



# **Wind Energy Strategy Report**

*Prepared for*

**Kilkenny County Council**

*By*



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## 1. - Introduction

### 1.1 TERMS OF REFERENCE

CAAS Environmental Services has been commissioned by Kilkenny County Council to prepare a report setting out a Wind Energy Strategy for the county.

The objective of this report is to evaluate and analyse wind energy resources within County Kilkenny, to define environmental and planning considerations for windfarm development and to make recommendations on how Wind Energy Resource Development Policy and Practice can be improved. This report will form the basis for assessment of windfarm planning applications and will assist in the decision making process.



## 2.- Evaluation Method

The study examines the potential for using and developing wind energy in County Kilkenny. It takes account of the relevant International, National and County Policies as well as the principal environmental, planning and technical criteria that determine the feasibility of the existing environment to absorb windfarm developments.

Environmental evaluation criteria at County level include the spatial analysis of land uses, designated ecological areas and topography (slopes and ridge lines). These are described and mapped in Section 5.1.

Land use planning criteria includes the existing relevant development control policies as set out in the Kilkenny County Development Plan 2002, described on Section 5.2. The national policies such as the Governments Climate Change Strategy and the Department of Environment and Local Government Guidelines on Windfarm Development are also taken into account. Other criteria embrace the international Kyoto commitment to reduce greenhouse gases by promoting the use of renewable energy sources and the EU Renewables Directive.

Technical criteria include wind speed, grid connection potential, site suitability (construction and operational), described and mapped in Section 5.3. The most significant environmental and planning evaluation criteria are generally recognised as the extent of visibility or 'viewsheds', which raise significant concerns.

In relation to this matter, possible future development scenarios have been described and mapped (see Section 6.3) to indicate the significance of visual impacts derived from windfarm developments for the overall planning policy in the County.

The County Wind Energy Strategy addresses wind farms, tall wind turbines (in excess of 20m) and groups of turbines (2 to 5). Individual turbines for private use are dealt with at Section 7.1.



### 3.- Renewable Energy Resources

Development of alternative energy sources is a priority at national and European level for both environmental and energy policy reasons. The context in Ireland is set by Government policies for the provision of electricity from renewable and indigenous sources<sup>1</sup> in line with official European and United Nations targets for reducing dependency on fossil fuels and emissions of greenhouse gases.

It is acknowledged that Ireland has a wind resource which is among the richest in Europe. This is mainly concentrated in the mountainous and coastal areas where landscape quality and environmental designations are also of considerable significance. This, in many cases, leads to significant land use planning conflicts which require careful resolution.

#### 3.1.- CURRENT RENEWABLE ENERGY SITUATION IN IRELAND

The main aim of the Government's National Wind Energy Strategy<sup>2</sup> is to deliver the revised target of 500MW of renewable energy based electricity generating plant announced in the Green Paper on Sustainable Energy<sup>3</sup> by 2005, the majority of which will be supplied by wind energy.

There is currently 125 MW of wind energy operational in Ireland. The initiative in Alternative Energy Requirements<sup>4</sup> in line with Government policies was announced in 1994 and originally intended to obtain 75MW of electricity from renewable sources by 1997. The rules of the competition encouraged large-scale windfarms and consequently, 10 windfarm projects were awarded in the event supplying a total of 73MW. There have been 5 AER competitions to date; AER 5 was launched in 2001.

AER has seen development largely concentrated in the north-western (and mainly upland coastal) region of the country, as contracts have generally been based only on competitive generation (and not supply) of electricity. Liberalised third party access accounts for only 10 % of wind energy, but has allowed some development away from the west coast, in regions where supply factors are favourable.

The fifth AER competition is expected to provide an additional 350MW from new wind energy generation plants, to be installed and running by 2004. Furthermore, the recently announced sixth AER competition will support the building of up to 500MW, by effectively doubling AER 5 targets and details of wind energy up to 470MW.

In Ireland while development of renewable energy is a government policy, the application of this policy is project based, rather than plan based. Consequently, there can often be significant local opposition to new windfarms as a result of concerns in relation to visual impacts, noise generation and effect on infrastructures.

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<sup>1</sup> National Plan 1994

<sup>2</sup> Strategy for Intensifying Wind Energy Deployment, Renewable Energy Strategy Group, Government of Ireland (2000)

<sup>3</sup> Dep. of Public Enterprise; Irish Government Publications, Dublin (1999)

<sup>4</sup> Dep. of Public Enterprise; Irish Government Publications, Dublin (2001)

### 3.2.- FUTURE TRENDS AND DEVELOPMENTS IN WIND ENERGY

As a result of a very strong demand growth in energy requirements, EU's ambitious wind power target, and the existing rich wind energy resource in the country, windfarms in the future are likely to spread onshore and offshore in Ireland. Current typical onshore windfarms have a 2MW to 15MW capacity, and comprise turbines of 500/660kW in capacity. They are connected to distribution networks at 20KV or 38Kv. Likely offshore windfarms encompass a 150MW to 250MW capacity, with 2/3MW turbines. These are generally connected to transmission networks at 100kV or 220kV.

The international trend however, is towards producing ever-larger wind turbines. This is because a small number of large wind turbines on a location of a certain area, yields more output than a large number of smaller wind turbines, which is a critical factor in the more densely populated northern European market. This may not be as important (or even appropriate) in Ireland, which has more rural and sparsely populated regions, but it is unlikely that Ireland can resist the trend, as mass-production economies of scale will dictate that only the larger turbines may be viable. At the moment many projects are planned in which the turbines have a capacity of about 2 MW with rotor diameters of 60 to 70 metres and shaft heights up to 70 metres. A 20% increase in turbine diameter and height can result in a 50% or more increase in electrical output.

Notwithstanding this trend towards larger windfarms and larger turbines, there have been recent new interests in very small (3-5 turbines) developments by farmers seeking alternative income sources. Some analysts believe that there will be a significant increase in the number of such applications.

Measures at the design stage will assist in solving visual and noise impacts of social concern. Similarly, appropriate land use planning considerations will support planners and operators of the Irish power system in the development control of an evident and necessary growth in the use of the wind energy resource.



## 4.- Strategic Considerations

### 4.1.- INTERNATIONAL AND NATIONAL FRAMEWORK FOR RENEWABLE ENERGY

The following is a summary of key objectives for renewable energy identified in government policy documents, programmes and acts.

The **Green Paper on Sustainable Energy**<sup>5</sup> sets the following targets in Ireland:

- Increasing the percentage of Total Primary Energy Requirement (TPER) to be derived from renewable sources to 3.75% by 2005 from 2% in 2000;
- Increasing the percentage of electricity generated from renewable sources from 6.3% in 2000 to 12.39% by 2005. This includes an extra installed capacity of 500 MW of electricity generated from renewable sources by 2005.

The **National Climate Change Strategy**<sup>6</sup> outlines the strategy to meet Ireland's commitment to limit greenhouse gases emissions to a 13% increase over 1990 levels by 2008-2012. Some of the key points relating to renewable energy in the strategy include:

- The reduction of annual CO<sub>2</sub> emissions by 1 million tonnes by 2010 through increased deployment of renewable energy;
- Review of rate and structure of Energy Taxes;
- Fuel switching from coal to renewable energy.

Governments **Strategy for Intensifying Wind Energy Deployment**<sup>7</sup> aims are:

- To deliver the revised target of 500 MW of renewable energy based electricity generating plant announced in the Green Paper on Sustainable Energy, the majority of which will be supplied by wind energy.
- To integrate planning considerations incorporating resource studies and access to the national electricity grid.
- To promote wind energy projects in the form of Alternative Energy Requirements (AER) competitions to ensure the early delivery of additional electricity generating capacity from renewable energy sources.

The **National Development Plan**<sup>8</sup> allocates a total investment of €67 million (£53 million) for renewable energy in the period 2000-2006. The main investment areas target:

- Re-enforcement and up-grading of electricity grid to accommodate increased use of renewable energy;
- Supporting delivery of additional renewable energy supply (including the AER programme);
- Encourage new entrants to the renewable energy market by support for small-scale projects.

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<sup>5</sup> Dep. of Public Enterprise; Irish Government Publications, Dublin (1999)

<sup>6</sup> Dep. of the Environment and Local Government; Irish Government Publications (2000)

<sup>7</sup> Strategy for Intensifying Wind Energy Deployment, Renewable Energy Strategy Group, Government of Ireland (2000)

<sup>8</sup> Government of Ireland; Irish Government Publications (2000)

The **Electricity Act 1999** sets out the following measures:

- Full deregulation of the market for electricity generated using renewable forms of energy as its primary source;
- Priority dispatch of electricity generated from renewable energy sources;
- Establishment of the Commission of Electricity Regulator with a duty to encourage research and development into methods of generating electricity using renewable, sustainable and alternative forms of energy.

The **Kyoto Protocol**<sup>9</sup> is an international treaty which indirectly contains Ireland's commitment to limit greenhouse gas emissions to a 13% increase over 1990 levels by 2008-2012 and which calls for research and development in the areas of renewable energy. Furthermore, the EU target of 12% of energy supply from renewable sources by 2010, enacted by the **EC Directive 2001/77/EC** on the promotion of electricity produced from renewable energy sources, converts a component of the Kyoto target into a requirement for Ireland to generate a minimum of 13.2% of its electricity from renewable energy sources by 2010.

Finally, as a result of the Electricity Act the Government runs competitive tendering competitions (AER) for 15 year Power Purchase Agreements for the generation of electricity from renewable energy generating plants. Thus, the electricity market has been completely liberalised for green energy.



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<sup>9</sup> United Nations Framework Convention on Climate Change (1997)



## 5.- Considerations for Evaluation of Wind Energy in Kilkenny

### 5.1- ENVIRONMENTAL CONSIDERATIONS

#### 5.1.1.- Ecological Designations (see Fig. 1)

Existing ecological designation in Kilkenny County are mapped (See Fig. 1). These include Natural Heritage Areas (NHA), Special Areas of Conservation (SAC) and Special Protection Areas (SPA).

Natural Heritage Areas are mainly located in the environs of the Rivers Nore, Barrow and Suir. There are also a number of NHAs dispersed throughout the County. The following are the locations of the existing and proposed NHAs in County Kilkenny:-

Site Code:	Site Name:	1/2" Map No:
002051	Archersgrove	51
000821	Ardaloo Fen	50
000400	Ballykeefe Woodland	50
000698	Barrow River Estuary	58
000827	Brownstown Wood	58
000830	Clohastia	51
<b>#000831</b>	<b>Cullahill Mountain</b>	<b>44</b>
000401	Dunmore Cave	51[<1ha]
001859	Dunmore Complex	50/51
000832	Esker Pits	51
000402	Fiddown Island	57
001858	Galmoy Fen	44
000403	Garryrickin Nature Reserve	57
000833	Grannyferry	58
000404	Hugginstown Fen	58
002094	Ice House near Inistioge, Co Kilkenny	58 [<1ha]
000836	Inchbeg	50
000837	Inistioge	58
000839	Kilkeasy Bog	58
000405	Kyleadohir Wood Nature Reserve	50
000842	Kylecorragh Wood	58
000406	Lough Cullin	58
001914	Lough Macask	50
<b>#002137</b>	<b>Lower River Suir</b>	<b>57,58</b>
000408	Mothel Church, Coolcullen	51 [<1ha]
000843	Mount Juliet	51
000844	Murphy's of the River	58
000845	Newpark Marsh	51
000409	Rathsnagadan Wood	58
000846	Red Bog, Dungarvan	51



<b>#002162</b>	<b>River Barrow and River Nore</b>	
002076	River Nore/Abbeyleix Wood Complex	44
<b>#000849</b>	<b>Spa Hill and Clomantagh Hill</b>	<b>50</b>
<b>#000407</b>	<b>The Loughans</b>	<b>50</b>
000410	Thomastown	51
000411	Tibberaghny Marshes	57
000855	Whitehall Quarries	51

NHAs are national designation introduced by the Wildlife (Amendment) Act 2000 however these designations are not yet in force as the relevant legislation has not yet been enacted. Development within an NHA may be considered by the Minister and permitted for *'imperative reasons of overriding public interest'* including those of social or economic nature. In practice, development proposals within NHAs are typically refused or given consent with conditions.

Special Areas of Conservation cover the riverbanks of the Nore River, crossing the County with a north-southerly direction, as well as the western banks of the River Barrow and the eastern banks of the River Suir.

SACs have been created by the Habitats Directive (92/43/EEC) to enable the protection, conservation and, where possible and necessary, restoration of certain habitats and/or species. Designated SACs are compiled within a framework of protected areas – i.e. *Natura 2000*. Developments that may impact on priority habitats and/or species (rare habitats and species that have been given priority status in Ireland) may only be allowed for health and safety reasons whilst for non-priority habitats and/or species, reasons for granting permission may also include economic and social ones.

There are neither existing nor proposed Special Protection Areas (SPA) in County Kilkenny.

Whilst every individual project is considered on its own merits, windfarm developments proposed within the boundaries of any of the ecological designations mentioned above, have been typically refused. In practice, it is apparent that the scale, dimensions and characteristics of windfarm projects significantly affect the quality and integrity of designated natural areas. However, windfarm developments typically disturb only 2% of site terrain, thus disruption to the natural environment is minimal. It is considered that proper management during establishment and decommissioning of windfarms will ensure negligible disturbance to a sites natural habitat. In conclusion, even though ecological designations represent key factors on planning terms, they could prove favourable for future windfarm developments.



### 5.1.2.- Areas over 200m of Altitude (see Fig. 2)

All areas above 200m are mapped both as the wind resource and also as landscape constraints because such areas will generally be characterised by limited vegetation and larger open fields. Elevation also provides an indication that these areas are likely to be more conspicuous than the surrounding landscape.

Areas above 200m are also likely to form the context for larger vulnerable features such as ridgelines. Primary ridgelines (visible only against the sky from many lower viewpoints) and secondary ones (visible at least from some prospects below a distant primary ridge line) perform important roles in providing an area with its identity and defining visual boundaries. They also can act as dominant landscape focal points. Due to the influence of ridgelines, in particular in a county dominated by significant areas of lowlands, such as Kilkenny, development in such sites can appear disproportionately visible over a wide area.

### 5.1.3.- Population Concentrations (see Fig. 3)

The total population of County Kilkenny in 2002<sup>10</sup> amounted 80,421 persons. While the total population increased almost 7% in the period 1996-2002, parts of the County experienced population decline. Growth was predominantly concentrated in eastern and south-eastern areas, and in the proximity to the main towns, particularly Kilkenny, Callan and Thomastown.

Kilkenny is a predominantly rural county with a strong pattern of independent towns and villages connected by the national and regional roads networks. There are a considerable number of smaller villages and settlement clusters with low population densities.

In 2002, approximately 88% of the population lived in rural areas<sup>7</sup> and the population increased more significantly in rural areas than in urban centres. These areas continue to experience severe development pressure. The share of population accounted for by urban centres remained stable, while that of the environs of the towns of Kilkenny, Callan, Thomastown and Castlecomer continued to rise.

As a result of the rural character of the County, the dispersed settlement pattern and the existing development pressure, it is likely that in many cases windfarm developments will lead to land use planning conflicts and significant local opposition, due mainly to concerns in relation to visual and landscape character as well as impacts due to noise generation.



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<sup>10</sup> Census 2002, Central Statistics Office, Preliminary Report

#### 5.1.4.- Landscape Sensitivity (see Fig. 4)

Every landscape can be affected to some degree by new developments. For the purpose of development control, it is important to determine the extent of the land affected by the visual impacts of the proposed development.

It is reasonable to assume that any evaluation of the visual impact of a proposed development should have regard to whether the area of the visual impact has been kept to a reasonable minimum, so that actions by an individual do not impose disproportionate effects on the community as a whole.

To illustrate the extent and significance of visual impact from windfarm developments, areas of potential visual impact around the locations of the current windfarm planning applications have been created (see Fig. 5). It is conservatively assumed that wind turbines are significantly visible from a distance not exceeding 5km. As the space between viewing location and wind turbines expand, the prominence decreases. For this analysis 10Km is used as the maximum potentially visual extent – though in practice windfarms in elevated areas are plainly discernible at distances in excess of 15-20Kms.

Further windfarm establishment is likely to increase the visual extent and, therefore, the visual impact of such developments throughout the county (see Scenarios of potential future distribution of windfarm applications –i.e. Figures 8 to 11).

### 5.2.- PLANNING CONSIDERATIONS

#### 5.2.1.- Kilkenny County Development Plan

The current strategy of Kilkenny County Council for renewable energy is outlined in the Kilkenny County Development Plan 2002. Development Control policies have been formulated to ensure that necessary social and economic development is approved whilst maintaining the overall quality of the environment.

Within the Development Plan, energy, planning, land use and environmental policies, criteria and procedures with regard to wind energy developments can be compiled from the following sections:-

- **Energy (Chapter 6, Section 6.6)**

The Council strongly supports national and international incentives for limiting emissions of greenhouse gases and encouraging the development of renewable energy resources.

It is stated that the Council has had regard to the National Climate Change Strategy in framing its policies and objectives in this development plan.

It is the policy of the Council to support the development of alternative forms of energy where such developments are in accordance with the proper planning and land use evaluation of the area.



- **Wind Energy (Chapter 6, Section 6.6.2)**

The County Development Plan states that the County Council has the intention to develop a spatial planning strategy for the county, which will identify:

- Strategic areas, which will be key areas deemed eminently suitable for windfarm development
- preferred areas which are suitable
- areas open for consideration and
- no-go areas,

It will be a specific objective of the Council to prepare a spatial planning strategy for the development of windfarms within the County. In the interim, development proposals will be assessed on their merits having regard to the relevant Government Guidelines.

Where proposals for windfarms come forward in areas which are designated as Areas of High Amenity, each application will be dealt with on its merits and any proposal, if permitted, will be subject to stringent conditions relating to aesthetics, siting, design, colour and landscaping.

- **Landscape Protection Policies (Chapter 9, Section 9.4.2 to 9.4.5)**

The County Council aims to protect the high quality landscapes of the County by designating Areas of High Amenity (see Fig. 4). These are areas in the county, which have out-standing natural beauty and/or unique interest value.

The policy context recognises that measures will be taken to control all development within the Areas of High Amenity so as to exclude from them any development which would be prejudicial to their natural beauty and visual amenity.

It is also stated that where development is permitted within areas of high amenity a very high standard of siting design and landscaping will be required in order to ensure that the proposed development will be assimilated into the existing landscape.

The County Development Plan also recognises that there is a need to protect and conserve views and prospects (see Fig. 4) adjoining public roads and river valleys throughout the county where these views are of high amenity value. Policy measures to achieve these include:

- a) To preserve, improve and open up places or areas from which views or prospects of high amenity.
- b) To control development so that views or prospects are not obstructed.

However, it is stated that in conserving views, it is not proposed that this should give rise to the prohibition of development along these routes but development, where permitted, should not seriously hinder or obstruct these views and should be designed and located to minimize their impact.

It is an objective of the County Council to compile, within the plan period, a Landscape assessment of the County types of development. The purpose of this is to evaluate the sensitivity of particular landscapes within the County.



## **5.3.- TECHNICAL AND OTHER RELEVANT CONSIDERATIONS**

### **5.3.1.- Wind Speed**

The cost at which windfarms can generate (and in some cases, supply) electricity depends on many factors (access to grid, construction costs, planning considerations etc), but wind speed is of course a critical factor. The viability of windfarms depends on these costs and the price which they are paid for the electricity. Given prices offered under the recent Alternative Energy Requirement 5<sup>th</sup> competition, wind speeds above 8.5 m/s at 50 m hub height is generally required. Future schemes may however enable some windfarms in favourable sites (close to consumer demand or where the windfarm will reinforce the grid) to be viable at lower wind speeds – perhaps down to 7m/s.

Elevation obviously has an impact on wind speeds, but is not all determining – for example wind energy at sea level on the west coast may be higher than at 300m elevation in the midlands. Furthermore construction, grid connection and maintenance costs may be higher at greater elevations and therefore affect viability.

Kilkenny wind distribution presents generally an average of 7 to 7.5 m/s of wind speed<sup>11</sup>. However, wind speed in elevated areas of the County has not been properly monitored yet. In any case, wind power is available for energy generation in County Kilkenny and windfarm developments are likely, in general, viable in economic and technical terms at some sites, principally at those areas above 200m in elevation.

### **5.3.2.- ESB Grid Connection**

220Kv and 110Kv electricity lines are mapped to show the main route corridors of the ESB coverage (See Fig. 3). Large windfarms produce large amounts of electricity which needs to be fed into the electricity network – this can be a constraint both in practical and cost terms to the location of large windfarms. In addition to grid connection, the transport of energy from the turbines to a substation, which connects to the grid, will usually require the establishment of ancillary infrastructure which may create additional visual impact. However, the new connection of the wind turbines to the substation (and sometimes from the substation to the grid) generally uses underground cables, minimising the visual impact of overground cables carrying the electricity to the main grid.

The scale of modern larger windfarms can however ensure that grid connection cost (up to 10-15Km) is generally not a significant constraint.

A separate planning permission is normally required for connection of the power lines to the national grid.

### **5.3.3.- Noise**

There are two sources of noise from wind turbines: the mechanical noise from the turbine and the aerodynamic noise from the blades. The former can be considerably reduced by appropriate engineering practice. The aerodynamic noise depends on the rotor speed, which in return depends on the wind speed.

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<sup>11</sup> Windmap for Ireland (2001)

In any case, noise levels emanating from proposed windfarm developments when measured at the nearest inhabited house should not exceed 40dB(A) (15 minute leq.) at a wind speed of 5m/s and 45dB(A) (15 minute leq) at wind speed in excess of 10m/s<sup>12</sup>. Measurements shall be made in accordance with I.S.O. Recommendations R.1996/1 "Acoustics-Description and measurement of Environmental Noise, Part 1:Basic qualities and procedures".

In general terms, and as a result of the typical population density of rural parts of County Kilkenny, it is likely that noise does not represent a major concern or case for objections. Nevertheless, noise impacts should be assessed in relation to the nature and character of the surrounding environment. Strategic measures should be taken to ensure a good acoustical design of turbines, in order to guarantee that there are no significant increases in ambient noise level at nearby surroundings, which could affect private properties and wildlife.

#### **5.3.4.- Access Roads**

The development of an efficient strategic transport system in line with national policy is essential to the future economic social and physical development of County Kilkenny.

The Council's long-term objective is to implement the Governments strategy for National Roads within the County and to develop an integrated sustainable system of transport.

An integrated and enhanced road network based on the National Routes linked to Regional, County and Local Roads (see Fig. 3) will offer major benefits to the County as a whole and to the regional and national economies, including:-

- supporting links to the main urban areas, towns and ports in the Region
- improvement in road safety and maintenance of road capacity
- reducing isolation, improving the quality of life and fostering rural development, diversification, natural resource development and tourism

In the interest of proper planning and sustainable development, Kilkenny County Development Plan states that the County Council will allow, among others, the development of new roads in large or strategic developments, particularly that associated with agribusiness, tourism and the need to promote rural resource development.

In any case, access roads to windfarm sites should be minimised. Windfarms availing of currently existing roads further reduce the footprint of the development on the proposed site. Therefore, the use of existing roads and farm tracks must be encouraged at all times, avoiding the construction of unnecessary roads. Where new access roads are required, unsealed surface (e.g. quarry screenings) over compacted surface should be applied to allow minimum disturbance of the proposed site.



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<sup>12</sup> Wind Farm Development Guidelines for Planning Authorities, Dept. of the Environment (1996)

## 6.- Evaluation

### 6.1.- TYPICAL WINDFARM IMPACTS

Major windfarm impacts and concerns principally arise due to the visual impact of the wind turbines with the landscape.

- **Receiving Environment**

There are three typical scales of landscape enclosure with the Irish Countryside - all occur within Co. Kilkenny.

Small-scale enclosures - these are provided by trees and field boundaries - such as hedgerows. These effectively cause objects up to 10m in height to become quickly screened at distances in excess of 300m (approx).

Medium-scaled Enclosures these are provided by local topographic features and variations -such as rivers and stream corridors, glacially formed features (eskers and drumlins) and features caused by gradual erosion of sedimentary and superficial deposits. These effectively cause objects up to 50m to become screened at distances in excess of 5 km from the object.

Large-scaled Enclosures topographic features of geographic origin – hills, mountains and plateaux, provide these. They are rarely less than 150m in height and screen objects throughout the landscape.

- **Turbine Impacts**

The height, colour and movement of turbines mean that they will generally be distinctive, conspicuous and contrasting within almost all Irish landscapes (The exception being within existing large-scale industrial environments - such as major ports). Visibility is limited only by the horizon (15 – 25Km) or by large-scaled enclosures (See above). Weather conditions may play a significant role in limiting visibility during mist and cloud or heat haze. However, a significant impact is generally experienced within a radius of 10 to 15kms from the location, both in visual and landscape character terms.

### 6.2.- EXISTING AND EMERGING TRENDS

Four Planning Applications for windfarm developments have been submitted to Kilkenny County Council to date since 1998 (see Table 1). Two wind measuring masts have been granted temporary permission.

The proposed windfarms are located along the River Nore, to the south-east of the County (see Fig. 6). The proposed windfarms involve upland location.





Reg. Ref	Applicant	Site/Townland	No. Turbines	Output (MW)	Status
02/1072	ART Generation Ltd.	Ballybeagh	5	175 MW	Further Information
01/1744	Wind Energy Developments c/o Rural Developments Consultants	Ballyvoal	4	660 KW	Further Information
01/1328	Wind Energy Developments c/o Rural Developments Consultants	Ballyvoal	1 wind measurement mast	N/a	Granted
01/937	Tom Tennyson	Bohilla	4	N/a	Further Information
00/1510	Tom Tennyson	Bohilla	1 wind measurement mast	N/a	Granted
98/948	Pollution Free Electricity Ltd.	Ballygub New	4	N/a	Further Information (5/11/98 – No reply to date)

Table 1. Windfarm planning applications to date.

Planning Applications were subject to a rigorous examination of their environmental implications and four of the proposed developments have been asked for further information.

Pre-planning application inquiries have also been recorded.

Applicant	Site/Townland
N/a	Tullagher
N/a	Mt Nugent, Johnswell
ESB	Brandon Hill

Table 2. Windfarm pre-planning inquiries to date



### 6.3.- FUTURE SCENARIOS

There are a number of factors in County Kilkenny, which indicate that there is likely to be a significant increase in the number of windfarm planning applications in the immediate future. These include:-

- the availability of a suitable wind resource
- liberalisation of the Electricity Market and the ideal opportunity for dispersed deployment of “embedded generators” like windfarms, CHP etc.
- the current limited contribution of Co. Kilkenny to renewable energy in Ireland

A number of future possible scenarios predicted for wind energy development in the county are as follows:-

- Small number of large farms with larger turbines – principally on uplands
- Mixed large and small with larger turbines – principally on uplands
- Mixed large and small with larger turbines – geographically dispersed
- Development segregated by type and place

However, and in general, large wind turbines are more likely to be used in future applications due to the enhanced power capacity.

Future wind energy projects in the County are most likely to occur where a consistent combination of some or all of the following factors occur:

- High energy sites (Lands over 200m elevation)
- Sites adjacent to the grid (110Kv or more)
- Precedence of current windfarm planning permissions

These factors are illustrated in Figure 7. They form the basis for predicting the locations of the future windfarm application locations that are used in the scenarios described below. Environmental considerations shall always be taken into account as they present constraints to windfarm developments (see Figure 5).

Four scenarios have been prepared and mapped (see Fig. 8, 9, 10 & 11) to illustrate the zone of visual impact and extent, likely to be created by future potential windfarm developments.

#### **Scenario 1**

Wind energy developments located to the south-east of the County. Current windfarm planning applications principally fall within this area of the County (see Table 1 and Fig. 8).

#### **Consequence**

Figure 8 shows that granting windfarm applications to the south-east will have a significant impact in the area due to the high amenity and scenic value of the area, existing ecological designations and relatively high population density.



### **Scenario 2**

Windfarm development located along the north-eastern plateau.

#### **Consequence**

Figure 9, shows that granting permission for windfarm development along the north-eastern plateau will also entail major visual impacts. Due to intervisibility of windfarms and the open nature of the County, the visibility of potential windfarms in this area will extend to major population centres, including Kilkenny City. Taking into account that Kilkenny City and environs present the highest population density in the County, it is likely that the cumulative effect of windfarm developments will generally increase concerns on affected population. Development associated nuisances and visual impact are anticipated to be significant.

### **Scenario 3**

Windfarm development located along the north-western upland area of the County.

#### **Consequence**

Figure 10 illustrates that the visual extent of potential windfarms along the north-western uplands will not significantly effect major population centres. Furthermore, as a result of the lack of scenic amenity designations, the lack of sensitive land uses, the uplands moorland landscape character and the notable low population density in the area, It is considered that the environmental and visual impact derived from locating windfarms in this area will be least significant. Nevertheless, taking into account existing proposed NHAs applications shall be evaluated in a project by project basis.

### **Scenario 4**

Dispersal of windfarm developments throughout the County, mostly including mountain locations (i.e. areas >200m altitude).

#### **Consequence**

Figure 11 demonstrates that the dispersal of windfarms creates additional and very significant visual impact that extends over a wider area of the County.

A key factor increasing visual impacts is the intervisibility of windfarms. The generally open nature of the County's landscape, will pose difficulties in the absorption of new and additional developments. . In this hypothetical future scenario, assuming that no measures are taken to grant/refuse windfarm planning applications, the landscape character and visual amenity of the County as a whole will be significantly affected in the near future.

Each singular case shows that granting windfarm applications will have an extended visual impact in County Kilkenny as a whole. However, by limiting



future windfarm applications to a zone, the extent of visual impact will remain confined to certain areas of the County.

#### **6.4. - RECOMMENDATION**

Therefore, it is recommended that impacts are minimised by allocating future developments to a specific area (see Fig. 12) and thus, confine the extent of the visual impact in particular (i.e. avoiding impacts on other landscape character areas) without further affecting the landscape quality of the County as a whole and allowing major areas free of visual impact.



## 7.- Strategy for Co. Kilkenny

The County Council recognises the need to support the development of renewable energy resources. It is likely to be a significant increase in the number of windfarm planning applications, both for large and small number of turbines, in the immediate future. The County Council's Strategic Wind Energy Development Plan will manage the predicted expansion of this type of development, while ensuring that Kilkenny contributes to national targets for renewable energy.

A number of possible scenarios predicted for wind energy development in the County are described in Section 6.3.

From the range of hypothetical future potential scenarios, Option 3 provides the best option in terms of visual intrusion, by avoiding County-wide visual impact. It is generally suggested that the north-west should be primarily used for windfarm developments, as it possesses ideal conditions for windfarm development; appropriate wind speed, low population density and modest visual amenity. The landscape character of the area will be significantly affected by the establishment of windfarms, although the visual impact will be contained locally. Due to the upland character, low population density, minor amenity and ecological significance in the environs of the proposed zone (see Figure 12), impacts from windfarm developments will be minimised and locally confined.

Note that much of the visual impact will occur to the west, within the functional area of Tipperary (North Tipperary). The areas affected are principally extensive areas of peatlands with very low population densities -as well as a short section of a national primary route (i.e. N8). The adjoining Planning Authority should be consulted on this matter prior to adoption.

Grid connection is optimised by locating windfarm developments in the same area – dispersed developments will require new substations, connections to the grid and other ancillary developments. Although at present the ESB 110Kv grid is located approximately 10Km to the west of the proposed zone, a grid connection should pose no major concerns as it could be provided by extending existing lines.

Note that the area defined for Wind Energy Development has an area of approximately 72 Km<sup>2</sup>. Assuming that only 25% were exploited, this would yield energy of between 108MW<sup>13</sup> and 216MW<sup>14</sup> which represent 21.6% and 43.2% of the entire **national** target for the year 2005 (see Section 4.1).

In conclusion, the clustering of windfarms in this particular area of the County is recommended to minimise visual impacts and effects on the environment of County Kilkenny as a whole, as well as to facilitate appropriate grid connections.

The County will benefit from the use of renewable energy resources while visual impacts and nuisances to the population are minimised, and the nature and character of its landscape maintained.



<sup>13</sup> Assumes 18Km<sup>2</sup> at 6MW/Km<sup>2</sup> (1MW turbines every 500x333m)

<sup>14</sup> Assumes 18Km<sup>2</sup> at 12MW/Km<sup>2</sup> (1.5MW turbines every 500x250m)

### **7.1.- INDIVIDUAL WIND TURBINES**

It is recognised that landowners in rural areas may wish to harness wind energy for private use. This is considered a reasonable use of renewable natural resources that also provides opportunities to augment farm incomes.

Planning applications for individual wind turbines shall be considered on their merits subject to the general provisions of the Development Plan and to the specific guidance on individual wind turbines below:-

- Turbines shall be limited to 1 per holding
- Turbine height shall not exceed 20meters measuring to the upper most tip of a vertically extended blade
- Turbines shall only be sited in the immediate vicinity of existing non-residential structures (e.g. farm buildings) that are served by existing access
- Turbines shall generally be coloured mid to dark grey and shall not contrast with surrounding colours.

## 8.- Wind Energy Policy Context for the Designated County Wind Development Zone

The following are a set of indicative policies, specific to the landscape, topography and wind resources of County Kilkenny, that will provide a framework for windfarm development plan review and assessment, notwithstanding the designations of the area.

- Recognise that wind energy is a potentially significant resource in the County
- Continue to facilitate appropriate development that respects the scale, character and sensitivities of the landscape and which complies with the National Guidelines on Wind Energy
- Encourage development (i.e. windfarms, access roads, powerlines and other ancillary development) on or adjacent to already man-altered sites such as forestry, peat workings, etc.
- Encourage windfarm development where its view sheds affect one single aspect of the landscape (such as enclosing valleys)
- Consider development that will not have a disproportionate effect on the existing character of the landscape in terms of location, design and visual prominence

### 8.1 . RECOMMENDATIONS

In assessing development within the designated area of County Kilkenny the Council will seek to maximise the wind energy potential of the designated area with appropriate accommodation of turbines from an electricity network, planning, environmental and landscape perspective.

This will help to minimise effects on local land uses and amenities, minimise visual impact by harmonising wind turbines with the landscape obtain maximum yield by appropriate sitting and layout provide for best utilisation of the grid and allow co-ordination with ESB National Grid (in terms of potential requirement of substation, etc.).

For individual applications it will be necessary for potential developers to show that they have optimised their development along the above lines.



## 9.- Good Practice Guidelines for Application within the Designated County Wind Development Zone

### 9.1.- INTRODUCTION

Windfarm developments should respect the character and diversity of their local landscape setting, sustaining the qualities of both mountain and lowland landscapes, while contributing to Ireland's renewable energy programme.

The following guidelines on good practice<sup>15</sup> in relation to the siting, layout, design and site management are intended to assist Kilkenny County Council and intending developers in the development of wind energy resources while maintaining the quality of the landscape and ensuring that the adverse environmental impacts are minimised within the designated Wind Development Zone.

### 9.2.- GUIDELINES FOR PLANNING AUTHORITY

- The Planning Authority must recognise the importance of wind energy as a renewable energy resource when carried out in an environmentally acceptable and sustainable manner.
- The factors which would determine whether or not windfarm development would be open for consideration within particular parts of the designated area must be established. This should include;-
  - ✓ Local planning of land use considerations including measures to minimise the impact of proposed windfarm in the local environment, both social and physical
  - ✓ Detailed wind energy potential on the basis of the nature and extent of the wind resources in the area
  - ✓ The suitability of the grid and accessibility to it
  - ✓ The suitability of the site, having regard to its other land use policies, including the need to protect important areas of built or natural heritage and high landscape quality from inappropriate development
  - ✓ Sites with significant wind energy potential may be further indicated by the Local Area Action Plan, to be designated solely or primarily as windfarm sites
- Each individual windfarm application must be assessed on its own merits, having regard to the factors considered above



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<sup>15</sup> The **Guidelines for Windfarm Development** published by the Department of Environment and Local Government have been taken into consideration.



### 9.3.- GUIDELINES FOR INTENDING DEVELOPERS - DEVELOPMENT CONTROL –

- Initial discussion with the Planning Authority at early stage is recommended to identify potential planning issues and considerations
  - Local interests should be consulted at early stage both to inform the public and to identify the concerns of the community
  - Large scale windfarm planning applications (i.e. more than 5 wind turbines or having a total output greater than 5MW) should always be accompanied by an EIS; small windfarms may provide a less detailed report taking into consideration potential environmental impacts (see EPA Guidelines on EIS).
  - Planning applications for ancillary developments (i.e. road access, communication infrastructure for control and grid connection works - transformers, substations, distribution/transmission lines, etc) should, where feasible, be submitted with the main windfarm development proposal
  - Windfarm developments should not compromise in any case the proper planning and development of the area and the preservation and improvement of amenities
- Impacts from windfarm developments are mainly **visual** and **environmental**. Consequently, Development Control measures should pay special attention to the size, scale, location, construction materials and structures.
- **Visual** impact assessments have regard to both immediate visual impact and views from a distance;-
    - ✓ Applications should generally be accompanied by visual impact studies, including a study of the zone of visual influence (ZVI) and detailed analysis of views particularly affected (i.e. photomontages)
    - ✓ Visual impact must consider the form and characteristics of the landscape, the existing skyline, the number, layout, size, design and colour of turbines
    - ✓ Special attention must be paid to cumulative impacts of developments
    - ✓ Effect on views from adjoining Counties
  - Best practice should seek for visual uniformity (i.e. same size and proportions, same colour and number of blades, same rotational speed in a given wind speed) (see Section 8.1)
  - All turbines within the designated Wind Energy Zone should rotate in the same direction
  - All turbines should be kept spinning and non-operating wind turbines should be quickly removed/replaced.
  - Solid towers should only be used
  - Developers should consider the use of a small amount of larger diameter turbines than a larger number of smaller turbines for a given power output to give rise to less visual intrusion
  - In order to ensure the aerodynamically efficient operation of turbines, it is generally required that turbines are sited 3-6 rotor diameters apart
  - Specialist advice on colour and finishes, especially in relation to the requirements of the particular location and visual backdrops, should be sought at application stage.
  - In general, matt finishes and neutral colours for turbines and structures should be encouraged



- **Location** represents the most sensitive aspect of windfarm developments. The following recommendations should be considered;-

- ✓ Sitting and grouping of wind turbines should harmonise with the scale and pattern of the landscape
- ✓ There should be a strong presumption against windfarms in Natural Heritage Areas (NHA) and/or other ecologically designated areas (i.e. SAC, SPA) unless there is a clear evidence that the natural amenity involved is not adversely affected
- ✓ If the project would be close to the boundaries of or visible from an adjacent Planning Authority's area, due consideration should be given to amenity controls in that authority's Development Plan
- ✓ Wind turbines should generally be setback from major roads to avoid distracting drivers

- Windfarm proposal can potentially impact on nearby **ecological** and/or **archaeological sites**. An assessment of the potential impacts is required to ensure that;-

- ✓ Windfarm developments do not have a significant negative impact on a site of Ecological Significance
- ✓ Windfarm developments do not have a significant negative impact on a known or likely existing site of archaeological importance
- ✓ Arrangements are made to ensure adequate protection of monuments of archaeological interest and geological/geomorphological sites proposed or designated for conservation

- **Noise**, in the public perception, is the second most sensitive aspect of windfarm developments, particularly due to the fact that windfarms are often located in rural environments. Planning considerations are required to ensure acceptable noise limits should be applied. It is recommended that;-

- ✓ Sites in close proximity to existing houses or other noise sensitive land uses should be avoided
- ✓ A minimum distance of 500m from dwellings is generally recommended but site specific evaluation may vary or further extend the mentioned distance
- ✓ It is recommended that maximum increase in background noise levels by the windfarm does not exceed 3dB(A)
- ✓ Wind turbine noise should not contain any distinguishable tonal or impulse character
- ✓ Conditions should be considered requiring the developer to undertake noise monitoring survey at specified locations and at specified times during the first year of operation in order to determine the type and extent of noise radiation

- **Ancillary developments** (i.e. road access, transformers, substations, distribution/transmission lines, etc) should similarly respect and, where possible, enhance the surrounding environment.

- ✓ Connecting lines within the windfarm should be underground
- ✓ Apart from the wind turbines and a wind measuring mast, no other structures should be located on a windfarm site
- ✓ Transformer housing should be contained within the tower or underground
- ✓ In case of ancillary structures being necessary and the underground option being not feasible, these should be harmonised with the landscape



- ✓ Foundation pads of towers should be at least 500mm below natural ground level to permit full re-instatement of ground after decommissioning
  - ✓ No fencing should be allowed on any part of the site (except for normal livestock fencing when the land is part of an operating agricultural holding)
  - ✓ Access roads should be unsurfaced and follow natural contours of the site to minimise visual impact or cut/fill that would lead to erosion
  - ✓ Access roads to sensitive areas (e.g. ecology/archaeology) should not be open to the public
- Where developers wish to install **wind** measurement **masts** and carry out wind resource analysis, planning authorities will facilitate them, wherever possible, by granting temporary planning permission, for up to 2 years. However, a temporary planning permission cannot be seen as prejudicing consideration of any subsequent proposal for a windfarm.
  - To ensure minimum disturbance during the **general operation** of the project (generally lasting for 20 to 25 years if not otherwise specified) the developer should also take into account the following considerations:-
    - ✓ Shadow flickers (i.e. shadow from operating wind turbines) must be minimised on neighbouring properties
    - ✓ Measures to lessen electromagnetic interference with the transmission of radio and television signals and other transmission systems should be taken
  - To ensure appropriate **construction** and **decommissioning** processes the following conditions should also be considered by the intended developer;-
    - ✓ Assessment of public safety
    - ✓ Limited access routes to the site during construction to minimise effects on ground conditions
    - ✓ Restriction of number, weight, width and axle loading of vehicles where necessary
    - ✓ Minimise staging areas and crane pads
    - ✓ Avoid construction of unnecessary access roads. Access routes are judged in terms of impacts on sensitive habitats, road networks, other land uses, etc.
    - ✓ Drainage implications of the development – keep buffers of undisturbed soil near drainages
    - ✓ Conditions levying financial contributions for reinstatement of roads
    - ✓ Conditions requiring certain parts of the site to be protected during construction (e.g. erosion control measures in areas of sensitive soil or vegetation)
    - ✓ Appropriate management of the site during the operational phase, to keep the site 'tidy'
    - ✓ After decommissioning a complete re-instatement of adversely affected areas and removal of all machinery, equipment and/or material must be carried out (ensuring that disturbed soils are re-vegetated)
  - To ensure that when the life of the project has ceased (typically 20-25 years) the landscape is **re-instated** the following is recommended;-
    - ✓ The developers should submit details of the reinstatement proposal at an application stage



- ✓ Conditions should include a requirement for the immediate removal of structures and the complete restoration of the site, by means of restoring original contours and re-vegetation
- ✓ A financial bond to ensure the proposal is carried out should be sought by the Planning Authority

