44-8 'Overhead Line Clearances'.

Proximity to Airports

35. In addition to interference with airport telecommunication systems (see paragraph 57-58), a wind turbine could interfere with the flight path of aircraft. Developments within a specified radius of major airports and aerodromes are subject to mandatory consultation with the Civil Aviation Authority or the Ministry of Defence under the Town and Country Planning (Aerodromes and Technical Sites) Direction 1992. Within a radius of 2 km of an aerodrome which is not safeguarded the airport management should be consulted by the applicant about the proposed development. The applicant should take account of the airport management's requirements, which will depend on local topography and the preferred flight paths at the site. Any structure more than 91.4 metres high must have aircraft warning lights, but only very large wind turbines will be this high.

Proximity to Roads and Railways

36. Applicants are advised to consult at an early stage the Department of Transport or the Welsh Office for trunk roads and the local highway authority for all other publicly maintained highways. In the case of railway lines authorities are British Rail (Area Civil Engineering) for operational lines and British Railways Property Board for non-operational lines.

37. Although a wind turbine erected in accordance with best engineering practice should be a stable structure, it may be advisable to achieve a set-back from roads and railways of at least the height of the turbine proposed, so as to achieve maximum safety. Drivers can be distracted by unfamiliar objects or by movement, and a cautious approach to siting turbines near roads may be justified, especially for example near a busy road which carries tourist traffic and has a bad accident record, and in relation to roads which may be improved at some point during the lifetime of the turbine.

Shadow Flicker

38. Under certain combinations of geographical position and time of day, the sun may pass behind the rotor of a wind turbine and cast a shadow over neighbouring properties. When the blades rotate, the shadow flicks on and off; the effect is known as 'shadow flicker'. It only occurs inside buildings where the flicker appears through a narrow window opening. The seasonal duration of this effect can be calculated from the geometry of the machine and the latitude of the potential site. For sites where existing or proposed development may be subject to this problem, applicants for planning permission for wind turbine installations should provide calculations to quantify the effect. For more information see Bibliography.

Noise Levels

39. Well designed wind turbines are generally quiet in operation. The table below indicates the noise generated by wind turbines, compared with other every-day activities:

Source/Activity	Indicative Noise Level dB(A)
Threshold of Pain	140
Jet aircraft at 250m	105
Pneumatic drill at 7m	95
Truck at 30mph at 100m	65
Busy general office	60
Car at 40mph at 100m	55
Windfarm at 350m	35-45
Quiet bedroom	20
Rural night-time background	20-40
Threshold of hearing	0

THE SOURCES OF NOISE

40. There are two quite distinct types of noise source within a wind turbine. The mechanical noise produced by the gearbox, generator and other parts of the drive train; and the aerodynamic noise produced by the passage of the blades through the air. The mechanical noise is similar to that present in much other rotating machinery, so it can be analysed and reduced by following standard engineering practice. It is likely to be tonal in quality. Over the last few years there has been a significant reduction in the mechanical noise generated by wind turbines, and it is usually less than, or of a similar level to, the aerodynamic noise.

41. The noise produced by a wind turbine blade is heavily influenced by the speed at which the blade tips move through the air and so, for a machine of given size, by the speed of the rotor. For most wind turbines the speed of rotation is constant, but some turbines have two-speed operation. This helps to reduce the noise emissions by using the lower speed in low wind speed and the higher speed at higher wind speeds when the background noise will be higher. A few turbines also have variable speed rotors. Aerodynamic noise from wind turbines is generally unobtrusive, it is broad band in nature and in this respect is similar to the noise of wind in trees, for example.

42. Wind-generated background noise increases with wind speed, and at a faster rate than wind turbine noise increases with wind speed. The difference between the noise of the wind farm and the background noise is therefore liable to be greatest at low wind speeds. It should be noted however that in some sheltered positions the background noise may remain low even when the wind speed at hub height of the wind turbines is well above cut-in. Background noise levels in rural areas are generally greater during the day than at night.

Existing Noise Standards

43. British Standard BS4142 1990 has been advocated as the standard which comes nearest to dealing with the issues encountered in wind turbine development. BS4142 is intended to assess

noise from industrial premises or fixed installations in mixed residential and industrial areas. It compares the level and quality of noise from an industrial source with background levels, and indicates whether the industrial sources are likely to give rise to complaints. It does not specify particular levels which would be acceptable.

44. Using BS4142 to assess wind turbine noise may be inappropriate for several reasons:

(a) wind farms are likely to be developed in largely rural areas and not in the areas to which the standard is principally addressed, namely mixed residential and rural areas;

(b) the scope of BS4142 specifically precludes situations where the background noise levels are below 30dB(A). This level is typical of the background noise level which might be found at some potential wind farm sites;

(c) BS4142 recommends that noise measurements should not be taken in 'extreme weather conditions such as high wind speeds greater than 5 metres per second average'. This restriction guards against unrepresentative measurements due to wind noise on the microphone. Wind farms are likely to be sited in windy areas where the BS4142 conditions may not be satisfied. Care should be taken when measuring noise levels in windy conditions.

45. Where any of these factors gives rise to concern about whether BS4142 is appropriate as a means of determining potential or actual perceived noise nuisance, the combined effect of the wind turbines should be determined by reference to the particular character and sensitivity of the area. This should be assessed by reference to the nature and character of neighbouring developments. Several agreements have already been reached between local authorities and wind farm developers, and these provide useful examples illustrating the range of conditions which are considered appropriate for wind farms. While agreements can be reached in specific circumstances, there is insufficient information at present to offer more quantitative general guidance. In areas of particular noise sensitivity local planning authorities may seek evidence from applicants for planning permission that the type or types of machines proposed will not only use best current engineering practice in terms of noise creation and suppression but also reflect 'best practical means' (BPM).

46. Local authorities (usually via Environmental Health Departments) and individuals can seek abatement of a perceived nuisance through the courts under the Environmental Protection Act 1990. This and other statutory controls are described in a forthcoming PPG 'Planning and Noise'. These provisions are relevant to noise generated by wind turbines, although in particular exceptional cases the community's or the nation's need for renewable energy may over-ride the disadvantage of noise emission.

47. Experience from mainland Europe has shown that there is unlikely to be a significant noise problem for any residential property situated further than 350-400 metres from the nearest turbine. Lesser separation distances may be acceptable depending on the turbines used and the specific conditions at a site.

Predicting Noise Levels

48. The data provided as part of the machine specification should include the source sound power

level[7] of the machine which is considered to act as a point source[8] located at the hub of the machine. This sound power level can be used by the developer or the local planning authority to predict the noise at different locations around the turbine. The parties should agree on appropriate prediction methodology before commencing. These predictions, together with the sound power level measurements and the associated independent report, should be provided by the developer to the local planning authority to indicate the basis for the noise calculations.

49. Although more noise is radiated in some directions than others by wind turbines, areas down-wind of the wind farm will normally experience the highest predicted noise levels.

50. For a machine the size of a wind turbine which requires the wind for propulsion and is too big to be fitted in a special acoustic test chamber, it is necessary to deduce the noise source power by indirect means. The measurement of the source sound power level should be made according to the procedures set out by the International Energy Agency (IEA), the Danish National Agency of Environment Protection or other suitable procedures. The IEA Recommended Practice can be obtained on request from the address given in the Bibliography at the end of this Annex. Any European standard which may be published will supplement or supersede these methods of measurement.

51. A planning application for a wind farm development could usefully be accompanied by the following supporting information regarding details of the proposed turbine(s) and predicted noise levels:

(a) technical details of the wind turbine;

(b) hub height and rotor diameter;

(c) location of rotor: up-wind or down-wind of the tower;

(d) speed(s) of rotation;

(e) cut-in wind speeds;

(f) predicted noise levels at specific properties closest to the wind farm over the most critical range of wind speeds;

(g) measured background noise levels at the properties and wind speeds outlined in (f) above;

(h) a scale map showing: the proposed wind turbine(s); the prevailing wind conditions; nearby existing development;

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[7] The fundamental property of sound energy of a source, usually expressed in dB relative to one picowatt.

[8] Mathematical approximation that all noise sources from turbines can be considered to come from a single source.

(i) results of independent measurements of noise emission from the proposed wind turbine including the sound power and narrow band frequency spectrum. In the case of a prototype turbine where no measurements are available, predictions should be made by comparison with similar machines.

Electro-magnetic Production and Interference

52. Provided careful attention is paid to siting, wind turbines should not cause any significant problems of electro-magnetic interference, i.e adverse effects on communication systems which use electro-magnetic waves as the transmission medium (e.g television, radio or microwave links).

53. A structure of any type can interfere with electro-magnetic transmissions. The nature of the interference depends on the size of the structure relative to the wave-length of the radiation. A wind turbine placed in a communication path may interfere with it in the same way as any other structure of similar dimensions. In this sense, wind turbines present no new problems. Nevertheless, there are two features of wind turbines which set them apart from conventional buildings: the blades rotate, and the turbine produces electricity.

54. Wind turbines contain electrical machines producing power. They will therefore also produce electro-magnetic radiation. In theory, the turbines could interfere with other signals in the neighbourhood of the machines. In practice, however, there is no difference between a wind turbine and any other electrical machine in this respect, and the turbine should not give rise to any unusual problems provided its components are designed and manufactured using good accepted practice. It is important to ensure that this is the case for individual designs, which should conform to the British Standards BS613, BS6667(3) or other equivalents. Only in very rare circumstances will electro-magnetic signals produced by wind turbines be a problem for potential wind farm developments.

Scattering of Signal

55. The general public may be concerned that a wind farm will interfere with television reception. Experience has shown that when this occurs it is of a predictable nature and can generally be alleviated by the installation or modification of a local repeater station or some cable connection.

56. Most characteristics of a wind turbine play a part in determining the nature and degree of signal scattering, including the rotor diameter, the number of blades, the rotational speed, the blade construction and material, and the blade and machine geometry. The tower and blades may scatter radiation, and the blades may further interfere with radiation scattered by the tower. The interference effects can often be reduced and this possibility should be discussed with representatives of the consultative bodies listed below.

Specialist Consultation

57. Since a large number of bodies use communication systems, and some of the users are commercially sensitive or of strategic or military importance it is impossible to obtain a definitive picture of all the transmission routes across a potential site. The Radio Communications Agency (RADCOM) hold a central register of all civil radio communications installations in the UK and act as a central point of contact. RADCOM will identify any radio installations in the neighbourhood of a wind farm site, but will not identify their owners. Although RADCOM is obliged to pass on any enquiry to all other interested parties, who should respond to an application, this process can be

slow/unreliable and an applicant for planning permission would be well advised to make direct contact with any authorities/bodies which are likely to be interested: a list of potentially interested parties is given at the end of this Annex.

58. In addition, it may be necessary to consult the local water company, gas company and electricity company and also the ambulance service (via the district health authority) and the coastguard. Statutory separation distances apply for certain neighbouring occupiers such as aerodromes. The European Commission Directive of 3 May 1989 on the 'Approximation of the Laws of the Members States Relating to Electro-Magnetic Compatibility' (89/336/EEC) is an essential reference.

Siting and the Landscape

59. It is inevitable that most development of wind turbine generators will be proposed in the uplands, on the coast and other particularly exposed regions, where the highest mean wind speeds are found, particularly in the case of commercial wind farms intended to supply electricity to the distribution network. Siting criteria may be more flexible in the case of single turbines or groups of turbines supplying primarily the turbine owners themselves. Local planning authorities must always weigh the desirability of exploiting a clean, renewable energy resource against the visual impact on the landscape of wind turbines. There is a clear role for wind farms to produce electricity both for the local electricity distribution networks and for other purposes. In some areas local planning authorities may express a preference for the use of smaller wind turbines, but a larger number of turbines would then be needed overall to produce the same amount of electricity. In the case of commercial wind farms, any policy of concentration on or of giving preference to individual or small clusters of turbines must have regard to the availability and cost of a local electricity distribution network connection, the creation of noise and other site-specific factors.

60. Although no completely objective assessment of the landscape qualities of an area and of the impact of development on the landscape is appropriate or possible, and the individual human eye will always have a role, nonetheless methods of objective assessment can define both absolutes and questions of scale[9]. Special considerations, set out in the body of this PPG, apply to applications in designated National Parks and AONBs, in view of the very high quality of the landscape in those areas that warranted their designation. The local planning authority and the applicant for planning permission should attempt to agree at an early stage the likely positioning of the wind turbine generators although they should leave some flexibility to change the positioning in the light of subsequent better information. In particular, the local authority and the applicant should agree from which points the wind turbine development will be seen, both close to a site and at some distance from it, and to what degree and from which locations photo-montages may be made.

61. If a proposal is for only one or two wind turbines, descriptive material, perhaps with photo-montages, may be a sufficient approach to assessing the impact of the development. For larger scale developments or sensitive sites, more sophisticated means of landscape assessment may be appropriate, including electronic mapping to determine zones of visual influence and computer graphics to generate landscape images. However, it should be recognised that these more sophisticated assessments will be a significant cost to the developer. For sensitive sites or larger scale proposals developers should be prepared to devote the appropriate time and attention to

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[9] See Landscape Assessment: A Countryside Commission Approach (CCD 18, 1987).

assess fully the impact of the proposed development.

62. The visual impact of wind turbine generators is influenced by five principal factors:

(a) land form and characteristics;

(b) number and size of machines;

(c) design and colour;

(d) layout of machines;

(e) the existing skyline of the area.

63. The countryside of England and Wales is of great variety, and variations in land form and characteristics may occur quite dramatically within comparatively small distances. In comparison with other well-established forms of development in the countryside, wind turbine generators are individually of low mass and require no extensive supporting infrastructure or services, but they do present a distinctive vertical feature and have the characteristic of movement not normally present in man-made structures, apart from traditional working windmills.

64. In terms of visual impact, wind turbine generators must be assessed with their particular and unusual characteristics clearly in mind. The acceptability of wind turbine generators will be determined to a considerable extent by the form and pattern of the landscape within and adjoining a particular site. Local planning authorities should always assess and judge the merits of a planning application on a site-specific basis.

65. Development plan policies should not prescribe wind turbine generators of a particular design or construction, either for the composition of the tower or for the design and type of axis. Both lattice and solid towers have been developed. Although most modern machines have cylindrical towers made of solid concrete or steel, those of steel lattice construction may be equally acceptable in landscape terms, as may be either vertical or horizontal axis machines.

66. The most suitable colours for the towers, nacelles and blades of wind turbines depend only to some extent on the background against which the machines will be seen. When seen against the sky, except at very close quarters, machines will always be viewed in silhouette. It is more important to achieve an acceptable colour to cater for short distance views and where machines are seen against a landscape background.

67. It is important that clear information is available about the type of machine and its proposed colour as soon as possible in the development process. The blades of wind turbines, are often made of composite material (for example, wood laminates or carbon/glass fibre and epoxy resin) and the colours must therefore be chosen and impregnated at an early stage. General experience of wind turbines in Northern Europe indicates that light grey/white colours are the most suitable for towers, nacelles and blades.

68. The applicant should not be pressed to name a particular manufacturer, but a choice should be identified early in discussion with the local planning authority between, for example, a solid or lattice tower and between vertical or horizontal axis machine types. It should be possible to identify

a preferred access road to the site, and the extent to which new roads will be required. The same applies to sub-stations and grid connection buildings. It will also be important to determine the surface materials of any new roads; in some locations it may be desirable to avoid particular types of road surface (eg tarmacadam) to reduce visual impact, but in most locations constructing an access road or providing ancillary buildings should not cause particular difficulty in the context of the larger scale of development of the turbines.

69. Wind turbines should be sited in sympathy with existing landscape features such as hedges and roads, and with contours. Where more than two wind turbines are proposed, the desirable pattern of development will clearly be affected by the number of turbines as well as by land form and landscape features. The most desirable layout in any given case will be a compromise between the quality of the wind resource, the characteristics of the land form and existing features of the landscape.

Ecology

70. The forthcoming PPG on nature conservation gives advice about the inter-relationship between nature conservation and development control. Apart from the movement of the blades, the development of wind turbines warrants no different approach in terms of ecological considerations from any other development. Applications to harness wind energy will often be made in areas designated as of ecological importance, and such applications should be rigorously examined. Evidence suggests that the risk of collision between moving turbine blades and birds is minimal both for migrating birds and for local habitats. The attention of local planning authorities and developers is particularly drawn to the Ramsar Convention on Wetlands of International Importance (Cmnd 6465), EC Council Directive on the Conservation of Wild Birds (Directive 79/409/EEC), the EC Council Directive on the conservation of natural habitats and of wild fauna and flora (92/43/EEC) and the Berne Convention on the Conservation of European Wildlife and Natural Habitats.

Archaeology

71. PPG16 gives advice on the procedures which should be followed in handling planning applications to ensure that archaeological remains are not needlessly destroyed. Where nationally important remains and their settings are affected by proposed development they should normally be physically preserved.

Listed Buildings and Conservation Areas

72. Special care will be needed if proposed sites for wind turbines should happen to be near listed buildings or conservation areas. DOE Circular 8/87 (WO 61/81) gives advice about the conservation aspects of planning control.

Construction Disturbance

73. Although construction disturbance from wind turbine development will essentially be no different from other developments, many turbines will be sited in areas served by a minor road network. In such cases, local planning authorities may wish to control the number of vehicle movements to and from the site in a specified period and, where possible, the route of such movements, particularly by heavy vehicles, by imposing
suitable conditions on planning permissions, or entering into planning obligations with the

developer.

Conditions

74. DOE Circular 1/85 (WO 1/85) gives advice about conditions. In relation to the erection of wind turbines these will mainly relate to noise emissions, the type of machine to be employed by reference to size, including rotor diameter, and the colour of the machines. Conditions may also be appropriate (a) to limit the flexibility to position wind turbines within a site, where flexibility is agreed to be necessary to enhance exploitation of wind energy; (b) to restore the site following permanent de- commissioning of the turbines (see paragraph 35 of the PPG); (c) about the appearance of ancillary buildings housing sub-stations and electricity distribution network connections; and (d) to ensure, for reasons relating to human perception, that all wind turbines on a particular site should rotate in the same direction!

CONSULTATIVE BODIES

Ministry of Defence
MOD Lands Branch
Chessington

Civil Aviation Authority
CAA Safeguarding Section AS3
Aviation House 2W
Gatwick Airport
West Sussex

Department of Trade and Industry
Fixed Services Department
Radio Communications Agency
Room 309
Waterloo Bridge House
Waterloo Bridge Road
London SE1

British Telecom
Frequency Management Engineer
British Telecom
NPA 3.2
Post Point 216
The Angel Centre
403 St John's Street
London EC1V 4PL

Mercury Communications
Waterside Park
Longshot Lane
Bracknell
Berkshire
RG12 1XL

Racal Vodaphone
2-4 London Road
Newbury
Berkshire

Cellnet
Hanover House
49-60 Borough
London
SE1 1DS

BBC
BBC Research Department
Kingswood Warren
Tadworth
Surrey
KT20 6NP

NTL
Crawley Court
Winchester
Hampshire
SO21 2QA

ITC
Kings Worthy Court
Kings Worthy
Winchester
Hampshire
SO23 7QA

Trinity House
Engineering Department
Trinity House Depot
East Cowes
Isle of Wight
PO32 6RE

Department of Transport
Marine Directorate Navigation and Communication
Official Post Branch
Room 653
Sunley House
90-93 High Holborn
London WC1V 6LP

Home Office
Radio Frequency and Communication
Planning Unit
Horseferry House
Dean Ryle Street
London
SW1P 2AE

Scotland Only

Directorate of Telecommunication
Scottish Office
St Andrew's House
Edinburgh
EH1 3DE

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