TO CATCH THE WIND

The Potential for Community Ownership of Wind Farms in Ireland

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Photograph of Baywind shareholders (front cover and page 23) courtesy of Baywind Energy Co-operative Ltd.

For Further information please contact:

Western Development Commission, Dillon House, Ballaghaderreen, Co. Roscommon.
Tel: 094 986 1441 Fax: 094 986 1443 Email: info@wdc.ie Website: www.wdc.ie

Richard Douthwaite, Cloona, Westport, Co. Mayo. Email: richard@douthwaite.net

Sustainable Energy Ireland, Glasnevin, Dublin 1. Website: www.sei.ie

Renewable Energy Information Office, Shinagh House, Bandon, Co. Cork. Website: www.sei.ie/reio.htm

Foreword

Ireland has one of the most promising, untapped energy resources to be found anywhere in Europe – wind energy. It is one of the few sectors in which the West of Ireland in particular has a major competitive advantage over almost every other region in Europe.

It was for this reason that, early in 2002, the Renewable Energy Partnership (REP), which consists of Brí Nua Community Wind Energy Group, Mayo Community Wind Energy Group and the Western Development Commission (WDC),[1] began to research the potential for communities in the region to benefit from the establishment of wind farms. The REP appointed a firm of consultants, CSA Group Ltd, to prepare a study entitled 'Community Ownership of Wind Farm Projects'. The REP then, working closely with the consultants, prepared this practical guide and accompanying CD Rom. Its objectives were to:

- determine whether Irish communities should become involved in wind energy development and, if so, how best they might do so
- provide communities, local government and interested groups with an understanding of the changes which need to be put in place so that communities could own successful wind farms
- assess whether it is feasible to set up community organisations to enable as many people as possible to invest in wind farm development
- assist community groups throughout Ireland to create their own investment vehicles for wind farm project development.

The REP believes that the residents of areas in which wind farms are going to be built should be offered the opportunity to invest in those farms. At present, wind farm developments bring very few benefits to rural areas, apart from the overall benefit to society of moving towards a more sustainable energy supply. This has contributed to opposition to wind farm construction. Consequently, if Ireland is to develop its wind energy resources to the fullest extent, people living in these areas will have to be given the opportunity to benefit from such developments.

It must be recognised that constraints currently exist to community ownership of wind farm projects. Efforts are ongoing to develop a new policy framework for renewable energy in Ireland which will hopefully address many of these concerns. This review is being facilitated by the Department of Communications, Marine and Natural Resources through a public consultation process 'Options for Future Renewable Energy Policy, Targets and Programmes'. If these concerns were addressed, taking a share in a collectively-owned wind-turbine would not only allow people to invest in the local production of wealth but also give them an immediate annual return on investment of approximately 10 per cent.[2] The Government's 'Green Paper on Sustainable Energy' (1999) gave community ownership of wind farms a strong endorsement and the current consultation and review process will hopefully assist in making community ownership a reality.

Although most countries in Europe have much less favourable wind conditions than Ireland, they have done much more to develop their wind energy resources. Local authority investment, capital subsidies, mandated electricity purchases, investment subsidies and fiscal benefits have all been used in various EU countries to encourage community investment in wind energy. Most EU governments offer support by requiring electricity distribution companies to purchase power from renewable sources at a generous guaranteed price rather than through a competitive bidding process like that still used in Ireland. The Renewable Energy Partnership welcomes the likelihood of a new system being introduced here following the public consultation process referred to above.

The REP believes that, in the right climate, the establishment of a Renewable Energy Advisory Group[3] could enable large numbers of small investors to invest significant amounts of money in a genuinely productive way. It would take time for people's confidence to build up, but the potential is certainly there. The long-term prospects are bright, provided action is taken now to create a supportive policy environment.

The Renewable Energy Partnership
June 2004

1 The Western Development Commission (WDC) is a statutory agency which has responsibility for fostering and promoting economic and social development in the Western Region comprising the seven counties of Donegal, Sligo, Leitrim, Roscommon, Galway, Mayo and Clare.

2 This return has been calculated using the financial model on the CD Rom supplied with this guide. Because some costs are assumed to be the same irrespective of the size of the wind farm, the model is very sensitive to changes in the number of turbines planned. The 10 per cent figure applies to a situation where two turbines are erected and a price of 5.216 cent per kWh is obtained. If more turbines were installed, the return would be higher.

3 See Part I, Section 3.1, Recommendation 7

How To Use This Guide

The guide begins with a brief summary of the key recommendation which has emerged from the examination of the potential for community ownership of wind farms.

Part I presents a detailed analysis of the factors facing wind energy developers in Ireland and compares their situation with that of their counterparts in other European countries where community ownership is much more common. The factors influencing community ownership are identified and recommendations are made to address any constraints.

Part II provides a step-by-step guide to setting up a wind farm and gives details of an approach which could assist communities either to develop their own wind farm once the current constraints have been addressed or to participate in a farm being established by a commercial developer.

We strongly recommend communities read both parts of this guide.

An explanation of abbreviations and a detailed glossary of terms are also provided.

This guide is accompanied by a CD Rom. The CD Rom includes financial templates which enable communities to assess the rate of return for a wind farm project.

Each time a wind turbine symbol appears in the text, it highlights the file which can be located on the CD Rom. The text of this guide is also on the CD Rom. If reading this guide directly from the CD Rom the file names in the text are hyperlinked to the relevant files.

Abbreviations

AER ..... Alternative Energy Requirement
BES ..... Business Expansion Scheme
CA ..... Connection Agreement
CER ..... Commission for Energy Regulation
CHP ..... Combined Heat & Power
EIA ..... Environmental Impact Assessment
EIS ..... Environmental Impact Statement
EPA ..... Environmental Protection Agency
ESBNG ..... ESB National Grid
EWEA ..... European Wind Energy Association
kWh ..... Kilowatt hour
IWEA ..... Irish Wind Energy Association
MCWEG ... Mayo Community Wind Energy Group
MnaG ..... Meitheal na Gaoithe
MW ..... Megawatt
NDP ..... National Development Plan
NGOs ..... Non-Governmental Organisations
NHA ..... National Heritage Areas
PPA ..... Power Purchase Agreement
RD&D ..... Research, Development and Demonstration
REIO ..... Renewable Energy Information Office
ROR ..... Rate of Return
SAC ..... Special Areas of Conservation
SEI ..... Sustainable Energy Ireland
SME ..... Small and Medium-Sized Enterprises
SPA ..... Special Protection Areas
TCC ..... Turnkey Construction Contract
TWh ..... Terawatt hour – a billion kilowatt hours
REAG ..... Renewable Energy Advisory Group
REP ..... Renewable Energy Partnership
WDC ..... Western Development Commission
WIF ..... Western Investment Fund

The CD Rom contains the following files:

File 1 ..... The Guide – "To Catch the Wind"
File 2 ..... The Financial Model for a Sample Wind Farm
File 3 ..... Danish Community Wind Farms
File 4 ..... British Community Wind Farms
File 5 ..... German Community Wind Farms
File 6 ..... Spanish Community Wind Farms
File 7 ..... Irish Community Wind Farms
File 8 ..... Technical Glossary
File 9 ..... Factors Affecting Community Involvement in Wind Farms
File 10 ..... Mechanisms for Community Entry into Wind Farming
File 11 ..... Progressing Community Investment in Wind Farm Projects in Ireland
File 12 ..... Investment Club or Fund
File 13 ..... Types of Legal Structures
File 14 ..... Financing for Community Entry
File 15 ..... Investment Incentives and Exemptions
File 16 ..... Definition of Risk and Opportunity in the Wind Farm Development Process
File 17 ..... Terminology for Calculating Return on Investment
File 18 ..... Operational Plan for Community-Owned Wind Farm
File 19 ..... Wind Farm Project Cycle with Stages for Community Involvement Identified
File 20 ..... Diagrammatical Description of Operational Plan for Development of a Community-Owned Wind Farm
File 21 ..... Operational Schedule for Development of a Community-Owned Wind Farm
File 22 ..... Guide to the Planning Process
File 23 ..... Process from EIA to EIS
File 24 ..... Model Documentation Required by those Providing the Loan
File 25 ..... Understanding the Contracts Matrix
File 26 ..... Relevant Websites
File 27 ..... Diagrammatical Representation of the Contracts Matrix

Potential for Community Ownership of Wind Farms – Key Recommendation

This study set out to explore the potential for community ownership of wind farms in Ireland.[4]

The various factors which influence ownership and community participation were examined and the results of this examination are outlined in detail in Part I of this guide. As a result of this examination, the Renewable Energy Partnership believes that until all or most of the issues listed below are addressed, communities are likely to run into significant resource difficulties if they attempt to develop 100 per cent community-owned wind energy projects. Consequently, unless conditions are extremely favourable, communities should consider refraining from investing in their own wind energy projects as the level of risk and uncertainty is currently too high.

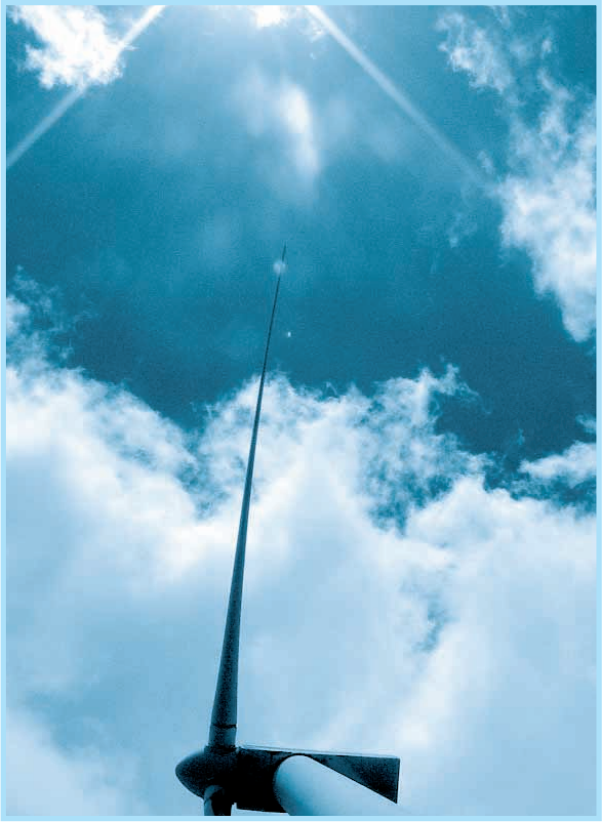
The most promising investment option that communities could currently consider is that of participating in commercial projects once such projects have secured planning consent, a grid connection agreement and a contract for the sale of electricity. The steps communities should take when considering investing in wind farm projects are outlined in this guide.

The issues which need to be addressed before communities can develop projects of their own are:

1. National policy
2. Access to the national grid
3. The Alternative Energy Requirement bidding system
4. Planning permission
5. The price offered
6. Financial supports and incentives
7. Access to information and support structures
8. Community ownership structures
9. Local authority structures

Each of these issues is discussed individually in Part I, Section 3 of this guide and specific recommendations under each heading are included.

During the course of conducting this study, a public consultation process - 'Options for Future Renewable Energy Policy, Targets and Programmes' - was initiated by the Department of Communications, Marine and Natural Resources. This provided the Renewable Energy Partnership with the opportunity to submit its findings and recommendations on the issues which influence community ownership. The submission was made in February 2004. The REP hope that its recommendations will be incorporated into the development of a new national renewable energy policy and that this policy will support community-owned wind energy projects.



4 Refer to the Terms of Reference for the study given in the Introduction.

Introduction

While each county has areas where wind farms are commercially feasible, Ireland's best wind resources are in the West.

The Renewable Energy Partnership (REP), which consists of the Western Development Commission (WDC), Brí Nua Community Wind Energy Group and Mayo Community Wind Energy Group, has spent the past two years finding out whether it is possible and profitable for local people to join with others in their community to generate electricity from the winds that sweep over their hills and shores.

Background to the Guide

The REP was formed in 2002 with the aim of investigating the potential for community ownership of wind farm projects in Ireland. Brí Nua Community Wind Energy Group is located on the Inishowen Peninsula, Co. Donegal and has a keen interest in investing in a small wind project there. Mayo Community Wind Energy Group (MCWEG) is located in South West Mayo and is interested in creating a wind advisory body to assist communities to invest in wind farm projects throughout Ireland. The Western Development Commission (WDC) is a statutory body established to promote, foster and encourage economic and social development in the Western Region.[5] Since its establishment in 1999, the WDC has carried out a series of in-depth analyses of many of the development challenges facing the Region and has set out detailed strategies to tackle them.[6] As a result, it has become involved in regional initiatives in rural tourism and organic agri-food production.

The REP's starting point was the knowledge that community organisations had played a crucial role in the development of wind energy in Denmark. Could their Irish counterparts do so a generation later? The REP appointed, and worked with, a firm of consultants, CSA Group Ltd and its German partners BBB Umwelttechnik GmbH (BBB), to investigate whether Irish communities should become involved in wind energy development and, if so, how best that might be done. Financial assistance was received from the WDC, Sustainable Energy Ireland, Inishowen Rural Development Ltd and the South West Mayo Development Company[7] to undertake this work.

The terms of reference for the study are as follows:

PHASE 1	PHASE 2
To develop a broad profile of the potential for community ownership of wind farms, providing insights to the various factors which influence community participation.	To identify successful models or systems of shared ownership or actions used in other regions which are transferable to community projects in Ireland.
By reviewing existing data identify factors which influence collaboration between the private sector and communities in joint ownership of wind farms.	To determine appropriate structures for shared ownership, indicating for each structure the range of preferred levels of ownership by each party involved in investments in wind farms.
By drawing from the market research studies, and supplementing it with interviews, determine the likely pattern of investment for investors.	To determine the likely financial returns and other benefits to investors from wind farm projects.
To identify viable investment options and to examine the necessary conditions that make investment by the community attractive.	Describe and define appropriate mechanisms for holding individual investments in wind farm projects.
To identify and evaluate the role and contribution of formal institutional supports including those which provide financial, training advice, consultancy, and other measures, which are relevant to wind farms.	To define the steps required to be taken by communities in establishing and promoting a shared ownership wind farm project and define the likely costs involved in setting up and managing a community-owned wind farm investment instrument/mechanism in Ireland.

5 Counties Donegal, Sligo, Leitrim, Roscommon, Mayo, Galway and Clare.

6 See Blueprint for Success; Blueprint for Promoting Foreign Direct Investment in the West; Blueprint for Tourism in the West; Blueprint for Organic Agri-Food Production in the West; The State of the West.

7 Inishowen Rural Development Ltd and the South West Mayo Development Company are LEADER companies.

Introduction

Methodology

As part of this research, meetings were held with local authorities, energy agencies, financial institutions, community groups, farmers, environmental groups, private companies and individuals from rural communities in Mayo, Donegal, Tipperary, Cork and Kerry. Several private wind farm developers, banks, credit unions, and national wind NGOs were also consulted. Wind energy projects in Germany and Spain, with proven community participation, also provided information. In addition, a literature and internet search was conducted to identify best practice internationally.

Outline of the Guide

Part I of the guide summarises the findings of the research and includes case studies of community ownership in Europe and Ireland. An assessment of the issues facing renewable energy development in Ireland and the Renewable Energy Partnership's recommendations for policy change are also given. Part II provides a guide to the steps a community group can take to develop or invest in a wind farm project.

PART I

A Profile of Community Investment in Wind Farms

1 Why Ireland Needs more Wind Farms

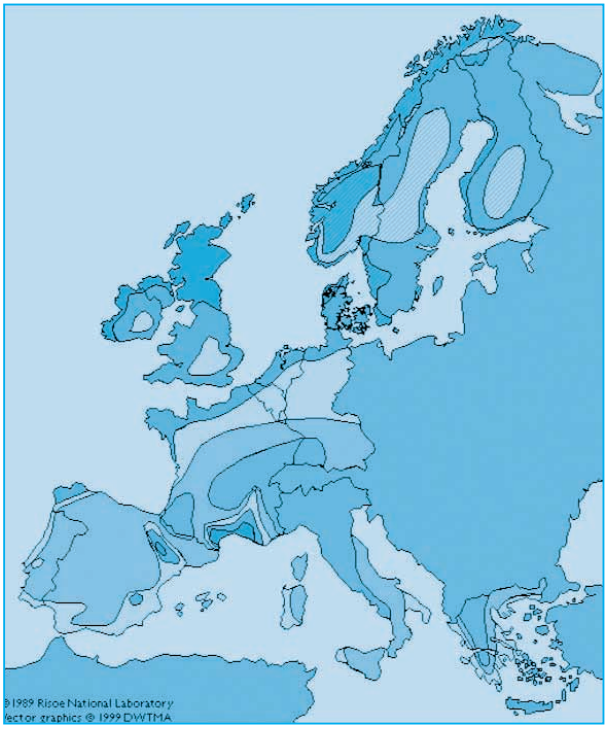
1.1 Ireland - Its wind energy resource and Kyoto commitments

Ireland has the second largest wind energy resource in the EU, exceeded only by Scotland.

As Figure 1 shows the highest wind speeds are on the western seaboard. As the energy that a turbine can extract from the wind increases in proportion to the cube of the wind velocity, most of the best wind power sites are located in the western counties.

According to a study by ESB International, wind could theoretically provide Ireland with around 15 times the total amount of electricity it generates annually from all sources at present.[8] Such generation capacity could allow the country to attract energy-intensive industries and to export power to our European partners.

Figure 1: Where the best winds blow



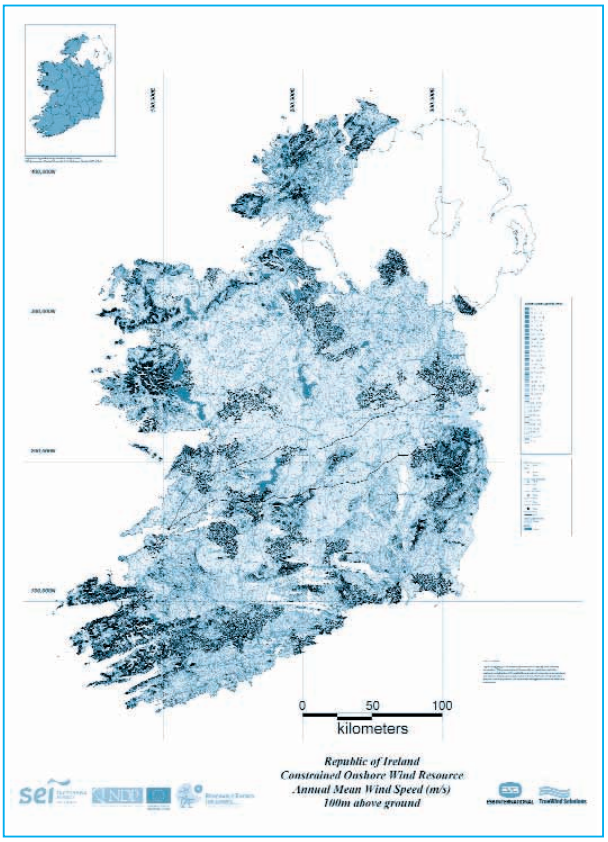
Wind resources at 50 meters above ground level for five different topographic conditions: 1) Sheltered terrain, 2) Open plain, 3) At a coast, 4) Open sea and 5) Hill and ridges.

	m/s	W/m²	m/s	W/m²	m/s	W/m²	m/s	W/m²	m/s	W/m²
	>6.0	>250	>7.5	>500	>8.5	>700	>9.0	>800	>11.5	>1800
	5.0-6.0	150-250	6.5-7.5	300-500	7.0-8.5	400-700	8.0-9.0	600-800	10.0-11.5	1200-1800
	4.5-5.0	100-150	5.5-6.5	200-300	6.0-7.0	250-400	7.0-8.0	400-600	8.5-10.0	700-1200
	3.5-4.5	50-100	4.5-5.5	100-200	5.0-6.0	150-250	5.5-7.0	200-400	7.0-8.5	400-700
	<3.5	<50	<4.5	<100	<5.0	<150	<5.5	<200	<7.0	<400
			>7.5							
			5.5-7.5							
			<5.5							

Source: Riso National Laboratory, Denmark

Sustainable Energy Ireland's (SEI) Wind Atlas for Ireland shows that at 100 metre hub height, every county in Ireland has a commercially exploitable wind resource. See Figure 2.

Figure 2: Sustainable Energy Ireland's Wind Atlas for Ireland shows that at 100 metre hub height, every county in Ireland has a commercially exploitable wind resource



8 The estimated potential electricity generation capacity from the wind was 345 TWh. (ESB International and ETSU, Total Renewable Energy Resource in Ireland, March 1997) In 2001, the total amount of electricity consumed in Ireland was nearly 21 TWh. (Sustainable Energy Ireland, Energy in Ireland, 2002)

1 Why Ireland Needs more Wind Farms

Potential electricity exports and industrial development prospects aside, there is an urgent need to develop Ireland's wind energy resource. The unprecedented rate of economic growth since 1994 has caused the country's electricity consumption to grow rapidly and electricity generation now accounts for around 38 per cent of the country's carbon dioxide emissions.[9] If these emissions, and those from other sources, are not checked and continue to increase, it is estimated that they will be 40 per cent above their 1990 level in 2008.

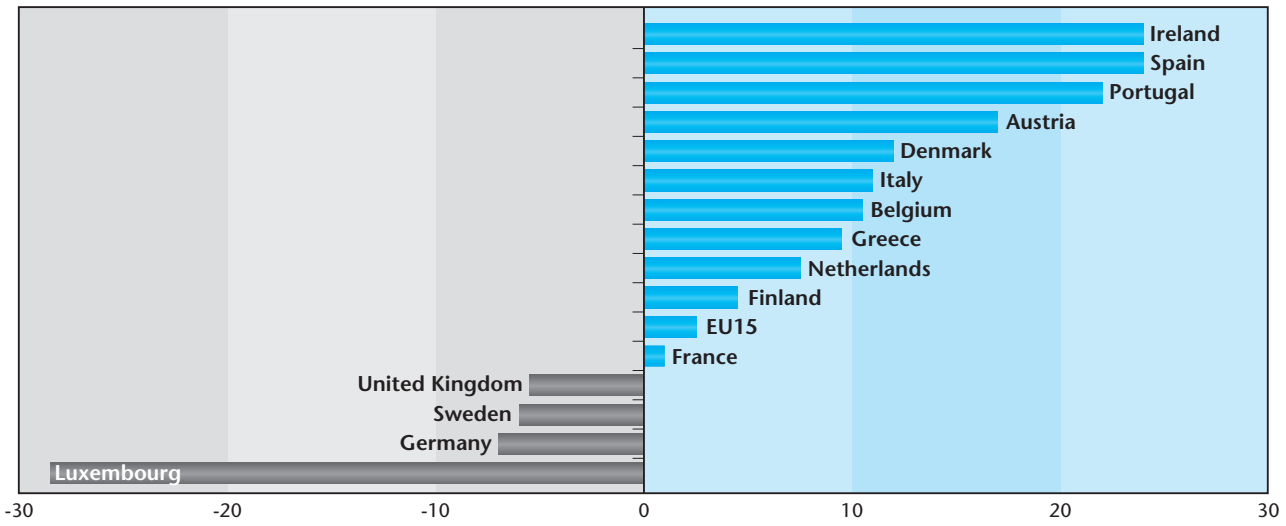
In 2008 Ireland has to honour its commitment to its EU partners that emissions must not be more that 13 per cent above their 1990 level. This commitment was given so that the EU as a whole can meet its Kyoto Protocol pledge to reduce its total emissions by 8 per cent from their 1990 level.

It will be very difficult for Ireland to keep this pledge. The Minister for the Environment, Heritage and Local Government, Martin Cullen, T.D., told the Dáil in 2003

> *'Ireland has the highest levels of emissions growth within the EU, reaching 31 per cent over 1990 levels in 2001. The European Environment Agency has identified us as among nine of 15 (EU) member states*[10] *significantly challenged in achieving Kyoto targets'.*

Figure 3 highlights the problem.

Figure 3: Ireland's Rising Greenhouse Gas Emissions (percentage points above or below target)



Source: European Environment Agency, 2003

If Ireland fails to keep its emissions at or below the 13 per cent increase commitment, it will be able to cover some of the over-run by buying emissions permits from countries such as Britain, Sweden, Luxembourg and Germany. These countries currently have permits to spare because they have achieved a performance above their targets.

However, these permits are likely to be expensive given that a lot of other countries are having problems meeting their commitments too. In addition, European Commission restrictions mean that permits can only be bought to cover emissions up to 10 per cent above the agreed target. Consequently, if Irish emissions are greater than 23 per cent above the 1990 figure, the country will be fined €100 for every tonne of carbon dioxide in excess.[11] Such a fine would, in effect, increase the cost of a kilowatt-hour of electricity from the two new peat stations by 14.3 cent, from Moneypoint, a coal-burning station, by 9.2 cent and by 4.6 cent from a typical gas-fired station.

Put another way, if an additional 1 per cent of Ireland's electricity came from the wind instead of the stations with the worst emissions, the peat ones, it could save the country around €50 million per annum. The calculations for these figures are given in the box opposite.

9 Sustainable Energy Ireland, Energy in Ireland, 2002, page 24. The 38 per cent figure applies to 2001 but is unlikely to have changed significantly since.

10 At the time of this quote there were 15 member states in the European Union, this increased to 25 on 1 May 2004.

11 Runge-Metzger, A., Head of Unit C2, Climate Change, EC Environment Directorate, Elements Conference, Dundalk, 7 October, 2003. The €100 fine only applies after 2008. It will be €40 before that.

Excessive CO_2 emissions: How the potential effect on marginal electricity prices was calculated.

The carbon dioxide (CO_2) emissions from Moneypoint and from a new peat station, Europeat 1, were calculated by Dara Connolly and Sheenagh Rooney of the UCD Environmental Institute in 1997 as part of the EU's ExternE study into the environmental costs of electricity production.[12] This showed that for every billion kWh of electricity produced at Moneypoint, 922,000 tonnes of CO_2 was released (if emissions due to the mining of the coal and its transport to the site are ignored, because these emission largely occur outside Ireland). Europeat 1 releases 1,430,000 tonnes of CO_2 to produce the same amount of electricity.

If fines of €100 per tonne of CO_2 have to be paid, this means that the operators of Moneypoint would have to pay €92,200,000 to produce 1,000,000,000kWh, which works out at 9.22 cent per kWh. Similarly, the fine for Europeat would be 14.3 cent per kWh. Combined cycle gas turbines produce electricity with roughly half the emissions from coal, so we have estimated the additional cost as a result of the fine on such stations to be half that of coal i.e. 4.6 cent.

One per cent of Irish electricity consumption is 240,000,000kWh. The fine on this output from a peat station would therefore be (240,000,000) x (0.143) = €34.3 million. No figures are available for the actual cost of production of peat electricity but the Public Service Obligation levy to cover the difference between the price from a gas or coal station and that from a peat station is €58 million in 2004. This covers about 10 per cent of Ireland's total electricity production, so the subsidy for 1 per cent is €5.8 million. To this has to be added the cost of coal or gas production, say 4.5 cent per kWh, or €10.35 million for 1 per cent of total production. We can therefore say that the total saving from not using peat to generate 1 per cent of Ireland's current electricity output would be €34.3 million + €5.8 million + €10.35 million = €50.45 million.

1.2 The case for community investment in wind farm development

The cost of building wind farms to supply enough electricity to displace 1 per cent of CO_2-emitting generation would be of the order of €125 million. This figure just covers the cost of constructing the wind farms. On top of this would be the expense of developing the grid and providing energy storage or back-up generators to cover windless periods. Even if these additional costs were equal to the cost of building the turbines, the annual €50 million dividend from replacing peat generation with wind generation outlined above would still provide the country with a very attractive 20 per cent rate of return.

The money involved in building wind farms could be readily financed by the corporate sector. However the study shows that, where an interest in investment has been expressed by the community, the residents of areas in which wind farms are going to be built should be given the opportunity to provide as much of the finance as possible. Others with ties to the particular area should also be given the chance to invest. This approach is desirable because:

1. There is a need to increase public acceptance

Experience in Ireland and elsewhere has shown that there can be considerable public opposition to the construction of wind farms in certain locations.[13] This is particularly the case if they are being developed by outsiders solely for their own profit. The opposition generally arises because a typical commercial wind farm creates very few jobs once it is built and consequently brings little benefit to the local community. When plans for a wind farm are announced, tourist and other interests, become concerned that it will spoil favourite views, effect television reception and impact on local wildlife.

Additional fears have developed about dangers to land and property as a result of the bog burst at Derrybrien, Co. Galway in October 2003. Initial investigations show that this was caused by the construction of a wind farm. Memories of this burst may make opposition to wind farm planning applications much stronger in every location of a remotely similar type. It should be noted that systems have now been put in place at Derrybrien to ensure that further slides do not happen and construction there has re-commenced. The experience however does highlight the need for communities to be involved in wind farm projects being developed in their local areas.

12 ExternE National Implementation, Ireland, December 1997.

13 Though a survey conducted by Sustainable Energy Ireland (SEI) in 2003 on 'Attitudes towards Wind Farms in Ireland' indicated a majority of the Irish public favour wind energy and the constriction of more wind farms.

1 Why Ireland Needs more Wind Farms

A useful source of general information on wind energy is 'Wind Turbines in 50 Questions & Answers', Civel Y., O'Donnell M., & Kellett P. The guide outlines where the impetus for wind energy derives, the technology, economic and environmental impacts of wind energy and describes the future of wind energy in Ireland from where it currently stands. http://www.sei.ie/reio/reiobookshop.html

Wind Farms are currently perceived as imposing risks and costs on local communities with no counterbalancing local gain other than the collective gain of moving towards a renewable energy economy. Unless communities are facilitated to become involved in projects being developed in their areas the development of many of the best wind farm sites may prove very difficult. If the industry is not to incur the higher costs of using offshore sites, people living in the districts in which the erection of wind turbines are planned will have to be able to benefit appreciably from them before they willingly give their consent.

In Scotland, commercial developers are routinely offering around stg£1,000 per megawatt per year to local communities. A recent proposal for a wind farm in Sutherland offered stg£2,500 per megawatt.[14] The success rate of planning applications in Scotland is around 90 per cent compared with a rate of 50 to 60 per cent in Ireland.

2. Wind Farm development could provide investment opportunities for people living in rural areas

As both the electricity grid and the wind belong to everyone, the benefits from harnessing them should be spread as widely as possible. At present there are very few outlets for rural people to invest in their own areas, apart from buying land.

However, if the circumstances were right, taking a share in a wind-turbine would not only allow people to invest in the local production of wealth but also give them an immediate return on investment of at least 10 per cent per annum[15] (***File 2: The Financial Model for a Sample Wind Farm)*** which compares favourably to other non-speculative investments they could make. Moreover, this return is likely to rise over the years because the value of the power to be produced by the turbine will

almost certainly increase in relation to other prices. This is for two reasons: firstly, the growing scarcity of oil and gas[16] and secondly, the imminent EU restrictions on fossil fuel usage in response to the threat of climate change. Wind energy therefore could be an ideal way of saving for a pension.

3. Implementation of Government policy

In 1999, the Government published its policy framework for renewable energies in the 'Green Paper on Sustainable Energy'.[17] A target was set of installing an additional 500MW of electricity from renewable sources by 2005. The Paper also gave a strong endorsement to community ownership of wind farms. However despite the welcome establishment of a Renewable Energy Strategy Group in 2000 to develop strategies for increased deployment of wind energy, little progress has been made in the area of community participation. A key element of this study was to examine and develop a broad profile of the potential for community ownership of wind farms in Ireland.[18] In Section 3 of this guide – Potential for Community Ownership of Wind Farms - Findings and Recommendations – the Renewable Energy Partnership outline the changes that could facilitate the Green Paper's objective.

14 Evidence from Baywind Energy Co-operative Ltd to the Enterprise and Culture Committee of the Scottish Executive for the Renewable Energy Inquiry, January, 2004.

15 This return has been calculated using the financial model on the CD Rom supplied with this guide. Because some costs are assumed to be the same irrespective of the size of the wind farm, the model is very sensitive to changes in the number of turbines planned. The 10 per cent figure applies to a situation where two turbines are erected and a price of 5.216 cent per kWh is obtained. If more turbines were installed, the return would be higher.

16 The world's reserves of oil and gas are running down and it has been predicted that the total energy available from the two fuels together will begin to decline in less than ten years.

17 Department of Public Enterprise, Dublin, September 1999.

18 Refer to the Terms of Reference for the study in the Introduction.

1 Why Ireland Needs more Wind Farms

The ability to produce electricity from renewable energy sources to meet one's own needs, with backup supply available from the network, opens the opportunity for local involvement in renewable energy projects. Local co-operatives, representative organisations and other local interests will be encouraged to develop projects in order to offset their own electricity bills. In order to facilitate this, the feasibility of introducing net metering of electricity as a means of encouraging small-scale renewable energy production will be examined by the Renewable Energy Strategy Group.
Ireland's Green Paper on Sustainable Energy, 1999

National Policy Documents

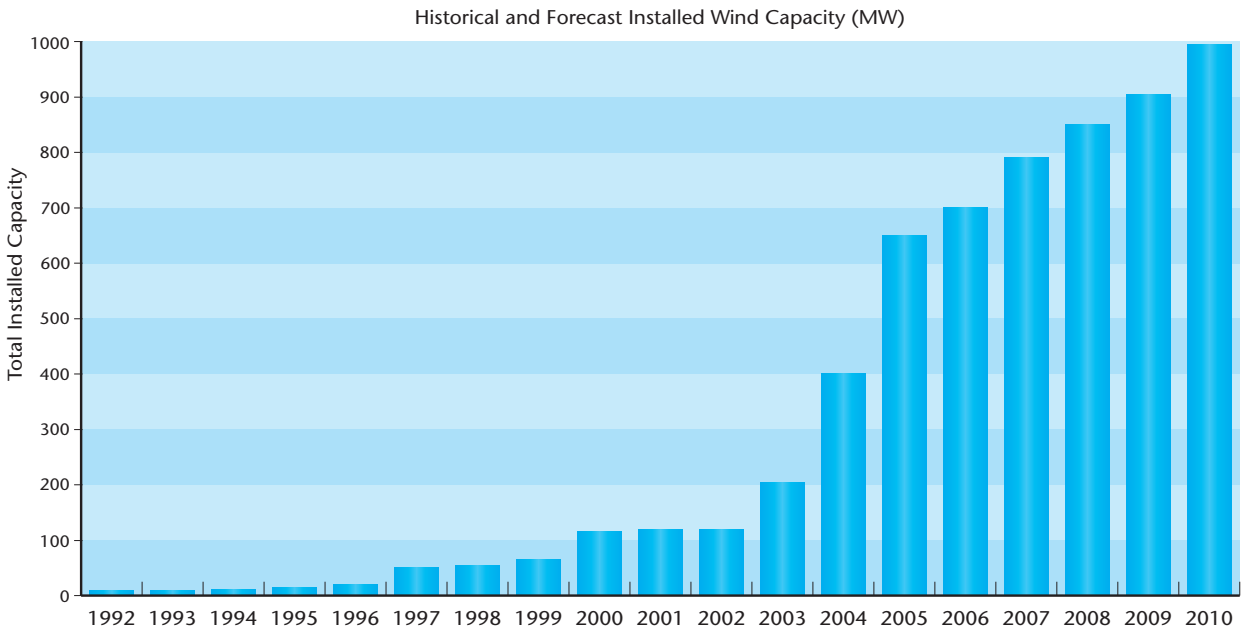
Renewable Energy: A Strategy for the Future, 1996 www.dcmnr.ie

Green Paper on Sustainable Energy, 1999 www.dcmnr.ie

Strategies for Intensifying Wind Energy Deployment, Renewable Energy Strategy Group, 2000 www.dcmnr.ie

As Figure 4 shows, the rate at which wind turbines were installed in Ireland was very slow until 2002. The Government is, however, expecting the rate to increase rapidly from now on.

Figure 4: Irish Wind Energy Generating Capacity – Installed and Projected (MW)



Source: GAD Report, Eirgrid, 2003

The Case for Community Investment: A Summary

1. There is a need to increase public acceptance of wind energy.
2. Wind Farm development could provide investment opportunities for people living in rural areas.
3. Progress on facilitating community ownership of wind farm projects could assist in the implementation of Government policy.

2 How Communities have already Invested in Wind Energy Projects

2.1 The European wind energy experience

Community investment in wind energy has worked well in Germany and in Britain. The real success story, however, is Denmark.

The steady demand for turbines from Danish community projects enabled infant manufacturers to stay in business during periods in which commercial and export demand almost disappeared. These companies then went on to become some of the largest producers of turbines in the world.

2.1.1 A Danish case study

The Danish experience is very relevant to Ireland in view of its similarity in population, size, wind resource and co-operative tradition. The popular movement to invest in wind energy on a community basis in Denmark can trace its origins to three families living in Ny Solbjerg on the outskirts of Aarhus. After the sharp rise in oil price in 1979 families and neighbours, who had previously shared a snowplough, decided that they should club together to buy a wind turbine to meet their energy needs. They would erect the turbine on the boundary where their properties met and sell any surplus electricity to the grid. This was a bold step as about €45,000 (€177,525 today based on the increase in the consumer price index since 1979) or €15,000 per family was needed to purchase the 55kW turbine they had in mind. Two of the families needed to take out loans secured on their properties to raise their share.

The local electricity company (Denmark has 110 regional power distributors) was much less enthusiastic. In fact it said quite categorically that there was no question of its accepting the group's power. It took political lobbying, a debate in the Folketting (parliament) and the direct intervention of the Minister for Energy to get that decision reversed and the grid connection made. A further two years of negotiations over the price followed but the agreement they made formed the basis of all subsequent group connections. Under it, they delivered all the power they produced to the public network and were paid 85 per cent of the household price for it. They then bought back all the electricity they needed at the full price.

When these generous purchase arrangements were announced, the group was almost overwhelmed by people telephoning to ask for help in setting up their own turbines. A total of 377 turbines were installed between 1979 and 1980 and wind power guilds were set up all over the country, drawing on a rural co-operative tradition that is very similar to that in Ireland.

Support Mechanisms

The only limitation imposed by the Danish Government on other groups getting similar treatment was that all members of a guild had to live in the same electricity supply area and within 3km of its turbine. No Environmental Impact Assessment (EIA) or Environmental Impact Statement (EIS) was required so long as there was 'no major impact'. The idea was that if people in the area around the turbine experienced any inconvenience from it, they should at least be able to enjoy its advantages. Persons from outside the area were not allowed to invest in these turbines and gain the advantage of cheaper electricity without being affected by any noise or visual disturbance from the turbine sites.

The emergence of the guilds[19] was a crucial factor in generating political support for the development of wind power. The first fruit of this was the adoption by the Folketting of the 1981 Energy Plan, which gave grants covering one third of the cost of installing a turbine. Three years later, the grants were replaced by a subsidy of 15.5 ore (1.9 cent) plus VAT for every kWh supplied to the grid. As a result, the buying price in 1994 was between 60 and 65 ore per kWh, depending on the price of power in the area in which the turbine was located. This was equivalent to roughly 8.25 cent per unit, and included a 27 ore (3.4 cent) state subsidy. According to Johannes Poulsen, the managing director of Vestas, Denmark's and the world's largest turbine manufacturer, this was enough to give a 15 per cent return on the capital invested.

The subsidies were limited to 150 per cent of each household's electricity consumption.[20] An average Danish household consumes 6,000kWh per annum so a typical guild member could avail of subsidies for the production of 9,000kWh. Any income over this was taxed. The requirement that participants in community schemes had to live within 3km of the turbines was later extended to 10km. The production of up to 30,000kWh by any person who lives, works or owns property in the borough in which the turbines are sited is now allowed.

[19] Danish guilds are partnerships rather than co-operatives because Danish law does not allow the members of a co-operative to set the interest they pay on its loans against their personal income tax.

[20] CSA Group Ltd, Final Report submitted to the Renewable Energy Partnership December 2003, p.107. Other material on wind energy in Denmark is taken from Douthwaite, R., Short Circuit, Lilliput Press, Dublin, 1996.

2 How Communities have already Invested in Wind Energy Projects

The tax relief and high guaranteed prices for wind electricity made Denmark not only a world leader in wind power generation, but also the leading global centre for turbine research, engineering and sales. Thousands of jobs were created. Wind Farms, 80 per cent of which are community-owned, now account for almost 22 per cent of Danish energy needs and more than 100,000 Danish families are wind guild members. Most financed their participation with loans provided by local savings banks and credit unions. Denmark intends to generate 50 per cent of its energy, 5500MW, from the wind by 2030. ***File 3: Danish Community Wind Farms***

In drawing lessons from Denmark's experience it should be remembered that Danish communities became involved in wind energy in the early phases of the technology's development. This was a time when the turbines and the wind farms themselves were too small to interest the established power generating companies and large investors. This helped incubate small locally-financed community projects. Irish communities will not have this advantage unless a degree of protection is provided.

2.1.2 The British experience

The best-developed British example of community investment in wind energy began in 1996 when a Swedish company, which had developed a wind farm at Harlock Hill in Cumbria, offered ownership to the local community through the Baywind Energy Co-operative Ltd. The co-operative was established as a vehicle for community investment. The offer was based on a renewable energy investment model widely used throughout Scandinavia. Two share offers raised nearly stg£2 million, 50 per cent of which came from people living in Cumbria and North Lancashire. This enabled the co-operative to buy three turbines and in 2001 it took out a bank loan to buy the remaining three. The co-operative has run the Harlock Hill site ever since. ***File 4: British Community Wind Farms***

Today Baywind Energy Co-operative Ltd has 1,300 shareholders and owns six wind turbines on two sites. The co-operative has a minimum shareholding of stg£300 and a maximum of stg£20,000 to allow the widest possible ownership and works on the principal of one member one vote. Seven shareholders are elected by the others to sit on the board. All profits from electricity generation are distributed to the shareholders after the co-operative has met its operating costs. Since 1996 members have received between 5.6 per cent and 6.6 per cent pre-tax return on investment or between 7 per cent and 8.2 per cent return under the British Government's Enterprise Investment Scheme.[21] Members will receive their capital back at the end of the project's life. If their money was on deposit with a bank at present they would earn from 1 to 3 per cent.

In addition, a percentage of the co-operative's income is diverted to an energy conservation and educational trust for the locality. The trust has worked with the local community for seven years to provide energy efficiency advice and grants to homeowners and community organisations in conjunction with the Carlisle Energy Efficiency and Advice Centre. In addition, schools and colleges receive grant assistance and support. Representatives from Baywind advise other community groups and hundreds of people from the UK and overseas have visited the site at Harlock Hill.

[21] The Enterprise Investment Scheme is similar to the Irish Business Expansion Scheme. It aims to help smaller trading companies raise equity finance from outside investors by offering tax incentives to them. Under the scheme, investors can take an active part as directors in the management of the companies in which they invest. The scheme is administered by the Inland Revenue and further details can be obtained at www.dti.gov.uk.

2 How Communities have already Invested in Wind Energy Projects

Energy4All Ltd

Baywind Energy Co-operative recently established Energy4All Ltd to enable communities throughout Britain to invest in and develop their own renewable energy developments or to join in larger developments in their region. According to Angela Duignan, Project Development Manager of Energy4All, the company provides the experience, expertise and administrative systems to create new co-operatives and enable them to own and manage their own projects. She states that

> *'The process involved in taking a project through to the point at which a turbine can be handed over into community ownership is legally and financially complex and involves considerable negotiations with larger wind farm developers. We are the only agency in Britain with experience of negotiating financially viable community ownership schemes.'*

The demand in the UK for public involvement in renewable energy developments is considerable and Energy4All has registered over 2,500 potential investors through its website (www.energy4all.co.uk) without advertising or promotion. When it sets up co-operatives, it gives preference to local investors so that the neighbouring community can maximise the economic benefits of the scheme. Energy4All is also working to develop a scheme to offer the green power produced by its wind farms to local homes and businesses.

Baywind Energy Co-operative has proved over the last seven years that the community ownership structure can be commercially successful and can bring major benefits to the local community:

- the co-operative members receive attractive annual dividends on their investments;
- the Energy Conservation Trust promotes energy conservation in the local community;
- the co-operative uses local contractors for site development, maintenance, and support;
- the wind farm is visited by hundreds of school children and adults on educational visits and Baywind provides environmental books for local schools;
- members receive a regular newsletter and support service on sustainable energy investment;
- the farmer receives land rental and the local council receives business rates;
- direct local involvement increases awareness of environmental issues at grass roots level.

'Part or full ownership of wind farms by the community is a most effective way to raise capital, maintain profits in the local economy and provide a sense of involvement', Angela Duignan says. 'It therefore increases the grass roots level of support for renewable energy and for additional climate change mitigation measures. Community ownership of part of a scheme ensures that almost all the revenue does not end up in shareholders' pockets elsewhere in the UK with only a tiny percentage left behind in the area which produced it. Revenue is distributed locally and is then available for reinvestment in the area rather than servicing loans from city banks and firms very often located overseas. The Baywind model has worked well for over seven years in Cumbria and we are now applying it in other communities.'

2.1.3 Community wind farms in Germany

Hollich Windpark

Hollich Windpark in northern Germany represents the classic German model of community ownership. It consists of eleven turbines each of 1.5MW capacity, erected at a total cost of €19 million by a limited liability company with limited partnership,[22] a form of ownership not available in Ireland. The company has 155 partners all resident in the city of Steinfurt and drawn from all walks of life. The maximum each partner was allowed to invest was €40,000 and the minimum was set at €4,400. Many took out loans to finance their shares.

The process which led to the development of the wind farm began when the site was designated as a preferred area for wind energy in the local development plan. The turbine manufacturer Nordex was actively seeking land leases in the area and the local agricultural association, LOV, established a planning committee to avoid conflicts between local farmers and find a local solution to planning objections. The farm was developed by the planning committee using the experience of one of its members who had operated wind farms since 1990. Only one public meeting was held and this was followed up by sending information by post to individuals who requested it. The farm pays compensation each year to people affected by its noise.

[22] GmbH & Co. KG. The shares can be sold to family members provided that the shareholders agree by simple majority. If shares are to be sold outside the group then the other shareholders have first right of refusal.

The Burger Windpark

The Burger Windpark in Lower Saxony was also initiated by the local farmers' association which worked with the manager of the local Raiffeisen farmers' bank. It has 19 turbines of 1.5MW capacity each installed at a total cost of €30.4 million, although community investors own only five of these. The association appointed an outside expert to manage the project for a small fixed fee and a 3.5 per cent share of the profits. The expert chose the site in an area already designated for wind energy in the local development plan. All residents in and surrounding the designated area were invited to participate in the project by investing €5,000 each.

Once planning permission had been obtained, 11 of the turbine sites were sold to an energy company, Energiequelle, to provide the capital to install five turbines as a community project. The three remaining turbine sites were developed privately. Interestingly, only one public meeting was held and no prospectus was issued. Twenty-six residents contributed to the project initially and a further seven joined after planning permission was obtained and before construction began. Voting rights are distributed in proportion to each person's shareholding and decisions are taken by a five-person board. It took two and a half years from the time the investment was first sought to the start-up of the farm. ***File 5: German Community Wind Farms***

2.2 Community wind farm projects in Ireland

Despite such positive experiences elsewhere in Europe, very few Irish communities have taken even the first steps to develop their wind energy resources. Of the 29 wind farms operating or under construction in Ireland in November 2003, only two small-scale developments could be regarded as community projects.[23] (See Table 1)

The first of these is on Inis Meáin, one of the Aran Islands off the coast of Co. Galway. Three 225kW turbines are used to power a seawater desalination plant required to supplement the island's inadequate groundwater supply. The second is a 660kW turbine installed by the Burtonport fishing co-operative to generate electricity to supply its fish processing and freezing plant. Together, these two projects made up only 0.7 per cent of the country's total installed wind capacity. ***File 7: Irish Community Wind Farms***

Table 1: Status of community wind energy projects in Ireland, December 2003

Name	Location	Stage of development in Nov 2003	Issues that arose	Comments
Fuinneamh Glas Teoranta (Inis Meain)	Aran Islands, Co. Galway	Complete	Planning objections were received (including European Commission re lack of EIA) but project was granted planning permission.	Wind Farm is being used for desalination.
Cumhacht Comharchumann Teoranta – a fishermen's co-operative (Burtonport)	Burtonport, Co. Donegal	Complete		Construction of 660kW turbine began in May 2003. Energy used for fish processing and freezing.
Bere Island Project Group (Bere Island)	Bere Island, Co. Cork	Power Purchase Agreement obtained	Failed to raise grant co-funding for loan finance. Planning permission expired Jan 2004.	Only community dividend to be paid: for community projects – envisaged that project will not go ahead.
Comharchumann Chleire Teoranta (Cape Clear)	Cape Clear Island, Co. Cork		Currently looking at erecting one 0.66MW turbine due to grid constraints. Community group uncertain about viability	Have not yet applied for planning permission.

[23] CSA Group Ltd Final Report submitted to Renewable Energy Partnership, December 2003

2 How Communities have already Invested in Wind Energy Projects

Bere Island Project Group

On Bere Island, which is located off Castletownbere in West Cork, a wind energy co-operative hopes to erect a 600kW Vestas turbine. This will be linked by undersea cable to the electricity distribution grid at Castletownbere. The co-operative was established by the island's 200 residents plus those who holiday regularly there and emigrants who still regard the island as home. Each was asked to buy a €1 share to become a co-op member. The revenue from the electricity sales is to be a community dividend. It will be used for island development projects decided upon by an elected committee operating under the island's integrated Conservation Plan. If the project goes ahead 'the island will have an income for 25 or 30 years which could have an enormous multiplier effect as you need cash of your own whenever you are looking for money from anyone else, says Mary Jordan, who worked on the project for 18 months.

The co-operative obtained a Power Purchase Agreement under the fifth round of the Government's Alternative Energy Requirement (AER) bidding system for renewable energy purchases, AER V, and had planning permission for the turbine. It was unable to go ahead as planned in 2003 however, because, even though it had raised over €100,000 from island sources, it was unable to get the €200,000 grant aid it felt it required to make the project viable. The co-operative had linked with a Scottish island community to apply for INTERREG funding but this was unsuccessful. The co-operative has also tried to source grant aid funding from national sources but again have been unsuccessful.

The refusals meant that construction was unable to proceed. The planning consent for the turbine expired in January 2004 and a new application will have to be made. It is unlikely, at the time of print that the project will go ahead as planned. The lack of funding essential to the viability of the project has broken the momentum and some of the support for the project at local level.

Templederry

Another community wind energy project in the pipeline at present is that at Templederry, Co. Tipperary where two wind farms are planned: a small fully community-owned farm with three 1.3MW turbines and another of 40MW to be owned by a group of local farmers. The project started in 1999 when the community development group, a registered co-operative, obtained funds from Tipperary LEADER to develop a Community Development Plan. After public meetings in four parish centres and widespread consultation, they identified renewable energies, including wind, as a way of achieving social, economic and environmental development. Accordingly, feasibility studies into three renewable sources – wind, biomass and anaerobic digestion, were carried out by the Tipperary Energy Agency with funding from the County Enterprise Board. As a result of the wind study, the community erected a 10m anemometer (***File 8: Technical Glossary)*** on the proposed wind farm site in 2002 and this has validated the wind resource. Planning permission is now being sought.

The community co-operative has registered a private limited company, Templederry Energy Resources Ltd, to carry out the wind farm development, and holds a no-cost 8 per cent share in it in exchange for the work it has done to date. The remaining shares were offered to members of the community who were informed that their investment could be lost if the project failed to get through the planning process. Despite this, the offer was oversubscribed.

Other projects

Other community projects under development include those by groups at Kiltimagh, Co. Mayo and near Ballyshannon, Co. Donegal. Locally-owned (as opposed to community-owned) projects are being developed by Golden Vale Co-op Marts Ltd of Kilmallock, Co. Limerick, which helps landowners select sites and move through the planning process. The landowner becomes a member of the wind farm co-operative operating on his land.

Meitheal na Gaoithe

Meitheal na Gaoithe[24] was set up as a co-operative to promote the development of wind and other renewable energies in ways that will allow farmers, communities and other groups to retain the financial and social benefits of wind farms in their areas. It provides information and support to its members and highlights issues at national and EU level.

Until the end of 2003, Meitheal na Gaoithe held numerous workshops around the country supported by the Renewable Energy Information Office and involving international experts. In spite of high levels of participation the workshops were discontinued. Meitheal na Gaoithe's chairperson, Tommy Cooke, says that the organisation took this step because of the losses that small and medium-sized wind farm developers had experienced as a result of failed planning applications and unsuccessful feasibility studies.

For example, projects that had succeeded in gaining planning approval were now at serious risk because they could not get Power Purchase Agreements, he added. This meant that the developers were not able to apply for grid connections and their projects were impossible to finance. Meitheal na Gaoithe estimated that approximately €4 million had been lost by small and medium-sized developers to date with at least €1 million being lost on failed planning applications.

'Small-scale community wind energy developments may have public support and are important for the development of positive public attitudes towards the technology however the actual mechanisms to deliver these projects have failed. The policies that operate to support small-scale renewable energy development are weak and favour large developers. In spite of the setbacks, we are determined to ensure that the benefits of renewable energy are made available to the rural communities' Mr. Cooke added.

[24] www.mnag.ie

2.3 Conclusions to review of European and Irish cases studies

Given the abundance of wind energy potential in Ireland why have so few community wind farms been established here? As Table 2 shows, Germany installed 250 times more wind energy capacity than did Ireland in 2002, while Spain installed 115 times.

File 6: Spanish Community Wind Farms

Both these countries have much less favourable wind conditions than Ireland. This means that Spanish and German wind farms are inevitably much less profitable than Irish ones unless considerably higher prices are paid for their power.

The research carried out under the 'Community Ownership of Wind Farm Projects' study[25] makes it very clear that for wind energy to develop substantially in Ireland, with or without community involvement, serious and consistent state support is required. Most EU Governments offer such support by requiring electricity distribution companies to purchase power from renewable sources at a generous guaranteed price.

Spain, for example, has such a requirement and also gives capital grants and tax benefits to wind farm developers and investors. As a result, the country installed 1,493MW in a single year (2002) almost ten times the amount that Ireland had installed in total at the end of 2003 (see Figure 4). Eighty-five per cent of the equipment used was made in Spain by some 350 different companies which now supply 12 per cent of all the wind turbines produced in the world. Around 26,000 jobs have been created.[26]

Every EU country which previously gave wind energy supply contracts on the basis of competitive bids has ceased to do so, except Ireland. Table 2 shows that the five countries with the best developed wind energy sectors all imposed an obligation on their electricity distribution companies to purchase whatever wind electricity is available at a fixed premium price. The 'Community Ownership of Wind Farm Projects' study shows that most European countries are offering guaranteed premium prices and imposing purchase obligations to ensure grid access for renewable energy suppliers. At least five countries, including Denmark, the Netherlands and Italy, are applying carbon tax on fossil fuels to generate additional revenues to support development of renewable energy sources. The remaining countries are applying tax benefits for investment in renewable energy. Most countries are also providing capital grants or subsidies for renewable energy development.

Ireland currently offers limited legislative, fiscal or financial incentives for the development of renewable energies, particularly to communities. Additionally, the current allocation of small wind power generating capacity to large companies, who can offer lowest prices, effectively debars local community entry.

Since every EU country to show sustained growth in wind energy installations operate feed-in laws which provide guaranteed Power Purchase Agreements at fixed prices, the REP's key recommendation is that Ireland must replace its Alternative Energy Requirement (AER) bidding system with a feed-in law,[27] at least for projects below a certain size. If communities are to have the chance to bring significant numbers of projects forward such a feed-in law should provide stable and transparent pricing mechanisms for at least ten years ahead.

The 'Community Ownership of Wind Farm Projects' study states that Irish renewable energy policy is lagging significantly behind our European partners in facilitating community ownership of wind farms. In addition, grid infrastructural constraints are likely to inhibit the development of wind energy installations in some parts of the West of Ireland and prove a major barrier to community entry there. A significant shift in Government policy is required if communities are to gain a significant share in ownership of wind deployment in Ireland. Each of the key 'wind countries' in Europe has pro-actively driven wind energy development politically, rather than relying on purely market-driven development. In each of the three dominant countries, Germany, Denmark and Spain, community ownership has been promoted through facilitative national and regional supports, with a strong component of public ownership.

[25] CSA Group Ltd Final Report submitted to Renewable Energy Partnership, December 2003
[26] European Wind Energy Association, Wind Directions, May - June, 2003
[27] The feed-in law system requires electricity utilities to pay a fixed price for all electricity generated from renewable resources.

Table 2: Summary of Principal EU Member States' Support Mechanisms for Renewable Energy Development and Corresponding Installed Capacity

Country	Legislative Support (1993 –1999)	Fiscal Incentives (1993 –1999)	Financial Support (1993-1999)	2002 MW of Installed Capacity	2002 Year End Total Installed Capacity
Germany	Purchase obligation. Guaranteed premium price.	Tax benefits for investing.	Subsidies and low interest loans for all Renewable Energy projects provided by local banks.	3,247	12,001
Spain	Purchase obligation. Guaranteed premium price.	Tax benefits for investing.	Capital grants.	1,493	4,830
Denmark	Purchase obligation. Guaranteed premium price.	Energy/carbon dioxide taxes on fossil fuel; revenue partly used to support Renewable Energy.	Subsidies provided historically for RD&D. Capital grants.	497	2,880
Italy	Purchase obligation. Guaranteed premium price.	Energy/carbon dioxide taxes on fossil fuel; revenue partly used to support Renewable Energy.		103	785
Netherlands	Purchase obligation. Guaranteed premium price.	Energy/carbon dioxide taxes on fossil fuel; revenue partly used to support Renewable Energy.	Government subsidies. Obligation for utilities to invest in Renewable Energy projects.	217	688
UK	Changed to purchase obligation (abolished NFFO).	Carbon dioxide taxation.		87	552
Sweden	Purchase obligation.	RE pays lower or no energy tax or nitrous oxide levy. Tax benefits for investing in Renewable Energy.	Investment Grants.	35	328
Greece	Purchase obligation. Guaranteed premium price.	Tax benefits for investing in Renewable Energy.	Subsidies (capital grants).	4	276
Portugal	Purchase obligation. Guaranteed premium price.		Interest free loans. Support for grid connection.	63	194
France	Competitive tendering (2001 changed to purchase obligation system with guaranteed price).		Subsidies (capital grants).	52	145
Austria	Guaranteed price	Energy taxes on gas and electricity; revenue partly used to support Renewable Energy.	Public grants, subsidies and loans.	45	139
Ireland*	**Competitive tendering**	**Reduced tax benefits for Renewable Energy.**	**Lack of subsidies/capital grants.**	**13**	**137**
Finland	Transmission costs fixed; grid access open to all producers.	Energy/carbon dioxide taxes on fossil fuel; revenue partly used to support Renewable Energy.	Subsidies on investments and equipment (capital grants).	2	41

Sources: European Environment Agency – Environmental Issue Report No 27 and European Wind Energy Association Press Release, 3 March 2003

* Public consultation process currently underway to determine future support mechanisms.

3 Potential for Community Ownership of Wind Farms - Findings and Recommendations

The crucial importance of promoting greater use of renewable energy resources to provide for Ireland's ever growing energy demand, as well as the positive experiences in other EU members states, have been outlined in the previous sections.

The experiences of a number of community groups in Ireland who have entered or are considering entering the wind energy sector have also been examined. These examples have raised some issues in relation to the existing policy framework governing wind farm development in Ireland. Some of these issues are particularly relevant for promoting community involvement.

During the course of conducting this exercise, a public consultation process was initiated by the Department of Communications, Marine and Natural Resources - 'Options for Future Renewable Energy Policy, Targets and Programmes'. This provided the Renewable Energy Partnership (REP) with the opportunity, in February 2004, to submit our findings and recommendations on the factors influencing community ownership to the Department. In May 2004, the Department announced the establishment of the Renewable Energy Development Group.[28] This is a welcome move and we are optimistic that steps will be taken shortly to implement some of our recommendations or to introduce measures with similar effect.

This section of the guide outlines the findings of the research and the REP's recommendations. It is hoped that implementation of these recommendations would facilitate and progress community-owned wind energy projects.

3.1 Findings and Recommendations

1. National policy

The experience of other European countries shows that a stable, supportive policy environment is essential to encourage communities and commercial developers to invest in wind energy.

The current fiscal, regulatory and infrastructural policy framework tends to favour development of wind farms by larger-scale developers. For example, the Alternative Energy Requirement (AER) bidding system has allowed larger-scale developers to take up some small-scale contracts intended for communities and small-scale developers. It is therefore particularly important to ensure that the national policy framework governing wind energy development contains specific measures aimed at encouraging community involvement.

Recommendation: The public consultation process undertaken by the Department of Communications, Marine and Natural Resources, as well as the establishment of the Renewable Energy Development Group, presents an opportunity to develop the necessary supportive policy framework. The new policy framework should discriminate positively in favour of community participation in wind energy development, so as the positive benefits of local involvement in renewable energy development can be realised.

2. Access to the national grid.

The study identified the cost and uncertainty of connecting to the national grid as a major constraint for community participation in wind farm development. According to Garrad Hassan,[29] a firm of consultants, output from Irish wind farms will not advance much beyond the 1000MW level without considerable investment in the grid. The 188MW already connected, the 700MW for which connection agreements have been issued plus 300MW from a joint ESB/Bord na Mona project in North Mayo means that all the available grid capacity has been allocated. No capacity for community projects is currently allocated. It should be noted, that a proportion of the 700MW for which connection agreements have been issued may not, in fact, be utilised and may be available for re-issue in the future. This could be reserved for community-owned projects.

Recommendation: All renewable energy projects below a certain size, and with a high level of community involvement, should be provided with a connection to the national grid at no cost to the project. The eligibility for such connections needs to be established according to clearly defined criteria and an example of a possible system for assessing eligibility is given in Appendix I.

28 Department of Communications, Marine and Natural Resources, Press Release, 6 May 2004

29 Garrad Hassan, The Impacts of Increased Levels of Wind Penetration on the Electricity Systems of the Republic of Ireland and Northern Ireland: Final Report, February 2003 http://www.cer.ie/cerdocs/cer03024.pdf

3. The Alternative Energy Requirement (AER) bidding system

The Alternative Energy Requirement (AER)[30] bidding system has created significant uncertainties in developing renewable energy projects and has made wind farm development in Ireland a highly speculative venture. The uncertainties have resulted in developers having to demand a higher return on their capital. In addition, the stop-go nature of the system has meant that there has not been a steady flow of Irish wind turbine orders and thus no basis for developing a turbine manufacturing sector here.

As outlined in Table 2 (see page 21) Denmark, Germany, Spain and every EU country to show sustained growth in wind energy installations have laws under which electricity producers can connect to the grid at any time and be paid a guaranteed premium price for their power. Both the UK and France have recently replaced the type of competitive bidding process currently used in Ireland with such a system.

Moreover, if the Commission for Energy Regulation's (CER) arrangements for selling electricity are applied to small-scale renewable energy projects when they come into effect in 2005, it will be impossible for small-scale promoters to raise finance. Under the new system, all electricity using the national grid has to be sold into a national pool. Electricity producers have to estimate how much power they can supply, and the cost of it, for each half-hour period during the day. The pool operator will then meet the projected demand with supplies from whichever electricity producers have submitted the lowest offers for each half-hour period. This makes it impossible to calculate what the wind farm's income will be over the course of a year and consequently whether it will be a good investment. A community would find it impossible to invest on such a basis.

Recommendation: The Renewable Energy Partnership strongly recommends that the AER system be replaced by a feed-in law[31]. This would enable all renewable energy projects below a certain size to sell their electricity at a guaranteed price. The price should be index linked and guaranteed for at least ten years.

The agency mandated to purchase the electricity from these projects could then sell the power into the national pool. Any shortfall between the income the agency received from the national pool and the price it paid its power suppliers would be covered by the Public Service Obligation levy paid by all electricity consumers. This is currently used to pay the higher cost of electricity bought under AER contracts and from peat-fired power stations.

4. Planning permission

At present there is a 50 to 60 per cent chance that an application for planning permission for development of a wind farm will be rejected. This high failure rate is mainly due to a lack of clearly zoned lands for wind farms in County Development Plans. In Denmark, the entire country is zoned.

It is also the case that, although Environmental Impact Assessments (EIA) are not a statutory requirement for wind farm developments of 5MW or less, some local authorities may request such an assessment if they deem it necessary.

Recommendation: In July 2000, the Renewable Energy Strategy Group[32] recommended that the country be divided into four zones for wind farm planning purposes. The Renewable Energy Partnership supports this idea and proposes that the zones could be as follows:

Zone A – ***Priority Areas:*** Areas deemed eminently suitable for wind farms.

Zone B – ***Preferred Areas:*** Areas suitable for wind farm development where planning permission would normally be granted if convincing evidence of community consent accompanied the application.

Zone C – ***Sensitive Areas:*** Areas where approvals would be limited to small projects developed by the local community.

Zone D – ***No-Go Areas:*** Areas unsuitable for wind farms due to their scenic, ecological, historic or tourism values.

30 See Glossary of Terms

31 The feed-in law system requires electricity utilities to pay a fixed price for all electricity generated from renewable resources.

32 Renewable Energy Strategy Group, A Strategy for Intensifying Wind Energy Deployment, 2000

All wind farm developers in Zones A and B should be required to give the local community the opportunity to raise a designated proportion of investment from people living within a specific radius of their sites before becoming eligible for planning approval. For example, the minimum local participation level could initially be, say, 5 per cent in both cases and then rise, as people become more accustomed to investing in wind energy, by a further 5 per cent every five years to a maximum of 20 per cent. The radius from the site for residential investors could be greater in Zone A as projects there are likely to be larger. A ceiling would be placed on the size of individual local investments in each case so as to spread the benefits of the investment as widely as possible.

In Zone C, all turbines would have to be entirely owned by community groups consisting of people living within a specified radius of the site. Broadly-based community groups would be permitted to erect single turbines of under 850kW in Zones A, B and C without needing to submit Environmental Impact Assessments (EIA) for them, except in exceptional circumstances.

5. The price offered

The competitive AER bidding system has resulted in low electricity purchase prices in Ireland in comparison with elsewhere in Europe. This has inhibited the development of the sector. For example, several contracts were given to firms under AER V which subsequently found them so unattractive at the price they had offered that they failed to supply power under them. The exact prices paid under the contracts issued as a result of the most recent bidding round, AER VI, have not been revealed as they are commercially sensitive but the report submitted by the consultants[33] to the REP estimates them to be approximately 4.7 cent per kWh.[34]

Care must be taken when comparing prices per kWh however, as they reflect the quality of the wind regime. For example if there are higher wind speeds in Ireland than in, say, Germany, more electricity would be produced here and this would counterbalance the lower price per kWh and increase the margins of developers in Ireland. Therefore, as a result of higher windspeeds, Irish wind farmers do not require, say, German-level prices.

Recommendation: Producing electricity from the wind is one of the few areas in which Ireland really does have an international competitive advantage. If the previous recommendations (1 to 4) are implemented, power prices would not need to be much above their present levels for them to be attractive to small investors - provided that they were guaranteed for 10 to 15 years.

If a feed-in law system is introduced (as proposed in Recommendation 3), the power price guaranteed to broadly-based community investment groups[35] should be calculated so that it is high enough to allow investors to repay a ten-year loan from their credit union on an average site. An example of such a calculation is given in Appendix II.

6. Financial supports and incentives

Apart from investments under the Business Expansion Scheme (BES), tax allowances for investments in wind farms were abolished in the 2003 Budget. At present it is proposed that BES will continue until 2006.

Recommendation: State support or incentives should be given in a way which encourages all those living in areas where wind farm projects are being developed to invest, regardless of their tax status. Such assistance could, for example, take the form of providing a level of support equivalent to that enjoyed by those availing of the BES scheme to all investors in renewable energy projects in the manner outlined in Appendix II. The calculations in Appendix II show that a power price of 5.216 cent per kWh is high enough for people to be able to borrow the capital they need to invest from their credit union and to repay their loan over ten years. Repayments would be covered by the revenue they receive from the sale of their share of the electricity.

Alternatively, state support for renewable energy development could take the form suggested in Recommendation 2 i.e. providing all renewable energy projects with cost-free connections to the national grid, a subsidy specifically permitted by Article 7 of the EU's 2001 Directive on the Supply of Electricity from Renewable Sources.

[33] CSA Group Ltd, Final Report submitted to the Renewable Energy Partnership, December 2003

[34] These prices are low when compared to Europe's wind energy leaders. For example prices paid in Germany have been 9.1 cent per kWh plus turnover tax (VAT) and in 2003 prices in Spain were 6.2145 cent per kWh for a 3.2MW wind farm.

[35] A large group of small scale individual investors from the community or who have links to the community.

7. Access to information and support structures

Communities are often unaware that they can become involved in renewable energy projects and the steps they need to take to do so. Even if they are aware, they are unlikely to possess the necessary specialist skills to progress very far. In addition, at present Ireland lacks the institutional and advisory arrangements that made community investment in other European countries such a success.[36]

Recommendation: The study identified the need for a support structure to help communities develop wind energy projects of their own or to negotiate a stake in commercial wind farms being developed in their area. It is recommended therefore that seed funding be provided to enable the establishment of a **Renewable Energy Advisory Group (REAG).**

The effectiveness of such a group would be dependent upon changes such as those recommended in this document to the policy framework governing wind energy development in Ireland. It is hoped that the current work of the Renewable Energy Development Group will result in such positive changes and facilitate the provision of seed funding for the establishment of a Renewable Energy Advisory Group.

Proposed Renewable Energy Advisory Group

The Renewable Energy Advisory Group (REAG) is envisaged as a national organisation acting as a 'one-stop-shop' for community groups that need expert technical, legal and financial advice on wind energy projects. It would fulfil a similar role in Ireland as Energy4All already plays in Britain (see Part I, Section 2.1.2). The proposed REAG would assist a community group to become involved in a wind energy project by:

- providing experts at subsidised rates
- helping source public, institutional and private funding
- assisting in negotiations with commercial developers
- carrying out due diligence studies on wind farm projects
- advising on the appropriate amount of investment and the potential rate of return.

The REAG could operate in much the same way as the Irish League of Credit Unions (ICLU) i.e. it would provide the training and expertise required by any group that approached it. Also, once it was well established, the REAG could be financed in a similar manner i.e. after a start-up period in which it would have to be subsidised, the REAG could become self-sustaining by receiving a small percentage of the income that each community group receives from its electricity sales. This would ensure the independence of the REAG.

Community organisations in areas in which wind energy projects are planned or in progress would be invited to join the REAG which would, if invited, work with them in any dealings they might have with developers, whether these involved community investment or not. In addition, the REAG would provide an umbrella organisation to present the case for community investment in wind energy nationally, in collaboration, where possible, with existing organisations.

[36] See Part I, Section 2 and Table 2 for further detail.

8. Community ownership structures

Raising money from a large number of people for a wind energy project is legally complex, as the trading of shares is closely regulated and advertising them is strictly controlled. While a range of collective ownership structures have been developed in Europe and the UK to solve this problem, initiatives to overcome this have not been tried in Ireland to date.

Recommendation: The study suggests that the co-operative model has worked well for Irish farmers and fishermen and may be a good vehicle for use by broadly-based community investment groups (see Part II, Section 4 and Section 5).

9. Local authority structures

Irish local authority structures differ significantly from those in other European countries. It is not within the remit of local authorities to actively promote community entry to wind farming, as is the case elsewhere in Europe.

Recommendation: Ways must be developed for local authorities to encourage community involvement in wind energy projects. Reserving areas for community wind farms in County Development Plans would be one possibility.

3.2 Conclusion

Careful consideration of all of these issues has led to the conclusion that until all or most of the issues outlined above are addressed, communities may face significant difficulties when developing 100 per cent community-owned wind energy projects. Consequently, unless conditions are extremely favourable, communities should consider refraining from investing in their own wind energy projects as the level of risk and uncertainty is currently too high.

The most promising investment option communities should currently consider is that of participating in commercial projects once such projects have secured planning consent, a grid connection agreement and a contract for the sale of electricity. The steps communities should take when considering investing in wind farm projects are outlined in Part II of this guide.

It is hoped that the work of the Renewable Energy Development Group will have a positive impact upon the current policy framework and will facilitate more active participation by communities in wind energy developments in the future.

The study also concludes that, in the right climate, the proposed Renewable Energy Advisory Group (REAG) could eventually enable small-scale individual investors to invest significant amounts of money in a genuinely productive way. It would take time for people's confidence to build up of course, but the potential certainly exists. For example, a fairly typical credit union in the Western Region currently has over €30 million available to lend to its 8,000 members but as the members only want to borrow €13 million of this, it has had to send €17 million out of the area for investment elsewhere. Every other credit union in the Western Region has surplus funds on a similar scale. The Western Investment Fund managed by the WDC has within its remit the scope to invest in community based wind farms.[37]

Other countries have found ways of using small-scale individual investors' savings for massive wind energy projects such as the €48 million offshore wind farm at Middelgrunden ***(File 3: Danish Community Wind Farms)*** in Denmark, which has been developed by a co-operative with 8,550 members, mostly residents of Copenhagen. The study shows that given a policy environment that facilitates community-owned projects, Ireland could have similar wind farms within a few years.

[37] For further information on the WIF visit www.wdc.ie. Two main criteria for investment apply: the commercial viability of the project and its ability to provide the WIF with an appropriate financial return for the risk undertaken and the social benefits accruing to the areas served by the project as a result of the investment, including employment potential and quality of life. The WIF does not give grant aid.

PART II

A Guide for Communities Participating in Wind Farm Development

4 Becoming Involved in Wind Farm Development

This step-by-step guide to setting up a wind farm provides details of an approach which communities could adopt either to develop their own wind farm (a step which is not recommended until some of the current issues raised in Part I have been addressed), or to participate in a wind farm development being undertaken by a commercial developer.

If a large number of communities are to participate in wind farm development, the findings of this study show that it is essential to set up an organisation to help them do so, along the lines of the proposed Renewable Energy Advisory Group (REAG) discussed in Part I, Section 3. In the meantime, community organisations that wish to seek immediate expert advice should contact Sustainable Energy Ireland's Renewable Energy Information Office which can provide a list of experts with experience in wind farm project development.[38]

The REP recommends that the initial task of the proposed REAG should be to help establish, and then provide assistance to, four different types of community organisation, these are:

- Community Charitable Trusts - either existing or new local community groups similar perhaps to a Community Council.
- Broadly-based Community Investment Groups - a large group of small-scale individual investors from the community or who have links to the community.
- Narrowly-based Local Investment Groups - a small number of large-scale investors from the community or who have links with the community.
- Independent Community Organisations.

4.1 Types of Community Organisations

Community charitable trusts

Some commercial developers may wish to seek community support before they submit their planning applications. But with whom in the community would these developers deal? Most communities do not have a suitable organisation. Money may be offered by developers to the community, as is the case in Scotland (see Part I, Section 1), but how would this be handled and spent?

Some developers may take another approach. National Power in England is prepared to allocate turbines to communities near its wind farms which the communities would come to own over time. The cost of the turbines would be recovered from the sales of the electricity they would produce, so that, after about ten years, the communities would own them outright and receive the income generated. As part of this study, National Power confirmed that it was easier for it to borrow to buy the turbines than it was for a community group to do so but 'unfortunately there's usually no appropriate community organisations with whom we can deal'.

Ireland needs a network of community charitable trusts, with the skills, legal status, expertise and mandate to deal with potential investors, in areas of the country with good wind power. The proposed Renewable Energy Advisory Group's (REAG) task would be to advise communities in those areas on how to set up charitable trusts, how to negotiate with developers and how to handle the income from projects so as to benefit the entire community. These organisations need to be set up as soon as possible because, once developers have secured their planning permission, the community's chance of negotiation will be gone.

2. Broadly-based community investment groups

Broadly-based community investment groups will aim to get as many people in their communities to invest in a wind energy project as possible. In this way the benefits are widely shared and the community's feeling of 'one-ness' is strengthened. Such groups would have a choice of finding their own wind farm sites and hiring a professional to handle the development for them (e.g. Burger Windpark in Germany as discussed in Part I, Section 2.1.3), or of negotiating to buy into a commercial developer's project. As stated above, the findings of this study mean that the latter is the only course the Renewable Energy Partnership can recommend in the present policy environment.

The current constraints to wind farm development and the Renewable Energy Partnership's recommendations for progressing community ownership are discussed in detail Part I, Section 3.

An example of the form that investment by a community in a commercial developer's project might take is given overleaf.

[38] Sustainable Energy Ireland, Renewable Energy Information Office, Shinagh House, Bandon, Co. Cork. Tel: 023 42193 E-mail: wind@reio.ie Web: www.sei.ie/reio.htm

4 Becoming Involved in Wind Farm Development

Two hundred families each put up €5,000, raising €1 million. The established community investment vehicle (the promoters) will realise that many of their target families will need to borrow from the local credit union to buy their shares. Accordingly, it is likely that the promoters will want to adopt a low risk strategy and will not want the investment made by their group to be used as risk capital by a wind farm developer to leverage a large bank loan. Therefore, even though it might mean a lower rate of return on the group's savings, instead of taking shares in a commercial wind farm, they will prefer to buy one of its turbines outright and offer the developer a management contract to run it for them.

Such a group will probably opt to register as a co-operative so that every investor, regardless of the size of their stake, has an equal voice. Such groups will need a considerable amount of advice and the establishment of the proposed REAG would facilitate this.

When circumstances are conducive to broadly-based community groups developing their own projects (see Part I, Section 3), access to general wind farming advice including experts they might employ such as electrical and civil engineers, financial and legal advisers, turnkey contractors etc. will be vital. The proposed REAG would be able to assist in this area and also advise on the level of costs that groups are likely to incur and suitable financial structures they might adopt.

3. Narrowly-based local investment groups

The people likely to become involved in narrowly-based local investment groups will tend to have higher disposable incomes than those in the more broadly-based group and will aim to secure a high return on their capital. They will therefore be prepared to accept a higher degree of risk. They will have the choice of developing their own projects, something they will be keen to do if one or more members already own suitable sites for a wind farm. Alternatively, they may opt to develop a wind farm project in conjunction with a commercial developer.

In the latter case, they would be willing for the commercial developer to use their money as part of the wind farm's equity to obtain a bank loan. Since the extra risk which this incurs will not suit those with a cautious attitude to financial exposure, the number of community members participating in the project may be quite small. Indeed, some may question whether this is a community venture at all, even though most of the shareholders live in the same area. A conventional limited company structure will suit this type of group as each investor's vote will be proportional to their stake in the company.

The proposed REAG would provide advice to such groups on the range of legal structures they might adopt and could send a representative to assist them in negotiating with commercial developers or in developing their own projects.

4. Independent community organisations

An existing community organisation, such as a co-operative or development trust, might wish to establish a wind farm, just as was done by the Burtonport Fishing Co-operative Society.[39] Such a group may, or may not, decide to allow other local people to invest in its project.

As in the Burtonport case, some of these organisations might wish to generate power purely for their own use rather than to sell to the national grid. For example, a group planning an eco-village in Cloughjordan, Co. Tipperary, would like to generate electricity to be used in community buildings and to be sold to those occupying the houses in the village. The power would be generated using gas from a biodigester as well as from the wind. The eco-village would draw electricity from the grid whenever its own generation was unable to meet the community's demand. The eco-village would not necessarily have to sell power into the public system.

In April 2004, the question arose as to whether the eco-village would be able to sell power to the villagers, in view of an EU requirement that every electricity consumer be able to switch electricity suppliers at 28 days' notice. Such a requirement would make the development of a local supply system impossible, as every house in the village would require direct access to a grid supply. Moreover, if the villagers were prevented from entering into a long-term electricity supply contract with their own collectively-owned company, it would be impossible to raise the finance for a wind-turbine and a gas engine-powered generating set.

The proposed REAG would work with organisations such as this, helping them to steer through the legal maze. The REP's view is that it is important that regulations allow communities, existing as well as planned, the option to meet their energy requirements directly from their own resources rather than having to do so indirectly through the national grid.

For further information on community involvement in wind farm development see ***File 10: Mechanisms for Community Entry into Wind Farming*** and ***File 11: Progressing Community Investment in Wind Farm Projects in Ireland***

[39] The Burtonport Fishing Co-operative is discussed in Part I, Section 2.2

5 Establishing a Local Group to Develop or Invest in a Wind Farm Project

This section outlines the first steps in the establishment of a local group to facilitate community participation in a wind farm project. It includes a discussion of the alternative legal structures available and the various means of raising the necessary finance.

5.1 Establishment of a Local Group

The first step in any community's involvement in wind energy development is likely to be the establishment of a local group. This can be quite informal at first, just a network of friends arranging a public meeting at which a speaker from a relevant organisation can explain the possibilities to them.

Communities of Interest and Communities of Place

While there are two types of community – communities of interest and communities of place - for the sake of simplicity, we'll confine our discussions here to communities of place. It should not, however, be forgotten that the hybrid between these two forms of community – a community consisting of people interested in a particular place and the people who live there – can be very effective in raising funds and getting things done, as shown in the Bere Island example (see Part I, Section 2.2).

Only if enough members of the community decide, following such a meeting, that they are seriously interested in investing in wind energy would an actual organisation be set up. This would not need a legal structure just yet. The legal structure should only be established shortly before investments are actually made. However, the members of the group would all become individual members of the proposed REAG so that it could function as an investment club and legally provide them with investment advice. See box opposite for details on investment clubs.

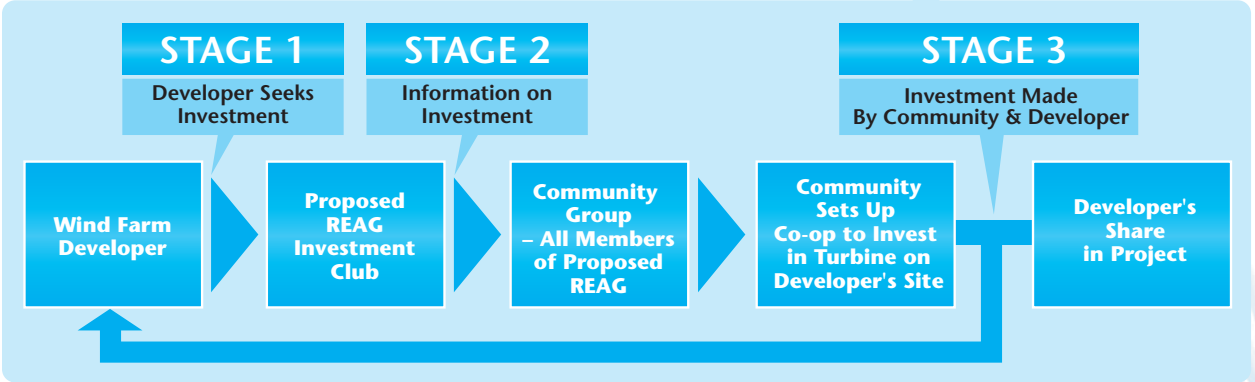
The Investment Club

One of the key functions of the proposed Renewable Energy Advisory Group would be to act as an investment club. The laws regulating the offer of investment opportunities to members of the public are quite restrictive but, once someone joins an investment club, they cease to be a member of the public and the laws do not apply. In particular, the expense of issuing a prospectus to potential investors can be avoided.

One way the proposed REAG could operate as an investment club is that developers could approach it with proposals for projects. The REAG could assess these and forward details of those considered viable to members who would then decide for themselves whether or not to go ahead. If members decided to invest, they could then set up a company or co-operative to act as the vehicle for their investments. The diagram below shows how the mechanism would work.

The REAG would be a 'not for profit' company, owned and controlled by its members. It would cover the cost of running the investment club from membership fees and by taking a proportion of the shares in the co-operatives or companies set up on its advice. ***File 12: Investment Club or Fund.***

Figure 5: The proposed Renewable Energy Advisory Group's Investment Club Mechanism



5.2 Types of Legal Structure

When a group has decided what it intends to do, it would require advice on what sort of legal structure, constitution, objectives and rules of procedure it should adopt for that purpose. (For further information on legal structures see ***File 13: Types of Legal Structures***). Two of the options for legal structures are:

- An Industrial and Provident Society (Co-operative)
- A Private Company Limited by Shares

1. An Industrial and Provident Society (Co-operative)

A co-operative is usually chosen where the community investors have a social as well as economic purpose. Rules should be established governing membership of the society. While these must not impose artificial restrictions upon, or discriminate against, any persons, it is possible to set criteria such as residency in a particular location and/or the purchase of a minimum number of shares. The rules of the co-operative must be approved by the Registry of Friendly Societies and a co-operative must have at least seven members. Details on how to establish a co-operative, with typical Articles of Association and Memoranda of Agreement are available on the Irish Co-operative Organisation Society's[40] website (www.icos.ie).

Advantages of a Co-operative structure

- The co-operative may qualify for Business Expansion Scheme (BES) relief (to 2006);
- Each member of the co-operative has the same voting rights (one member, one vote) but varying investment amounts are allowed;
- Investor's liability is limited to shares purchased;
- A local investment club or fund can invest in a co-operative and may find it attractive to do so as it has similar characteristics to those of a limited company.

Disadvantages of a Co-operative structure

- Has limited investment capability;
- Maximum investment criteria may apply;
- The shares are not readily tradable;
- Registration of a co-operative takes at least three months.

Community Considerations

The co-operative structure would allow any number of local people to be investors, as well as setting up an organisation that could facilitate other projects in the area. Each investor would have equal voting rights, however if the investor wishes to exit their investment, they can only sell shares to other investors, and not to the co-operative. This legal structure is ideal for the broadly-based community investment groups discussed in Part II, Section 4.1.

2. A Private Company Limited by Shares

A Private Company Limited by shares may issue shares with various rights attaching. There are two main types of shares, Ordinary Shares and Preference Shares, however it is possible to have several other classes of shares depending on particular circumstances. Ordinary Shares usually have voting rights and Preference Shares usually carry no right to vote, but rank ahead of Ordinary Shareholders in the event of the payment of a dividend or winding up. Shares may not be offered to the general public.

Advantages of a Private Company Limited by Shares

- A Private Company Limited by shares may qualify for Business Expansion Scheme (BES) relief (to 2006);
- Shares are transferable and tradable privately thereby providing a clear exit route for investors even if the company is seeking BES;
- Voting shares and non-voting shares enable each member to have voting rights commensurate with their investment. This can prove to be useful when attracting certain types of investors;
- It can attract investment club (***File 12: Investment Club or Fund)*** or fund type of investment without having to concern itself with investor numbers (see Community Considerations below);
- The registration of a company is a relatively simple procedure;
- It may issue a limited circulation type prospectus;[41]
- As with a co-operative, the liability of investors is limited to the value of their shares.

[40] As the co-ordinating organisation for co-operatives in Ireland, ICOS provides a range of services to its member co-operatives and represents them on national and international organisations.

[41] The company can decide who to ask to invest.

Disadvantages of a Private Company Limited by Shares

- Cannot offer its shares to the general public;
- Can offer shares to known associates without the need for a prospectus;
- Must re-register as a public limited company if a wider investment base is needed;
- Can incur high Corporate Compliance costs.

Community Considerations

The Private Company Limited by shares structure does not provide the flexibility for larger-scale projects but would suit smaller-scale ones. It allows any number of local people to be investors if they work through an investment club, such as the proposed REAG. If an investment club or fund were not used, there is a limit of 50 on the number of investors eligible to participate. If the number rose above that, the company could be converted into a public company but the compliance costs of this are higher. Investors would have the security of knowing that, if they wished, they could exit their investment through a buyback arrangement with the company.

Legal Structures - Points to note for Community Groups

The establishment of a company or a co-operative requires the adoption of a **Memorandum of Association** and **Articles of Association.** These documents describe the objectives of the company or co-operative, the financial liability of the members and the internal rules of the company governing shares, general meetings, directors and secretary, dividends and capitalisation of profits if appropriate. The content of these documents would depend on the objectives of the community group and could vary significantly from community to community. The proposed REAG, if established, could assist with the registration process and provide drafts of the required documents.

If large numbers of small investors want equal ownership then a co-operative is the best structure. If there are several large investors with whom a number of smaller investors wish to share ownership in proportion to their level of investment then a private limited company is best. In either case, the **Shareholders' Agreement** will set out all the rules by which the company or co-operative members will abide.

It could cost up to €2,000 to set up either type of entity and the community should allow for auditing costs of €750 - €1,000 per annum. The set-up cost includes registration costs, which are listed on the Company Registration Office website (www.cro.ie), and legal fees. The establishment of an REAG would allow community groups to adapt the pro-forma Memoranda and Articles of Association and Shareholders' Agreement provided by that organisation and legal costs could be kept to a minimum.

The main point of establishing either form of legal entity is to protect the individuals involved by limiting their liability if things go wrong. The Renewable Energy Partnership strongly recommend that the registration of a company or co-operative be delayed until shortly before some risks are to be taken, such as just before the actual investments are made or the group begins to spend large amounts of money. Before that, an informal organisation with clear objectives and rules should be all that is required. Indeed, it may not be necessary for a group of large investors to set up a company at all. They can leave that to the commercial developer and just buy shares as individuals in the project.

5.3 Raising Finance

In the broadly-based community investment group case, the main objective is likely to be to enable as many people as possible to invest wisely in wind energy. A secondary objective (from the perspective of building a more sustainable local economy) will be to bring as much income into the community each year as possible.

This means that such a co-operative would not wish those of its members with inadequate savings to raise the money for their shares by borrowing from a commercial bank. Instead, it would prefer them to borrow from the local credit union as the interest that they would pay would go to lenders from the locality i.e. as a dividend to those who save in the credit union.

The 'Community Ownership of Wind Farm Projects' study[42] found that €500,000 was the minimum amount required to attract the interest of commercial developers. Therefore the community group will need to set itself the target of recruiting enough members to raise this amount.

Of course, there is no need to raise this money in advance of a suitable project being identified. Indeed, it would be very hard to do so. After the investment group has been set up, all its committee can reasonably do is hold an occasional public meeting both to spread the idea of community investment in wind energy and to let those who have already expressed interest know that things are still moving along. Articles in the local newspaper and talks to local groups and schools would also help. Then, when a suitable project has been identified, the effort to get people to commit themselves to making an investment would start in earnest. However, if the group comes to an agreement with the developer before planning permission is obtained it should have at least a year to raise the money required as this would only be paid over after the wind farm has been built and successfully commissioned.

In the case of the narrowly-based community investment group, the main objective is likely to be gaining the maximum return on the investment. They will therefore want to put a limited amount of risk capital into a wind farm company and then have the company borrow the balance of the capital needed to carry out the project - perhaps 85 per cent - from a commercial bank. Very probably, the founders of the group will be able to recruit all the additional investors they need through local social networks and there will be little need for public meetings and press publicity at all.

In the broadly-based case, then, the loan finance for the project would probably be raised by dozens of people, some borrowing small amounts as individuals from the local credit union. Each borrower would be personally responsible for repaying their own loan, regardless of how the wind farm project developed. The credit union would not be lending to the wind farm directly but to individual members of the community group secured on their standing in the community. In the narrowly-based case, by contrast, it is the wind farm company which is the borrower, not the investors as individuals. The liability of the latter is limited to the issue price of shares they have bought and the bank will require the project's assets to be pledged as security.

For further information see ***File 14: Financing for Community Entry*** and ***File 15: Investment Incentives and Exemptions***

[42] CSA Group Ltd Final Report submitted to Renewable Energy Partnership, December 2003

6 Assessing Wind Farm Developer's Projects

This section guides community groups through the process of assessing the risks involved in investing in a commercial developer's wind farm project.

This includes detailed guidance for assessing the rate of return from such an investment utilising the Financial Model contained on the CD Rom which accompanies this guide.

6.1 Assessing Risk

Until it becomes feasible for communities to consider developing their own projects, both broadly-based and narrowly-based community investment groups who wish to become involved in wind energy will be required to negotiate to buy into projects which are already well advanced. The proposed REAG would assist with such negotiations.

Every wind farm project begins when an individual, or a small group of people, start to investigate the possibility. If the preliminary results seem promising, the pioneers will then utilise their own time and money to progress the project to a certain stage before inviting others to invest. The crucial question for both broadly-based co-operatives and narrowly-based companies is therefore "how much money should we pay those who got this project going for the work they did and the financial risks they took?"

This will apply to almost every project for which investment has to be sought from a wider group than those who initiated it. This is because, unless the work and investment by the pioneers was either very small, covered by their employers, or they are very community-minded, they will require some compensation for their efforts. More specifically, as a wind farm project moves successfully through its various stages, it will become increasingly expensive for investors to buy in. This is not just because of the increased investment of time and money made by the pioneers but also because as each stage is achieved, the risk that the project will fail is reduced. The 'Community Ownership of Wind Farm Projects' study,[43] investigated the costs and risks of failure at each stage of the wind farm development process. The results are outlined in Table 3.

Table 3: Opportunity and Risk - Stages in a Wind Farm Development Project

Stage	Risk of Failure Before Farm Opens	Cumulative Cost to Reach End of Stage
1. Site Selection The project may not proceed if the wind resource is poor, a grid connection is too expensive, planners or the landowner object.	95%	Up to €20,000 plus time
2. Planning Permission There is a 50-60% chance that planning consent will be refused. The need for an EIA and a grid connection report are major costs.	70%	Up to €100,000 plus time
3. Getting an Electricity Purchase Contract The current AER system makes this unpredictable.	40%	Up to €140,000 plus time
4. Arranging Finance It may prove impossible to raise the required capital.	30%	Up to €150,000 plus time

The stage at which a community group invests is therefore crucial. Broadly-based community investment groups have little option but to invest only when the wind farm has been successfully commissioned (although they will have agreed at an earlier stage to invest, subject to certain conditions). On the other hand, narrowly-based community investment groups will be able to negotiate better terms if they are prepared to risk putting their money into a project at an earlier stage. Both types of group would, however, need to have access to professional support so that a professional approach can be adopted in relation to community/developer negotiations.

For further information see ***File 16: Definition of Risk and Opportunity in the Wind Farm Development Process***

[43] CSA Group Ltd. Final Report submitted to Renewable Energy Partnership, December 2003

6 Assessing Wind Farm Developer's Projects

6.2 Assessing Rate of Return

Three other factors, besides the level of risk, affect the return that investors can expect from a wind energy investment. These are:

- The scale of the project. The costs of, say, measuring the wind resource, providing road access, and obtaining an Environmental Impact Assessment (EIA), are much the same regardless of the number of turbines to be installed, therefore bigger projects can be expected to give a better rate of return.
- The terms that a group negotiates with the initial developers of the project.
- The way the wind farm is financed. Provided everything runs smoothly, the highest returns can be obtained by borrowing 80 per cent or more of the capital required from a bank at a fixed rate of interest for the life of the loan. Such a loan would normally be repaid over the first ten years of the project's life. However, community investors might decide not to borrow at all or, like the Baywind Co-operative (see Part I, Section 2), only to borrow a small proportion of the required capital. This, of course, would maximise the amount of money coming into the community from the wind farm but reduce the actual percentage rate of return.

The difference to the rate of return that various financing arrangements and project sizes can make can be explored using the Financial Model on the CD Rom supplied with this guide. The model can be run for:

- different sizes of a wind farm project;
- different ratios of debt/shareholders' capital;
- different power outputs from the turbines.

The CD Rom includes financial templates which enable communities to assess the rate of return for a wind farm project. The cash flow forecast on the CD Rom is for a 5MW wind farm with typical wind speeds[44] and earning 5.216 cent per kWh[45] for the power it sells, but all these parameters can be changed. The price can be increased or decreased, the farm made larger or smaller, the wind speed increased or lowered.

The example on the CD Rom shows that the revenue generated would be sufficient to service the debt and provide a dividend payment annually to investors. (***File 2: The Financial Model for a Sample Wind Farm)*** Terminology used for calculating the return on investment is shown in Appendix III. Also see ***File 17: Terminology for Calculating Return on Investment***

[44] The community group can consult the recently published Wind Atlas of Ireland (SEI, November 2003) to obtain a reasoned estimate of the average wind speeds for their locality.

[45] The Government's AER VI documentation fixed a price cap for wind energy at 5.216 cent per kWh for large-scale projects (up to 25MW) and 5.742 cent per kWh for small-scale projects (up to 5MW).

6 Assessing Wind Farm Developer's Projects

To illustrate how the Financial Model can be used, three scenarios have been selected and the process of finding the required answers is set out below.

To Begin:

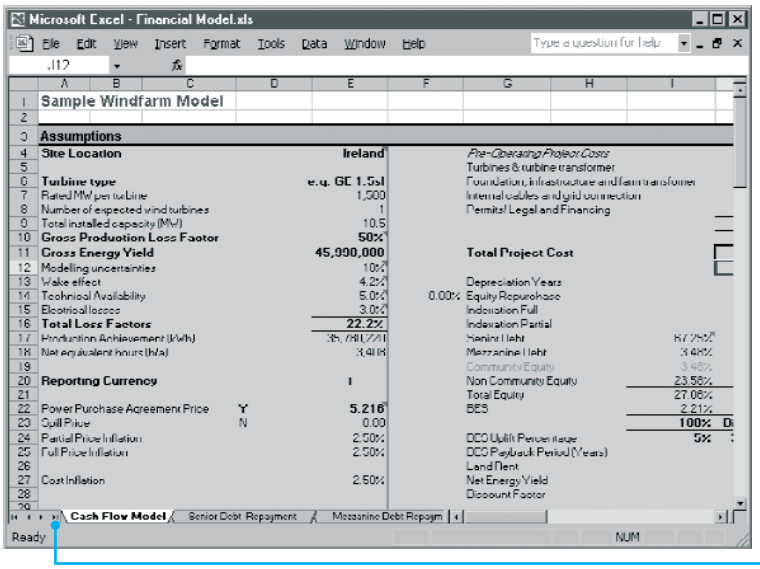
Double click on ***File 2: The Financial Model for a Sample Wind Farm*** on the CD Rom.

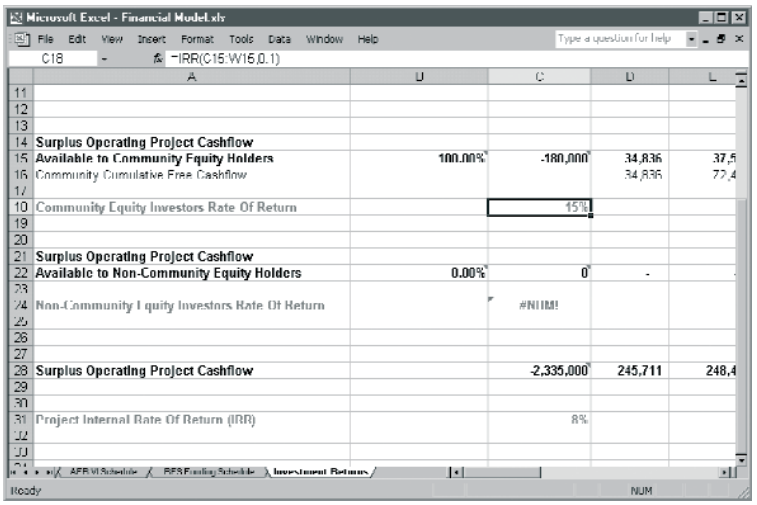
Click on the left arrow on the bottom left hand side of the worksheet tab area until you can see the **Cashflow Model** tab.

Click on the **Cashflow Model** tab. This is the worksheet where the community may enter variable data about the wind farm project in which they wish to invest.

Scenario 1: One turbine to be bought by the community with local equity and bank debt

What would the cash flow revenue be from one turbine owned by the community group and bought with a combination of bank loan and locally raised equity?



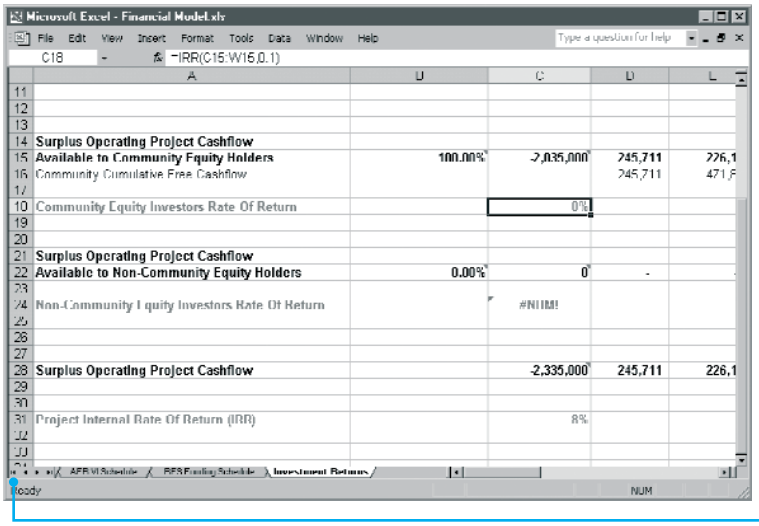


1. Go to the **Cashflow Model.**
2. Click on Cell **E8**, number of expected turbines, and type in 1.
3. Click on **J17**, senior debt, read the comment box and type in, for example, 1,900,000 as the amount of senior debt.
4. Click on **J19** and type in the amount of community equity, for example 180,000. Click on **J18** and type in the amount of mezzanine debt as 0. Click on **J20** and type in the amount of non-community equity as 0.
5. Click on the right arrow on the bottom left hand side of the worksheet tab area until you can see the **Investment Returns** tab.
6. Click on the **Investment Returns** tab.
   - Note that cell **C18 Community Equity Investors Rate of Return** is 15 per cent.
   - Note that cell **C31 Project Internal Rate of Return (IRR)** is 8 per cent.
   - Note that the surplus operating project cashflow available to community equity holders (i.e. revenue) from the wind farm electricity sales for each year is shown from **D15** through to **D20**.

6 Assessing Wind Farm Developer's Projects

Scenario 2: One turbine owned by the community without bank debt

If the community bought a turbine outright instead of getting a loan what would the rate of return be?



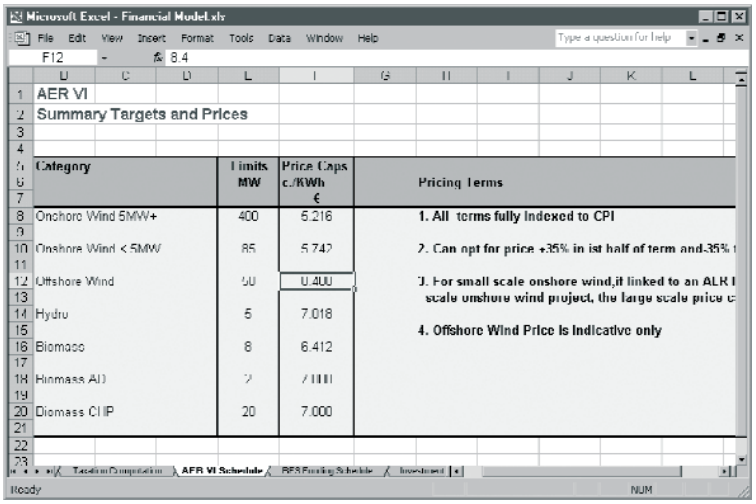
1. Click on the left arrow on the bottom left hand side of the worksheet tab area until you can see the **Cashflow Model** tab.
2. Click on the **Cashflow Model** tab.
3. Click on **J17**, senior debt and type in 0.
4. Click on **J19**, community equity, and type in 2,035,000.
5. Click on the right arrow on the bottom left hand side of the worksheet tab area until you can see the **Investment Returns** tab.
6. Click on **Investment Returns** tab.
   - Note that cell **C18 Community Equity Investors Rate of Return** is 8 per cent.

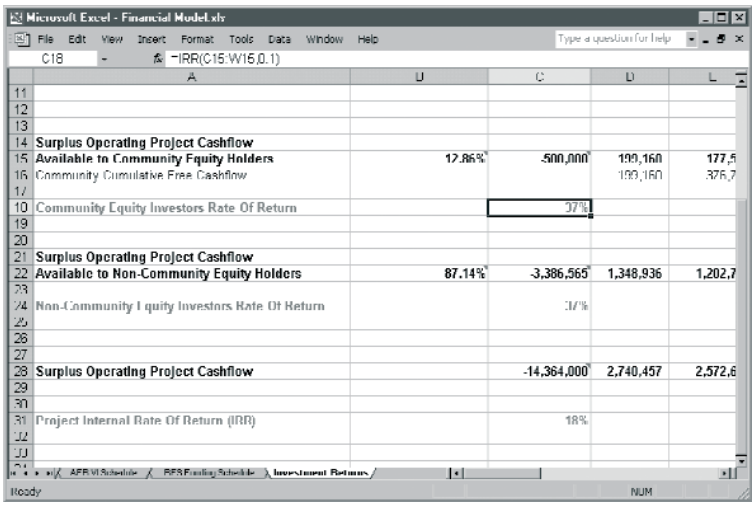
Scenario 3: Variations in power purchase agreement electricity prices

What would be the effect of different price scenarios? For instance, if the German price of 8.4 cent per kWh was applied in Ireland what would be the effect on the rate of return for a 10.5MW wind farm? (Incidentally, the German price is the same as the price offered for offshore wind under AER VI).

1. Click on the left arrow on the bottom left hand side of the worksheet tab area until you can see the **Cashflow Model** tab.
2. Click on the **Cashflow Model** tab.
3. For a 10.5MW wind farm we need to enter a few figures in the **Cashflow Model** worksheet.
   - Type 7 in **E8**, the number of expected wind turbines.
   - Type 1,383,000 in **J6**, Foundation, infrastructure and farm transformer costs.
   - Type 706,000 in **J7** Internal cables and grid connection.
   - Type 9,660,000 in **J17**, Senior Debt.
   - Type 500,000 into **J18**, Mezzanine Debt.
   - Type 500,000 into **J19**, Community Equity.
   - Type 3,386,565 in **J20**, Non-Community Equity.
4. Click on the right arrow on the bottom left hand side of the worksheet tab area until you can see the **Investment Returns** tab.
   - Note from cell **C31 Project Internal Rate of Return (IRR)** that the rate of return is 10 per cent for the existing model for a 10.5MW wind farm.
   - Note that cell **C18 Community Equity Investors Rate of Return** is 15 per cent at the AER VI price of 5.216 cent per kWh.

6 Assessing Wind Farm Developer's Projects





5. Click on the left arrow on the bottom left hand side of the worksheet tab area until you can see the **Cashflow Model** tab.
6. Click on the **Cashflow Model** tab.
7. To change the price click on **E22 Power Purchase Agreement Price:**
   - In the formula bar at the top of the screen change **F8** to **F12**.
   - Click on the right arrow on the bottom left hand side of the worksheet tab area until you can see the **AER VI Schedule** tab. You will see that **F12** is a price of 8.4 cent per kWh.
8. Click on the right arrow on the bottom left hand side of the worksheet tab area until you can see the **Investment Returns** tab.
   - Note that cell **C18 Community Equity Investors Rate of Return** is now 37 per cent.
   - Note that cell **C31 Project Internal Rate of Return (IRR)** is now 18 per cent.

7 The Wind Farm Development Process

This section guides community groups through each of the stages involved in establishing a wind farm project, from initial site selection right through to the commissioning of the wind farm.

7.1 The Stages in the Wind Farm Development Process

The stages in the development of a wind farm are as follows:

Stage 0:	Formation of Community Group
Stage 1:	Site Selection
Stage 2:	Obtaining Planning Consent
Stage 3:	Getting a Contract from an Electricity Distributor for the Purchase of the Power
Stage 4:	Arranging Finance
Stage 5:	Construction
Stage 6:	Commissioning

For a summary of this process see the following files contained on the accompanying CD Rom

File 18: Operational Plan for a Community-owned Wind Farm

File 19: Wind Farm Project Cycle with Stages for Community Involvement Identified

File 20: Diagrammatical Description of Operational Plan for the Development of a Community-owned Wind Farm

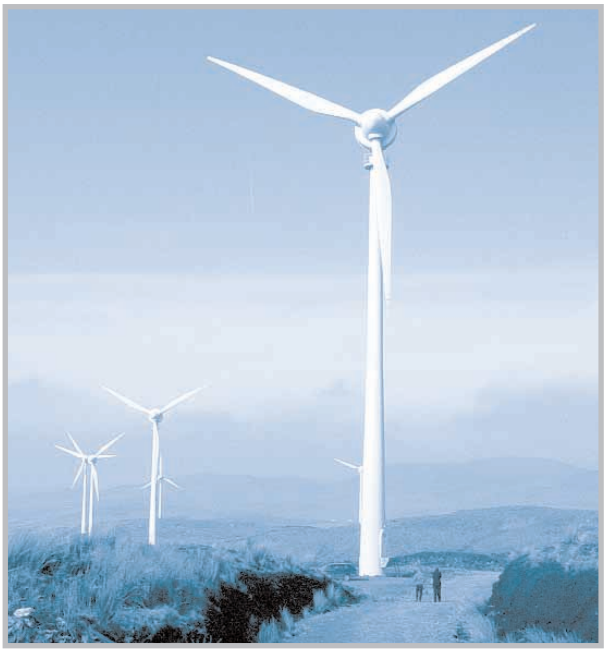
File 21: Operational Schedule for the Development of a Community-owned Wind Farm

We have already discussed Stage 0, namely the setting up of a Community Group. Stages 1-6 will be explored in detail in this section. Firstly, even if a local group only intends to buy into a commercial development, its members might wish to do so before the turbines are actually up and running, as that would enable them to be in a position to get the best possible terms in exchange for shouldering some of the extra risk. In such a situation, they would need to know what was involved in taking the project on from the point at which they make their investment.

Secondly, if improvements are made to the policy environment in Ireland, as discussed in Part I, a community wind investors' group may decide to investigate the possibility of developing a wind farm itself rather than buying into a commercial development. Such a course would require it to spend an appreciable amount of money with no guaranteed return – making a full appreciation of the complexities and risks involved in developing a wind farm project essential.

Angela Duignan of Energy4All writes:

> *"In the short to medium term Energy4All is promoting part community ownership of developer sites as the most practical method for sharing renewable project benefits. However, schemes independent of outside developers are possible and, especially for small projects, preferable. Community-led schemes bring projects to areas that developers would not consider due to scale, profitability or complexities but such projects are prone to take a long time to develop. Considerable effort is required to match local commitment with resources and renewable expertise but the key limiting factor at the moment is risk capital as it takes stg£100,000 to take a scheme up to the planning application stage and sometimes significantly more."*



7 The Wind Farm Development Process

Stage One: Site Selection

The main factor which determines whether a wind farm is going to be profitable is obviously the wind. The higher the average speed over the year the better, particularly as the power a turbine can extract depends on the cube of the windspeed. This means that a site with an average speed of 7 metres per second can produce 59 per cent more power than one with 6 metres per second.

Sustainable Energy Ireland's Wind Atlas of Ireland is available on CD Rom format from the Renewable Energy Information Office. Using this format it is possible to home in on the areas of particular interest and the Atlas can be used to get a good preliminary indication of the wind speeds in the area.

As a rule of thumb, any upland area with a view is likely to have a good enough wind resource for a wind farm but this is likely to make the location sensitive from a tourism perspective. Consequently windspeed maps need to be compared with the **County Development Plan** (available from local county council offices) or, in the case of counties Cork and Kerry, with the zones that the county planners have established wind farms are likely to be permitted. In early 2004, Mayo, Clare, Galway and Sligo were well advanced with their zoning process but some other counties are not at this stage yet.

Once the location of the windiest acceptable areas have been established – and a conversation with a senior planner would be useful to confirm them – the next step should be to contact the grid operator or suitably qualified and experienced electrical engineering consultancy to identify areas where connections might be possible. This would involve a connection to the distribution side of the grid for wind farms under 10MW and to the transmission side of the grid for bigger wind farms.

After the grid operator's information has narrowed down the best area for the wind farm, the next step is to drive through the area looking for suitable sites and talking to landowners there. It is a good idea to locate three or four possibilities and then commission a consultant to visit them all to select the most promising one. After that, carry out the following three checks on the site selected by the consultant:

1. Examine the County Development Plan to see if the site has any archaeological remains or is within a Natural Heritage Area (NHA), Special Area of Conservation (SAC) or Special Protected Area (SPA). The Heritage Service (previously Dúchas) within the Department of Environment, Heritage and Local Government should be consulted to see if there are any plans to designate NHA, SAC or SPA status in the area of the proposed site (www.duchas.ie)

   Even if the enquiries show that there are unlikely to be any archaeological remains, get an archaeologist to walk the ground to ensure that there are no obvious relics that would make a wind farm undesirable. A check with a naturalist who knows the area would be a good idea too. Both professionals may be required to contribute to an Environmental Impact Assessment later on so the visits now are a good way of establishing a relationship. Having said that, do not overlook local knowledge. If there is a local archaeological or naturalist group it would make sense to involve them. A project about community ownership should not be afraid to engage with the community at all levels.

2. The visual and environmental impact of wind farms can often be mitigated by small changes in design. Go back to the county planners and confirm that they are happy about the site selected. Arrange a site meeting if possible. Issues that could be discussed include the sensitivity of the landscape around the site; the scale of the proposed farm; any cumulative effects due to other wind farms in the area; the impact on views and designated scenic landscapes as well as any local visual aspects; impacts on nature conservation, archaeology, and historical structures; local environmental impacts including noise and shadow flicker; potential impacts on fauna and flora, the visual and environmental impacts of associated access roads, plant and grid connections. ***File 22: Guide to the Planning Process***

3. Double-check with the grid operator. Connection to the distribution grid is becoming increasingly difficult due to both competition and grid capacity constraints and potentially presents a major constraint to the project. The grid operator published a guide, Guide to the Process for Connection to the Distribution System (ESB, January 2002), which sets out the steps and requirements necessary to obtain a generation connection to the Distribution System (contact info@eirgrid.ie for a copy). Consider using the grid operator's fee-based Pre-Feasibility Study service designed to explore connection opportunities for specific sites and to estimate connection costs, which can be as high as 15 per cent of the capital cost of a wind farm. (The actual cost is very dependent on the site's location and whether a substation is necessary.) The grid operator service will cost around €750. A possible alternative to a grid connection is to supply electricity directly to a local industry or manufacturing plant, as done by the Burtonport Co-operative.

7 The Wind Farm Development Process

If the site passes these tests, the next steps are:

1. **Secure a legally-binding option to erect wind turbines on the site from the landowner or owners**

   This will probably involve payment unless the owner(s) can be persuaded to take shares instead. The proposed Renewable Energy Advisory Group could supply specimen agreements and advise on terms. A local solicitor should be engaged to examine the legal ownership of the site and its access route and any third party issues such as grazing or turbary rights. If the land is commonage, the written consent of all owners will be required, which may be hard to get. The cost of the lease is generally based on 2.5 per cent of gross annual turnover or approximately €3,500 for every 1MW wind turbine (2003 figures). There should be clear and transparent locational data regarding the turbines and their visual impacts before people living in the area consent. Otherwise it may lead to individuals pulling out at a later stage when they realise the impacts.

2. **Erect a mast tall enough to mount an anemometer**

   This is used to measure, over a minimum period of one year, the wind resource at the intended hub height of the wind turbines selected for the wind farm. This should be as close to hub height as possible and readings should be taken from two heights on the mast for verification. (Preliminary readings at a minimum height of 10m are often taken first for a period of a few months to check if the site is as promising as thought before going to the expense of erecting the taller mast.) These wind speed readings are correlated against those from the nearest Met Éireann weather station with readings stretching back for at least 30 years. This enables a rough prediction of the annual energy production in kilowatt-hour per year (kWh/yr) for the site to be made.

   Anemometers and masts can be rented from several companies in Ireland. The correlation and prediction analysis can either be carried out by consultants or by the turbine manufacturers if you have already decided on the equipment likely to be used. It is worth comparing the costs of getting the turbine manufacturer to carry out the measurements with contracting an independent expert to measure the wind resource. Also compare the cost of buying the equipment outright or leasing it and then supplying the data to a consultant to be interpreted. It is important to emphasise the importance of accurate measuring. The entire project finance relies very heavily on wind speed readings.

   Community groups should be aware that steps can be taken to minimise the cost of this process. For example, due to the number of anemometers that are already in existence it is possible to get a reasonable estimate of windspeeds in many locations. It may be possible for an expert to make such an estimation for €500 to €600.

   If a group decides to erect a test tower itself, this will cost €3,000 - €8,000 depending on its height, plus €3,000 for the instruments. For test towers above 30 metres it would be inadvisable for the community to carry out the work themselves.
   The community should purchase a new calibrated anemometer and new windvanes, however the rest could be second-hand. Data loggers are very reliable and as the larger developers are increasingly using expensive gsm-enabled models, guide models are available at good prices. These are quite adequate for community groups as members can read the loggers regularly at no cost, something not always possible for developers often working hundreds of miles away.

3. **Define scope of Environmental Impact Assessment**

   If an Environmental Impact Assessment (EIA) is required to accompany the planning application, ask an environmental consultant to visit the site to define its scope. (Not all counties require an EIA for projects below 5MW – in those cases, an environmental report which can be drawn up by a planning consultant is all that will be required).

   One of the main parts of an EIA is the Environmental Impact Statement (EIS) document, which is why you often see "EIA/EIS" written as one. The scoping of the EIA is important because its cost depends on the complexity and sensitivity of the site. For example, if a bird survey is required it could add another €10,000 if done professionally. A planning application with surveys and drawings and an EIA for an average site should cost around €50,000 but allow an extra €5,000 for survey work if the terrain is complex or the slopes are steep. The cost of the EIA component in that figure is €40,000 but the price could run to almost double that for upland bog sites or if a hydrological study is required.

   During the visit, the consultant will get a feel for the farm's likely effect on flora, fauna and birds, humans and the view. He or she will also look for possible impacts on water supply, turf cutting and walking routes and summarise the likely overall positive and negative environmental impacts of the wind farm. They can then estimate the cost of the EIA needed. If any wildlife surveys are going to be required, members of the community group with appropriate

skills might be able to carry them out over the course of the year while the wind tests are being completed. This would save the group the costs of the work. Guidelines on the information to be contained in Environmental Impact Assessments have been issued by the Environmental Protection Agency (contact: www.epa.ie). ***File 23: Process from EIA to EIS***

Stage 2: Going for Planning Consent

After a year, when all the wind data is in, the turbine manufacturer or consultant will determine the likely energy yield from the site and work out how the turbines should be set out to exploit its potential most effectively. The energy yield is calculated by multiplying the theoretical power of the wind by an efficiency factor determined by the performance of the wind turbine type selected and the location of each turbine in relation to the others. Overly close spacing of turbines can greatly reduce production and shorten the life of the turbines by causing turbulence. For each possible layout, a picture of what the wind farm will look like against the backdrop of the actual landscape will be created to accompany the planning application. The resulting wind resource report is important for funding applications and loan requests.

The cost of the turbines can be calculated from the preliminary wind farm configuration and layout. To this are added the costs of the Environmental Impact Assessment (EIA), the site construction work, legal and financing charges and the cost of the grid connection to arrive at the total project cost. This figure plus details of the proposed financing arrangements, the likely price that will be obtained for the electricity and the cost of leasing the site can be inserted into the Financial Model on the CD Rom accompanying this guide (***File 2: The Financial Model for a Sample Wind Farm)*** to produce a cash flow forecast and an estimated rate of return on the community's investment. This will indicate whether it is worth proceeding with the project or not.

If the financial report is favourable, and an EIA is required, ask the environmental consultant who visited the site earlier to go ahead as the job may take several weeks to complete as it can involve several experts doing baseline surveys of the topography, human habitation, flora and fauna, soils and geology, hydrology, air quality, landscape quality, material assets, cultural heritage and traffic. The energy consultants' report will already have addressed noise and shadow flicker and these will be added to the EIA, which will contain a description of the development and its likely effects under a number of sub-headings such as potential impacts, remedial measures, predicted impact, monitoring and site reinstatement. The cost of the full report may be in excess of €50,000 as discussed in the last section.

Once that is complete, the planning application can go ahead. At the pre-planning meetings, the planning officer will have clarified the documents required with the application and the amount of detail needed. It is advisable to use an engineer to help with the application form. Planning permission can take from six months to a year to obtain, particularly if further information is requested by the planning authority. Following the granting or refusal of planning permission, an appeal may be submitted to An Bord Pleanála, either by third party objectors or by the promoters. Adjudication by the Bord can be a long, drawn-out process. The Government is currently investigating alternative mechanisms to expedite the planning process for major infrastructural projects deemed to be of benefit to the state, this may extend to some wind energy projects.

Obtaining planning permission for a wind farm can cost €100,000 - €150,000 including the EIA. Schedule 9 of the Planning and Development Regulations 2001 gives full details of fees for planning applications and is available from county council offices. ***File 18: Operational Plan for a Community-owned Wind Farm*** and ***File 19: Wind Farm Project Cycle with Stages for Community Involvement Identified***

Stage 3: Getting a Contract to Supply Electricity

If planning consent is granted there is still only a 50-50 chance that a wind farm will actually be built. This is due to the very high uncertainty relating to grid connection and Power Purchase Agreements in Ireland at present.

In countries with a feed-in law, there is no uncertainty about this stage as wind farm developers know that electricity distributors are legally obliged to accept their power and to pay them a guaranteed price. As a result, the promoters can use their estimates of the construction costs and the measurements they have taken of the wind resource on their sites to calculate almost exactly what the financial return from their project will be. This allows them to raise any further equity capital they require (in the case of a community project, by inviting extra people to come in) and then, if the project is to be geared,[46] to borrow the balance of the capital they need from a financial institution.

[46] Gearing is the term used when developers increase both the riskiness and the profit potential of their projects by augmenting their own capital with borrowed funds.

7 The Wind Farm Development Process

This is not yet possible in Ireland. A community group would need both a grid connection agreement with the grid operator and a Power Purchase Agreement from either an electricity distributor or from an organisation prepared to purchase the power for its own use, before it could confidently work out the financial return. It should therefore delay inviting more people to participate until both agreements have been secured.

As discussed in Part I, a replacement for the AER system is currently being considered by the Renewable Energy Development Group. Therefore the future context in which electricity supply contracts will be issued is currently uncertain.

The ESB's publication, Guide to the Process for Connection to the Distribution System (ESB, January 2002) sets out the steps and requirements currently necessary to obtain a generation connection to the distribution side of the national grid, the part most likely to be used by community wind farms. Connection charges depend on the specific technical details of the proposed facility. Once the application is acknowledged it will take at least 90 working days before a conditional grid connection offer is made to the community company. The community company must accept this connection offer within 60 working days or the connection offer expires. The grid operator then issues a **Formal Acceptance Notice.** This is a "bankable" document essential for any application for loans or investment funds.

Almost certainly, future Power Purchase Agreements are going to become more complex than they have been under the AER arrangements. Even if a European-style feed-in law with a fixed, guaranteed price is enacted in Ireland, issues like the ownership of the green credits that the wind farm will generate will have to be considered. (Green credits are a way of ensuring that all electricity distributors either sell, or pay the extra cost of, a minimum amount of green electricity.) Developers will also have to consider whether they should accept a price indexed to the general cost of living or if that would be a mistake since energy prices are likely to rise more rapidly than other costs. Most community projects will need specialist help in this area.

By law, wind farm developers must also obtain from the Commission for Energy Regulation (CER) an **Authorisation to Construct** under Section 16 of the Electricity Regulation Act, 1999. CER has the power to grant or refuse to grant a **Licence to Generate Electricity** under Section 14 (1) of the 1999 Act. CER can also issue a **Licence to Supply Electricity.** In January 2003, CER signalled its intention to modify the procedure for assessing small-scale (less than 5MW) licence applications in order to minimise the regulatory burden on smaller market participants. It proposes to follow a simple financial assessment procedure and to carry out technical assessment in-house to reduce costs. Current fees for a wind farm of less than 5MW capacity are €35 each for an Authorisation to Construct and a Licence to Generate.

Stage 4: Arranging finance

Once a community wind farm's core group has obtained a contract with a customer to purchase its power and can be sure that it can get that power to the purchaser, it should develop a Business Plan as this will be required by potential investors, loan providers and investment institutions. A Business Plan is a detailed financial forecast that summarises the profit plan, cash forecast and balance sheet. It sets out:

- the management team and the wind farm product and services;
- the technology to be used and details of quality control and assurance;
- the intended electricity market size and potential for growth. A competitor analysis will also be included;
- details of all funding sources and whether or not funding has been secured;
- the socio-economic benefits of the project.

The **Profit Plan** represents a careful assessment of the profit the community group reasonably believes it can achieve in the wind farm project, setting natural caution against natural optimism. It is not an optimistic target, nor the minimum achievable if things go wrong. It must be a realistic assessment based on careful study.

The Profit Plan will show annual revenues generated from electricity sales against direct costs, overheads and capital expenditure to give a net profit or loss for each year. The Profit Plan will show if the project is profitable and at what stage the profit will be generated.

The **Monthly Cash Forecast** flows naturally from the assumptions made in the Profit Plan. For each item of income and expenditure itemised in the Profit Plan, a judgement is made as to which month the income will actually come into the bank account and in which month payment will have to be made. Having totalled revenue and costs for each month one ends up with either net cash in or net cash out for each month. The cash forecast tells the community group how much money they need and when they need it. ***File 2: The Financial Model for a Sample Wind Farm***

The **Balance Sheet** shows whether the business is strong or weak and how much capital is employed. It will show whether financial requirements are short or long-term. Balance sheets are prepared monthly by trading companies. A Monthly Balance Sheet Forecast is prepared for the wind farm project based on the cash forecast. Your accountant and bank manager will discuss

the implications of the completed balance sheet with respect to looking for finance for the project.

As a rule of thumb, a Business Plan will cost in the region of €3,000 - €3,500 to prepare, depending on its scope. It may range upwards from this to €5,000 if the community was to have 100 per cent ownership, which would require a more complex study. LEADER companies or a County Enterprise Board may grant-aid the preparation of the Business Plan. If the community group is seeking a stake in a commercial developer's wind farm, both the developer and the community company will require separate Business Plans.

Raising Loan Finance

If the wind farm project is sound and the community group can demonstrate that it knows what it is doing it will almost certainly be able to raise 80 per cent of the capital it requires as a bank loan – assuming it wants to take that higher-risk route. The bank will require:

1. Copy of planning permission and project plans.
2. Grid connection agreement.
3. Details of equity funding.
4. Profile of the management team and its advisers.
5. Wind resource report from reputable firm of experts.
6. Construction contracts with a credible contractor with firm costs.
7. Copy of the Power Purchase Agreement.
8. Project cash flows; construction cash flow schedule including VAT and letters of credit.
9. Copy of the operation and maintenance contract with warranty terms, costs and conditions; the CER permissions, Authorisation to Construct and Licence to Generate.
10. Land rights, leasehold/ freehold and any way-leaves.

Wind Farm financing of around 80 per cent of the project cost is the most common approach in Ireland today as debt is the cheapest form of funding for wind projects in the current low interest rate environment. The bank's only security is the project and its assets. Avoid providing a bank guarantee that includes a charge on the personal assets of anyone in the group. ***File 24: Model Documentation Required by those Providing the Loan***

The Western Investment Fund managed by the Western Development Commission has within its remit the scope to invest in community based wind farms.[47]

Stage 5: Entering into Construction Contracts

Once finance has been secured, the community company will need to enter into a wide range of legal contracts with technical advisers, county councils, land owners, electrical contractors, the distribution network operator, the Commission for Energy Regulation, construction firms, wind turbine manufacturers and suppliers, lending institutions, operation and maintenance contractors, insurance firms and others. (***File 25: Understanding the Contracts Matrix)*** Expert advice will be crucial to ensure that the contracts are watertight, the allocation of risk is clear and that all the contracts are compatible. This advice would be available if a body such as the Renewable Energy Advisory Group, as proposed by the REP, is set up.

The terms of engagement of the consultant experts should have a clear scope of work and agreed fees. Both the banks and investors will look closely at the contracts and lenders may want some of them assigned to them as part security for their loans.

The organisation and administration of the construction process can be simplified if a turnkey contractor is appointed to carry out all the work associated with the construction and commissioning of the wind farm for a fixed fee. The fee is often high but the contractor carries most of the financial risks and undertakes to deliver a commissioned wind farm for a fixed price by a certain date. Lending institutions prefer turnkey development contracts but the premium price can render small projects uneconomic. A turnkey contract covers the scope of work, duration, guarantees, rights to sub contract, variations, performance standards, default/step-in, termination, force majeure, reports and records, insurance, indemnities and many other issues. The contract should contain robust warranties and penalty clauses to take account of possible delays in construction. The contract will have milestones with interim certificates and payments linked to interim deliverables.

Stage 6: Commissioning

The turnkey contractor will be responsible for commissioning the wind farm and will only receive the last part of the contract payment after the wind farm has supplied power and operated satisfactorily for whatever period was stipulated in the contract.

A summary of the above stages is provided in ***File 18: Operational Plan for a Community-owned Wind Farm***

[47] For further information on the WIF visit www.wdc.ie. Two main criteria for investment apply: the commercial viability of the project and its ability to provide the WIF with an appropriate financial return for the risk undertaken and the social benefits accruing to the areas served by the project as a result of the investment, including employment potential and quality of life. The WIF does not give grant aid.

Glossary of Terms

Alternative Energy Requirement	Ireland's renewable energy programme under which the ESB offers contracts to purchase power from renewable energy installations such as CHP, wind, hydro and waste/biomass sources.
Anemometric records	Anemometric records record how fast the wind is blowing at a site over a period of time.
Association of Irish Energy Agencies	A national association of energy agencies set up under the EU's SAVE II programme.
Authorisation to Construct	Licence required from the Commission for Energy Regulation (CER) before construction of a new power station can commence.
Carbon Emissions Trading	Inter-EU trading between areas with carbon excesses and areas with low carbon output.
Combined Heat & Power	Simultaneous generation of usable heat and electrical power in a single process. A generating facility that produces electricity and another form of useful thermal energy (such as heat or steam) used for industrial, commercial, heating, or cooling purposes.
Commission for Energy Regulation	The Commission for Energy Regulation (CER) licenses new players to enter the electricity generation and supply market and also regulates that market.
Commonage	Communally held land defined by legally binding Common Rights.
Community of Interest	An association of people who are bound by a common interest but who do not necessarily live in the same geographic area. Their motives may be ethical, such as a nationwide environmental association, or purely financial, such as an investment group, or any mixture of both.
Community of Place	This can be a community bounded by a village, town or county or some other local boundary. All of the people live in the area in question and everyone has a personal interest in it.
Connection Agreements	A Connection Agreement is required between the generator and the grid operator, setting out the terms upon which a wind farm may be connected to the Transmission System, which is operated by ESB National Grid (shortly to be taken over by EirGrid) or the Distribution System, which is operated by the ESB.
Contracts matrix	The contracts matrix is a term used to describe the complex web of contractual issues which must be addressed by wind farm developers and includes advisory, commercial, financial, legal and technical issues.
Department of Communications, Marine and Natural Resources	The responsible government ministry for energy in Ireland. Its Sustainable Energy Division develops policy pertaining to renewable energies, including wind, and is critical to policy facilitation of small entrants to Irish wind energy markets. The newly established Renewable Energy Division deals with AER applications.
Designated Investment Funds	These are funds set up by a number of investment managers, life assurance companies and investment brokers. The fund managers collect subscriptions from investors and find eligible companies that want to raise new capital and are prepared to issue new shares to obtain the finance.
Distribution grid	The local wires, transformers, substations and other equipment used to distribute and deliver energy to end-use consumers from the Transmission system.
Due diligence	An in-depth technical, financial and legal evaluation of a project or company to ensure that all required data is independently verifiable and reliable.
Embedded generation	Generating plants connected directly to the Distribution System are referred to as Embedded generation.

Glossary of Terms

Emission Trading Directive	Current discussion on the procedure in the EU for trade between areas with low and high carbon emissions thus encouraging compliance with the limits while also allowing flexibility.
Energy intensities	Ratios between energy consumption and economic activity (measured as GDP or value added in €).
Environmental Impact Assessment	The process for anticipating the effects on the environment caused by a development.
Environmental Impact Statement	The document produced as a result of the EIA process.
Environmental Protection Agency	Organisation with responsibility for promotion and implementation of environmental protection and management in Ireland.
ESB National Grid	National electricity infrastructure network.
Feed-in law system/ Electricity Feed Law	The feed-in law system requires electricity utilities to pay a fixed price for all electricity generated from renewable resources.
Fossil Fuel	Oil, natural gas, coal, lignite, peat.
Green Dividend	The positive environmental effect of any development.
Grid Codes	Grid connection and operation of wind farms are controlled by a number of Codes that define the technical aspects of the working relationship between the Transmission and Distribution System operators and users of these systems.
Guild	A partnership which functions like a co-operative.
Kyoto Protocol	UN's agreed protocol for its Framework Convention on Climate Change, first signed in Kyoto, 1992 (188 signatories by February 2003).
Large-scale projects	Projects producing up to 25MW (AER VI price of 5.216 cent per kWh).
Licence to Generate	Licence required from CER before commencing generation.
Memorandum and Articles of Association	The Memorandum and Articles of Association of a company contain the rules and procedures pertaining to the activities of the company.
National Development Plan	National Development Plan 2000-2006 includes an investment of €185 million for energy efficiency and renewables.
National Greenhouse Gas Abatement Strategy/National Climate Change Strategy	National framework for achieving reductions in greenhouse gas emissions to meet Kyoto Protocol requirements.
National Heritage Areas	Designated areas of national ecological and cultural importance.
Net-Metering	A metering system which effectively runs the electricity meter in reverse if the consumer is producing electricity and feeding it into the local grid.
Non Fossil Fuel Obligation (UK)	Requires the Regional Electricity Operators in England, Wales and Northern Ireland to secure specified amounts of electricity from renewable resources.
Non-statutory organisation/ Non-governmental organisation	Independent organisations with private funding.
North/ South interconnector	A connection or link between the power systems of Northern Ireland and the Republic of Ireland that enables them to draw on each other's reserve capacity in time of need.

Glossary of Terms

Power curve	The Power curve is the measurement of the wind speed over a period of time (velocity per second) relative to the effect (or potential electricity output in kilowatts (kW)). The curve varies significantly with wind speeds, which are higher in the west of Ireland than in many other parts of Europe.
Power Purchase Agreement	A Power Purchase Agreement (PPA) represents an agreement between the power generator (wind farm) and the power purchaser, Electricity Supply Board (ESB) or ESB National Grid (ESBNG)/ EirGrid, as appropriate, for the long-term sale of electricity.
Renewable Energy Information Office	The Renewable Energy Information Office, a national service provided by Sustainable Energy Ireland (SEI) was established to promote the use of renewable resources and provide independent information and advice on the financial, social and technical issues relating to renewable energy development.
Renewable Energy Partnership	A strategic partnership between the Western Development Commission, Brí Nua Community Wind Energy Group and Mayo Community Wind Energy Group.
Risk Capital	Capital investment in high risk ventures.
Security of supply	Requirement for uninterrupted supply within the electricity network.
Shareholders' Agreement	Sets out all aspects of the participants' association on the establishment of a legal structure such as a co-operative or private company limited by shares.
Small-scale projects	Projects producing up to 5MW (AER VI price of 5.742 cent per kWh).
Special Areas of Conservation	Areas covering a broad range of 'priority' habitats and species.
Special Protection Areas	Areas where regularly occurring migratory species and listed rare and vulnerable species of birds are protected.
Statutory body	An organisation that is required to exist by law and was brought into existence by the enactment of an Act of the Oireachtas.
Sustainable Energy Ireland	Sustainable Energy Ireland, formerly the Irish Energy Centre, is Ireland's national energy authority. The authority promotes and assists environmentally and economically sustainable production, supply and use of energy, in support of Government policy, across all sectors of the economy.
System charges/connection fees	Cost of connection and use of the grid network by an energy supplier.
Transmission Grid	High voltage (400 KVa) electricity cables distributing electricity from power stations, often long distances.
Transmission Planning Bill	Soon to be published Bill designed to speed up the planning process for installation of major transmission projects.
Transmission Use of System	Cost of connection and use of electricity network.
Western Development Commission	The Western Development Commission is a statutory body established to promote, foster and encourage economic and social development in the Western Region.
Western Investment Fund	The Western Investment Fund is a €32 million venture capital and local investment fund managed by the Western Development Commission.
Wind resource	The wind resource available at a potential site can be evaluated using the Wind Power Density. The wind power density, measured in watts per square meter, indicates how much energy is available at the site for conversion by a wind turbine.

Appendix I: Example of possible criteria for prioritising grid access

All renewable energy projects below a certain size, and with a high level of community involvement, should be provided with a connection to the national grid at no cost to the project. The eligibility for such connections needs to be established according to clearly defined criteria. An example of a possible system for assessing eligibility may involve grid connection agreements below a certain size running for ten years. Producers then apply for renewal, competing against other existing producers whose agreements have also expired and against proposals from prospective new entrants. Applications for grid capacity awarded points according to the following criteria.

1. **Environmental Benefit.** Scored up to a maximum of 20 points. Highest points go to applications from biogas digesters using food waste and animal slurries because they would not only have zero greenhouse gas emissions but would also prevent potential environmental problems. Generators using methane from landfill would also score highly. Low or zero points would go to peat stations because of their high CO_2 emissions and the damage done by peat extraction.
2. **Reliability and flexibility of supply.** A simple 10-point scale. A thermal power station can be expected to supply electricity perhaps 97 per cent of the time - scoring 9.7 points. A wind farm might supply only 30 per cent of the time, and would get three points. Suppliers unable to supply continuous power would get points if they were able to guarantee to meet peaks in demand - encouraging projects with a power storage capacity.
3. **Income retained in the local community.** A simple 10-point scale. If 100 per cent of the gross revenue from electricity and other sales (green credits, heat etc.) were retained within a 100-mile radius of the plant, the score would be 10. Peat stations would score well on this measure because of the income they generate in their local areas.
4. **Location.** Points would be given according to the proportion of the power from the station that would be used within a 100 mile radius from the site. If 100 per cent was likely to be used within that area, 10 points would be scored.

Appendix II: The Rate of Return Required by Credit Union Borrowers

For all members of a community to be able to invest in a wind energy project, those without savings would need to be able to borrow the capital they require. Several of the credit unions in the Western Region[48] have indicated their interest in becoming involved in such projects.

It would be desirable if those needing to borrow in this manner were able to repay their loans within ten years entirely out of the revenue from the sale of their share of the electricity their wind farm produces. How high would electricity prices need to be for that to be possible? The following is a worked example.

Suppose that a family borrows €10,000 over ten years to invest in a community wind co-operative planning to build two turbines on a farm fitting the Financial Model contained on the CD Rom accompanying this guide. At current interest rates, repayments to the credit union would be €1,400 per annum. In other words, to repay the loan, the rate of return on the family's investment would need to be 14 per cent. This would require an electricity price of 6.5 cent per kWh,[49] provided the family received the payment tax-free. (Members of the Danish wind guilds are allowed to earn up to a certain amount from their wind energy investments without paying income tax and a similar concession could be considered here). This price is above that currently paid for electricity from fossil fuel sources.

Two possible approaches could be used to make up this difference:

Scenario 1: Public Service Obligation

The difference could be facilitated through use of the Public Service Obligation levy.

Scenario 2: Capital grants

Those investing in a wind farm could be provided with benefits similar to those which operate under the BES scheme. For example:

The family borrows €10,000 from the credit union and invests in a two-turbine wind co-operative. The co-operative then receives a grant equivalent to the tax benefit that would be received by someone in the top tax rate band under the BES provisions – currently €4,200. The family's total investment would now be €14,200. As the financial model on the accompanying CD Rom shows, the family would receive a return of 10 per cent on the total sum invested if the guaranteed power price was 5.216 cent and it could consequently pay off its loan if, as in the previous example, the income from the wind farm was tax free.

In fact, the only difference between the two approaches is how the higher cost of the wind energy is apportioned. In the first example, the electricity consumer pays the lion's share, while the national exchequer does so in the second scenario.

The Danes attempted to spread the benefits of the tax concessions and the price supports they provided for the development of renewable energy as widely as possible. They did this by setting a maximum amount that people could invest. A similar approach could be taken here with a maximum limit of, say, €25,000. A limit could also be placed on the maximum income from a wind energy project that would be tax-free, say, €3,000 per annum.

APPENDICES

48 Counties Donegal, Sligo, Mayo, Leitrim, Roscommon, Galway and Clare.

49 If the farm had five turbines, the price required would be 6 cent per kWh, as there are economies of scale in wind farm construction.

Appendix III: Terminology for calculating return on investment

Cashflow	Investments generate cashflows over their lives. In the preliminary stages, cashflow tends to be negative because of developmental costs. After operations commence, the cashflows are expected to be positive as revenues are received and investors begin to earn a return on their invested capital.
Discounted Cashflow (DCF)	DCF analysis is a technique which is used to evaluate the attractiveness of an investment. All cashflows (both inflows and outflows) are included in the valuation calculations as they occur. Taxes are included when paid (not when fall due) and any working capital required for the project is also included. Depreciation, as a non-cash item, is only included in so far as it reduces the physical outflow of taxes. The cashflows generated by a project are discounted back to the present and the present values of the annual cashflows are totalled to determine the value of the investment at the discount rate or required rate of return specified.
Discount Rates	The rate of return required by an investor has three components: ● A fee for the use of his/her money ● A fee for managing the project in which the money is invested ● A fee for taking the risk The minimum or 'risk-free interest rate' is determined by the financial markets and has been traditionally stated as the 'interest rate paid on government bonds'. Today, the 'risk-free interest rate' includes an adjustment for inflation and ranges for short-term and longer-term rates. With a longer-term investment, inflation is less predictable and thus the risk adjustment may be higher. The internally established required rate of return is the preferred discount rate to use in preliminary feasibility studies. In the absence of an established rate, a rate may be constructed by using a combination of 'risk-free market rates', plus a management fee and a risk adjustment.
Net Present Value (NPV)	The NPV is the sum of the net cashflows for every year in the life of a project, after being discounted at the specified rate. The NPV includes present values of project expenditures and the investment outlays made prior to production, as well as the present values of the cashflows from the actual wind farm. ● A positive NPV signifies that investment expenditures will earn a higher rate of return than that specified by the discount rate. **This is an acceptable project.** ● If NPV is equal to zero, the investment will earn the exact return specified by the discount rate. **This is a marginal project.** ● If NPV is negative, the investment will not earn as large a return as specified by the discount rate. **This is an unacceptable project.**
Internal Rate of Return (IRR)	The IRR is another discounted cashflow indicator. For an investment to be attractive, it must generate sufficient positive cashflows to repay the investment expenditure and also to provide a return for the use of the money. The IRR is a measure of the return on the outstanding balance of the investment for each period in the life of the project. The IRR is defined as that discount rate which will set the NPV exactly to zero. ● If the IRR is less than the required discount rate, the project will not earn the required return. ● If the IRR is greater than the discount rate, the project will earn a better return than that required and the investment is recommended.

Appendix III: Terminology for calculating return on investment

Payback Period	The payback method, as a valuation technique, is a measure more of the liquidity of the project than its profitability. The payback period of a project is defined as the number of years required to return the initial outlay. The method should not be used as the principal method of appraisal, but only as a measure of liquidity, as cashflows may extend well beyond the payback period.
Senior Debt	Generally that money which is borrowed from a main (senior) lending institution such as a bank at commercial interest rates. This senior debt would generally constitute the main part of the loan (up to 80%) for development of the wind farm.
Mezzanine Debt	Generally that money which is borrowed from a junior lending institution such as a merchant bank at usually higher commercial interest rates. This more expensive junior debt would generally constitute a smaller proportion of the loan (10%) for the development of the wind farm.
Equity	In this context, equity is money which is input by the community investment company. Individual members of the company may have borrowed their share input to place in the equity basket, while others may have derived their share input to the equity from their personal savings.

Design: **JDK Design** T: 071 912 0905 www.jdkdesign.net

NDP NATIONAL DEVELOPMENT PLAN

Western Development Commission
COIMISIÚN FORBARTHA AN IARTHAIR

sei SUSTAINABLE ENERGY IRELAND

South West Mayo Development Company Ltd.

IRDL

Renewable Energy Partnership
Western Development Commission
Dillon House, Ballaghaderreen
Co. Roscommon, Ireland

Tel: +353 (0)94 986 1441
Fax: +353 (0)94 986 1443
Email: info@wdc.ie
Web: www.wdc.ie

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