Micro & Small Wind Generation

IWEA Discussion Document

Executive Summary

The purpose of this document is to identify areas for discussion with stakeholders in the micro- and small scale generation industry. The main areas which need to be addressed in order to allow the micro generation industry to develop to its full potential have been identified. This industry, if allowed develop, will produce much needed jobs and investment in manufacturing, research, turbine installation and maintenance, potentially reduce energy costs for domestic and commercial micro-generators and decrease dependence on imported fossil fuels.

This document was developed by IWEA and has been circulated to MEGA and Meitheal na Gaoithe for review. In particular the proposals in this document are in line with those being put forward by MEGA, who are in full support of this document.

The key areas are:

1. Financial
2. Standards/Quality of Equipment
3. Planning
4. Grid
5. Manufacture, Research & Development

Each area must be dealt with in order to allow the industry to grow and develop**.**

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Introduction

Many issues are limiting the uptake and acceleration of the installation of micro and small wind generation systems in Ireland at a time when the global drive is to decrease every country's dependence on fossil fuels by significantly increasing energy production from natural resources. Small wind systems can be defined as having a swept area of 200 m^2, roughly equating to 50-60kW. This is line with the internationally recognised IEC standard.

In Ireland we are extremely fortunate to have one of the world's best natural wind resources and yet we do not have the uptake one would expect in terms of microgeneration. This is an important aspect of generation for combating climate change, as the electricity generated locally can go a long way towards reducing the overall electricity demand and meeting our national targets, as well as giving the user control over how and when they use their electricity. It provides the opportunity for users to demonstrate our determination to reduce carbon dioxide emissions, individually, collectively and nationally.

There are a number of issues affecting the uptake of the installation of microgeneration in Ireland and these are outlined in this document. The following is a list of the key recommendations from this discussion document:

1. Financial
    - The level of the feed-in-tariff (FiT) should be increased and paid for all units generated, whether exported or not.
    - The rate of the FiT should be increased so that the payback term of a microgeneration unit is reduced to the region of 6-8 years, therefore becoming a more attractive option for users.
    - The FiT needs to be available to all customers irrespective of the supply company they use or the type of tariff they are on.

2.Standards/Quality of Equipment
    - Standards need to be developed to apply in the following general areas:
        - Product design and manufacturing standards
        - Product performance standards
        - System design and installation standards
    - IWEA propose that the FETAC Award Standards that have been developed for installer training should be a statutory requirement of small wind installers in Ireland, along with the manufacturer's training for each wind turbine type to ensure that installers are trained to proper standards.

3. Planning
    - There needs to be a uniform approach to exemptions across planning departments and that the criteria which apply should be well defined. Currently there is disparity between the different planning departments which is leading to confusion among those interested in installing microgeneration systems.

4. Grid
    - IWEA will continue to work with ESBN to develop a new process for generators between the current minimum limit and a sensible capacity that could be assessed on a local basis quite quickly. This should allow the installation of larger machines and removal of some of the export restrictions.

5. Manufacturing, Research & Development

- IWEA to investigate options in relation to promoting small wind manufacturing in Ireland.
- Therefore IWEA recommend the development of a centre or centres of competence to assist the small wind industry with design, development, evaluation, testing and certification of small wind turbines.

1. Financial

Incentivisation

Most of the EU member states have introduced financial incentives for both initial purchase and on-going power production for small wind turbines, usually based around a combination of grant aid to assist initial purchase and Feed in Tariffs (FiT's) for ongoing output power production. The table that follows illustrates the rates paid in a number of countries.

Country	FiT Rate/Unit	Cap (if any) on power produced	Special Conditions
Germany	€ 0.57	None	Exported unit 20 years
Portugal	€ 0.45	None	Exported Units
Spain	€ 0.44	None	Exported Units
France	€ 0.58	None	Exported Units
Italy	€ 0.44	None	Exported Units
UK/NI	£0.241 - 0.345*	None	All generated units
Ireland	€0.19 - €0.09	3000units at higher rate, then lower rate	Exported Units, 3 years Domestic accounts only First 4000 users only

* Value depends on capacity of microgenerator unit. Tariff valid from April 1st 2010.

Many of the countries in the above illustration initiated their plans by incorporating an initial grant aid programme such as the Clear Skies initiative in UK/NI with a lower FiT rate but with the worsening global financial environment, the initial grant aid has been withdrawn in favour of a higher FiT rate which is to be introduced on April 1st, 2010.

The uptake of small wind turbine installations in all of the above countries, with the exception of Ireland, increased with the introduction of incentives and continues to increase rapidly. In Ireland there remains a low level of installations in comparison with the other countries in the table. In Northern Ireland alone there are more installations of wind turbines that in the Republic of Ireland. This is likely to be a result of the lower levels of incentivisation available in Ireland. The number of installations in the UK is likely to increase even further with the introduction of a feed in tariff for **all** units generated. Payment for all units generated takes into account the actual cost base to produce and deliver electricity to a user which, if generated locally by a small wind turbine system, would no longer be required.

Considerations must be given to both the electricity and the environmental value of power produced by a renewable energy technology. A payment method should be introduced that will identify the environmental reward for investment in micro generators. This payment reward will classify types of renewable micro generators based on their environmental value per kWh generated, i.e. varied payment per kWh for Micro CHP and Wind, although same payment per kg Carbon Dioxide saved (i.e. €c / kg CO_2)

In this case the payment is full recognition for the value of reduced environmental impact and for all units generated, both consumed on site and exported. Since the electricity produced by the micro generator will displace grid supply the payment calculations may be based on the national carbon intensity of the electricity mix, currently (SEI 2008) at 582 gCO_2/kWh, and the average annual price of carbon. The price of carbon is now publicised for the purpose of the Carbon Levy, introduced in the Budget 2010 (December 2009) at an equivalent of €50/tonne.

It is recommended that this method of payment will simplify the metering technology (kWh generator meter only) where payment is given for all units generated, both exported and end-user consumption. This metered record of RE produced may also qualify for a Certificate of RE Origin. This method will also provide valuable and accurate information towards the SEI National Statistics Support Unit for the purpose of inventory database and carbon abatement figures.

IWEA recommend that the level of the feed-in-tariff should be <u>increased</u> and paid for <u>all</u> units generated, whether exported or not.

Payback

The very low FiT rate in Ireland has a detrimental effect on the overall payback term for such an installation. A typical 6KW small wind turbine system which is of suitable quality, reliability, and longevity of operation, installed at a typical house has a current payback term of approximately 12 – 20 years when based on power units generated and the current FiT. Such a long term payback period is a very unattractive financial proposition even if the householder has real commitment to environmental sustainability and carbon footprint reduction. The same wind turbine system with a FiT such as the UK/NI rate, would have a payback period of approximately 6-8 years, and as such becomes a far more realistic and attractive proposition.

IWEA propose that the rate of the FiT should be increased so that the payback term of a microgeneration unit is reduced to the region of 6-8 years, therefore becoming a more attractive option for users.

Currently ESB Customer Supply is the only supply company that offers a FiT (Feed in Tariff) to small wind turbine installations, and it is only payable to Domestic Tariff Account holders. If you have a Commercial or Agricultural Tariff, or if your supply company is a company other than ESB Customer Supply, you do not qualify for a FiT. This is something that needs to be addressed urgently.

In order for microgeneration to become a realistic option for end users, it needs to be available to all customers irrespective of the supply company they use or the type of tariff they are on.

Wind Speed Assessment

Annual average wind speed is a key determinant of the financial performance of any wind project. In the case of small wind, full site assessment is expensive relative to the total project costs.

We have seen small wind turbine installations at what are clearly poor wind sites (next to buildings, behind trees, etc.), possibly due to over-optimism and/or ignorance on behalf of the supplier or site owner. The resulting poor performance can ultimately tarnish the name of the wind industry.

Techniques are now under development using the Irish Wind Atlas, Google Earth, etc. to allow for less expensive site assessment methods which don't require anemometers, towers or site visits. Inexpensive (though uncalibrated) home weather stations are now available for self-assessment by homeowners. Simple guidelines and rules of thumb can also be very useful in avoiding poor wind turbine siting.

Therefore it is proposed that IWEA:

- encourage appropriate site assessment for small wind projects
- encourage the development of new site assessment methods for small wind

2. Standard / Quality of Equipment

Standards

Standards of various types should be identified and enforced for small wind systems, especially in the area of product performance and safety. Performance of small wind systems to date has usually been poorer than promised, and sometimes significantly so, which is potentially damaging to the industry. Practitioners of wind energy are well aware that even small wind turbines are substantial pieces of machinery with the potential to vibrate, overspeed, generate high voltages, etc., hence the need for proper safety standards.

It is also obvious that installation quality will impact wind turbine performance and safety. The SEAI Standards Development Group has recently developed standards for installer training which have been approved by FETAC. IWEA recommend that these awards be a statutory requirement for installers of small wind in Ireland.

Finally it must be considered how standards are to be maintained, verified and enforced (standards regulation).

It is not proposed to develop standards in this discussion document, rather to agree a direction for standards development in light of existing standards activities in Ireland and internationally. Additional required standards should also be identified.

Therefore it is proposed that standards should be developed to apply in the following general areas:

1) ***Product design and manufacturing standards***
2) ***Product performance standards***
3) ***System design and installation standards***

Standards regulation/compliance monitoring is also an area to be considered. All of these are discussed below.

Product design and manufacturing standards and Product performance standards

It is essential that the quality of product being installed is up to a suitable standard, and that good quality products are promoted. It is important that the standards to which the equipment must comply can be properly defined, and that products that meet the required standards are recognisable. There may be a case for having a list of manufacturers or turbine types which comply with the standards, and making this information available. The use of quality equipment could also be encouraged through grant schemes that are only available for equipment that meets the required standards.

The American Wind Energy Association (AWEA) and the British Wind Energy Association (BWEA) have produced very similar performance and safety standards[i,ii]. These standards cover:

a. Performance Testing
b. Acoustic Sound Testing

[i] *AWEA Small Wind Turbine Performance and Safety Standard*, AWEA 9.1-2009
[ii] *BWEA Small Wind Turbine Performance and Safety Standard*, 29 February 2008

c. Strength and Safety
d. Duration Test
e. Reporting
f. Labelling
g. Changes to previously certified products

The standards are based on IEC standard 61400 for wind turbines, and three parts of this in particular:

- IEC 61400-2 – Design requirements of small wind turbines
- IEC 61400-11 – Acoustic noise measurement techniques
- IEC 61400-12 - Power performance measurements of electricity producing wind turbines

To quote from the forward of both the AWEA and BWEA standard (identical wording): "The goal of this standard is to provide meaningful criteria upon which to assess the quality of the engineering that has gone into a small wind turbine meeting this standard, and to provide consumers with performance data that will help them make informed purchasing decisions. The standard is intended to be written to ensure the quality of the product can be assessed while imposing only reasonable costs and difficulty on the manufacturer to comply with the standard."

It would make sense to have a similar document for Ireland, with fairly minor changes. For example the BWEA document has more detail than the AWEA document in the areas of noise and performance testing, while the AWEA document requires consideration of tower design, but BWEA doesn't.

Therefore IWEA propose to investigate whether or not the existing product design and manufacturing standards and product performance standards can be adopted in Ireland, or whether standards specific to Ireland will be required.

It should also be considered whether or not a CE mark is required on all wind turbines, thereby implying compliance with such standards as the EU EMC Directive (2004/108/EC), Machinery Directive (2006/42/EC), Low Voltage Directive (73/23/EC) and others.

System design and installation standards

Along with the product design, manufacturing and performance standard other standards that may be fully or part relevant are listed below.

<u>Grid Compliance</u>

- EN 50438 and ESB Networks *'Conditions governing the connection and operation of microgeneration'* provide for type approval of network interfaces for micro-generators and for facilitated access to the network for such generators. The capacity limit generally prescribed in EN50438 is 16A per phase and ESB Networks have extended the limit applicable in Ireland up to 25A for single phase generators.
- Beyond the limits prescribed in EN50438 and ESB Networks conditions, interfaces are no longer type approved and must be tested in situ following installation. They generally entail the use of protection relays and the appropriate installation and set up of these relays. This requires a site assessment by ESB networks at present. (A new application procedure for systems up to 30kVA domestic and up to 50kVA commercial is currently been looked at by

ESB networks. This will be very welcome and will fit nicely into the 16m/50kW size proposed in references 1 and 2.)

Electrical Safety and Regulation

- National Rules for Electrical Installations
- Energy (Miscellaneous Provisions) Act 2006, under which the CER has the responsibility to regulate the activities of electrical contractors with respect to safety. This includes the definition of 'Controlled Works'[iii].

Health and Safety Legislation

- Safety, Health and Welfare at Work Act 2005 (SI No. 328 of 2005)
- Safety, Health and Welfare at Work (Construction) Regulations 2006 (SI No. 504 of 2006)

Planning Legislation

- Planning and Development Act 2000 (SI No. 30 of 2000)
- Planning and Development Regulations 2007 (SI No. 83 of 2007)
- Planning and Development Regulations 2008 (SI No. 235 of 2008)

Siting Standards

- The siting of wind turbines is very important from both a production and a safety perspective. Poor siting of turbines can result in poor production or can cause safety issues. It is essential that there are standards relating to the siting of turbines to ensure that safety of people and dwellings is considered at all times.

Other Miscellaneous Standards

- BS 4142 – Method for rating industrial noise affecting mixed residential and industrial areas.
- BS 8004 Foundations
- BS 8110-1 Structural Use of Concrete - Part 1: Code of practice for design and construction
- Engineering Recommendation G83/1
- BS 7671 Requirements for electrical installations
- BS 6651 Code of practice for protection of structures against lightning
- BS 6133:1995, 'Code of practice for Safe operation of lead-acid stationary batteries
- Energy Efficiency Best Practice in Housing - Installing small wind-powered electricity generating systems; Guidance for installers and specifiers (CE72)
- SI No. 83 of 2007
- SI No. 235 of 2008
- ISO 1996 Acoustics - Description, measurement and assessment of environmental noise
- EN 60903 Live working. Gloves of insulating material
- EN 60900 Live working. Hand tools for use up to 1000 V a.c. and 1500 V d.c.
- IS EN 60947-3 Specification for low-voltage switchgear and control gear, switches, disconnectors, switch-disconnectors and fuse-combination units
- IS EN 50164 lightning protection components
- I.S. EN 50272-2 Safety requirements for secondary batteries and battery installations - part 2: stationary batteries

[iii] Controlled Works are electrical works which require a certificate to be issued. Under CER Decision CER/09/009, the installation of a small or micro scale generator, though not specifically detailed, is included within the definition of Controlled Works.

Installer training standards

In recognition of the need for the development of an Award Standard for microgenerator installers, SEI convened a meeting of key stakeholders in early 2009. At this meeting the formation of a Standards Development Group (SDG) was discussed and its composition agreed. A proposal for the formation of a Standards Development Group was submitted to FETAC on 26th February 2009. The Standards Development Group comprised

- Sustainable Energy Ireland, SEI (lead organisation);
- Electricity Supply Board, ESB;
- Commission for Energy Regulation, CER;
- Electrical Contractors Safety & Standards Association, ESSCA;
- Training and Employment Authority, FAS;
- Micro Electricity Generators Association, MEGA;
- Solar Energy Society of Ireland, SESI;
- Electro-Technical Council of Ireland, ETCI;
- Irish Wind Energy Association, IWEA.

The SDG was convened to develop an award specification leading to accredited training programmes for installers of small and micro scale electricity generation technologies.While starting from a relatively low activity base, the deployment of these technologies will create a need for appropriately trained and competent personnel to ensure the safety and reliability of installations.

The awards are as follows:

1. Electrical Installation of Micro-generators
2. Implementation of Small Scale Wind Systems
3. Implementation of Solar PV systems

The first two awards are relevant to micro and small scale wind systems.

1. Electrical Installation of Micro-generators
The purpose of this award is to equip the learner with the relevant knowledge, skill and competence for the electrical installation, connection, testing and commissioning of micro generators in accordance with relevant guidelines, standards and legislation whilst working on their own initiative and without supervision.

2. Implementation of Small Scale Wind Systems
The purpose of this award is to equip the learner with the relevant knowledge, skill and competence for the specification and assessment of small wind turbine projects for the management of the installation of small wind turbines according to the manufacturers' specification

These awards have now been finalized and can be seen on the FETAC website (http://www.fetac.ie/modules/Certificates/L6FETACIndex.html).

IWEA propose that these awards should be a statutory requirement of small wind installers in Ireland, along with the manufacturer's training for each wind turbine type to ensure that installers are trained to proper standards.

3. Planning

In an attempt to accelerate the uptake of small wind turbine systems, two statutes were introduced to law which were designed to simplify and ease the planning requirements for the installation of small wind turbine systems. This would reduce the administrative issues and allow prospective users to install small wind turbines without the necessity for full planning application, providing certain criteria were met.

The complete Statues are referenced in law as Statute No 83 of 2007 Planning and Development Regulations 2007 which relates to the installation of small wind turbines for domestic use and Statute No 235 of 2008 Planning and Development Regulations 2008 which applies to commercial/agricultural installations.

Small wind turbine systems that met the criteria set out in these two Statutes, would be Exempt from planning.

The introduction of these Statutes and the applicable Exemption from Planning had a significant impact on the small wind turbine market sector in that there was a considerable increase in the number of enquiries from people who wished to pursue a turbine purchase from the domestic, small commercial, and farming communities. These individuals and suppliers were all under the impression that if an installation complied with the exemption criteria, a small turbine installation could proceed immediately without the previous necessity of applying for full planning permission and the costs involved in such applications.

Subsequently, a considerable number of systems were installed and the market became more buoyant. However, uncertainty has arisen following the required decommissioning of a 6 KW turbine that was installed under the Exemption Statute in County Louth that was deemed by a local passing member of the Planning Department of Co Louth to be “interfering with view of interest”. The case was appealed by the owner three times at local level and twice at An Bord Pleanala at a legal cost to the owner of some €8,300.00 only to have the turbine disassembled. When this case was “published” on the SEI website, it caused and continues to cause uncertainty.

The only sensible course of action following this case was for prospective users and suppliers to seek a Declaration of Exemption letter from their local planning office prior to any installations to ensure that their installation did not suffer the same consequences as the County Louth case. Originally the request for this Declaration of Exemption did not incur any costs applied by the local planning office, however there is currently a cost of €80.00 being applied to any Declaration of Exemption request.

The County Louth case created and continues to create significant confusion which adversely affects the uptake and installation of small wind turbine systems totally contrary to the aim of the Statutes which is to encourage and accelerate the installation of such systems

1) Even if a proposed small wind turbine installation meets the criteria set out in the relevant Statutes, a local planning office can oppose the installation on grounds that are not published within the actual Statutes.
2) There appears to be a lack of clarity regarding these Statutes, and their implications in some planning offices.
3) There is considerable variance across the country in the interpretation and implementation of these Statutes. In some areas the Exemptions are known and understood and swiftly

agreed, while in some areas there is a lack of knowledge as to the existence of the Statutes and Declaration of Exemption requests.

4) Many Planning Offices are demanding that persons applying for a Declaration of Exemption under the Statutes must go for Full Planning Permission for their proposed installations when the Statutes were introduced into law to overcome this condition.

It is essential that there is a uniform approach to exemptions across planning departments and that the criteria which apply are well defined. Currently there is disparity between the different planning departments which is leading to confusion among those interested in installing microgeneration systems.

Turbine maximum height

The Statutes (Domestic No83 of 2007 and Commercial/Agricultural No 235 of 2008) have a domestic height limitation of 13m, and 20m overall height in Agri/Commercial. This really limits the power harvest capabilities of any size wind turbine and really limits the annual harvest of small systems. It is a known fact that if you increase the wind harvest of a wind turbine, you have a cubic increase in the power harvested, basically speaking, the higher you go the more energy.

It is proposed that the heights at which exemptions will apply be increased to increase the benefit that can be obtained from the installation of small wind systems.

4. Grid

Grid Issues for Microgeneration

ESBN's policy for microgeneration was intended to facilitate a non bureaucratic connection process for very small generators. It is based on an "inform and fit" process where the user informs ESBN of their intention to connect on a one page form and may then proceed in the absence of notification to the contrary from ESBN.

The process and standards were originally based on UK standards set out in G83, however, the current process aims to follow the EU EN50438 standard quite closely. There are some legacy issues remaining from the period where ESBN developed procedures in advance of the publication of EN50438. It would seem that there needs to be some changes made to these processes in the near future, particularly, as the size of generators people are interested in are larger than those covered by the existing procedures. In essence once you go even slightly above the current threshold you move from the "inform and fit" world to the full generator connection application world. ESBN are currently considering a process for generators slightly larger than the current standard that would allow a quick evaluation of the suitability of the immediate local network for the proposed connection and allow installations to proceed where they do not require network upgrades.

The current scope (definition of size) of microgeneration is broadly consistent with EN50438 and limits the feed in current to 16Amps/phase at LV on a 3 phase site and 25Amps on a single phase connection. These numbers originally came from the G83 standard. These limits are designed to prevent harmonic emissions impacting on power quality and voltage standards of demand users. In practise there is likely to be minimal impacts on the networks caused by generators of these sizes if they are reasonably sparse. If there was a concentration of them in a weak network area then there may be cause for concern.

There is also a limit of 40% of the size of the LV transformer applied to Microgeneration sites and in practise this could be the limiting factor for many sites. For a new build one off house a 15kVA transformer would be standard although there could be cases where a 15kVA transformer could be supplying a small group of houses or a farm. In urban or more heavily developed areas current LV transformers would be 200kVA, 400kVA or 630kVA. This limit is a right that ESBN reserve as it may be an issue if a number of parties wish to install microgeneration behind a single transformer but it is believed to be a bit sporadic in application.

The technical standards required for microgenerators feeding into the grid will need to be considered in light of the introduction of electric vehicles. If microgeneration and electric vehicles are to become a significant feature in the future of the Irish electricity system, consideration of the impact of larger amounts of electricity feeding back into the grid will be required in the development of technical standards.

IWEA will continue to work closely with ESBN in developing a new process for generators between the current minimum limit and a sensible capacity that could be assessed on a local basis quite quickly. This should allow the installation of larger machines and removal of some of the export restrictions.

Information on the current policy can be located at:
http://www.esb.ie/esbnetworks/generator_connections/micro_gen_connections.jsp

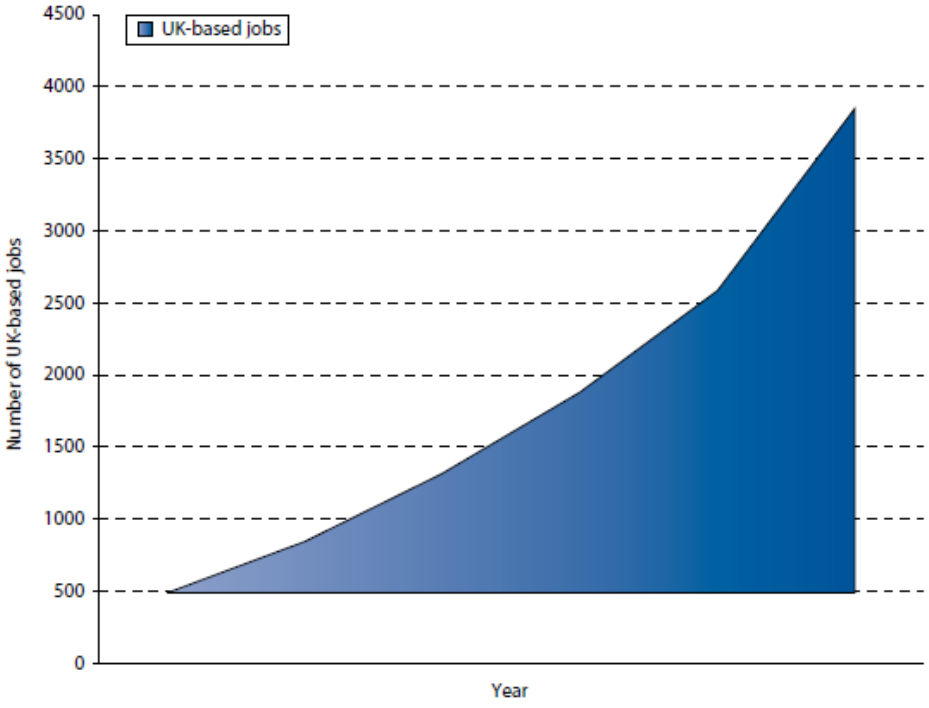
5. Manufacture, Research & Development

Small Wind Systems Market Trends

There is a significant appetite for the manufacture of small wind turbines in the Republic of Ireland. Numerous firms have begun down this road in spite of limited government interest or appreciation of the potential for job creation.

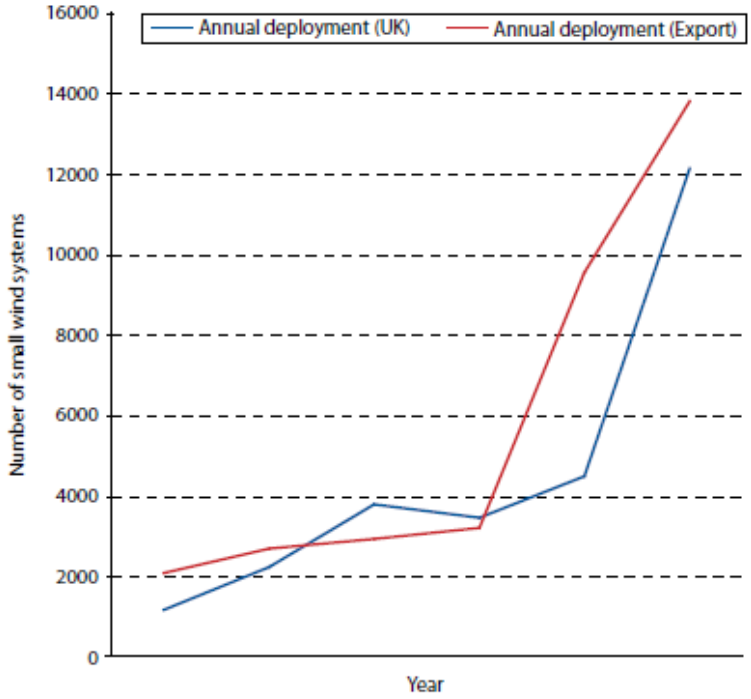
The British Wind Energy, in their "Small Wind Systems UK Market Report 2009", show the trend in small wind jobs as indicated below, and state:

"The number of UK-based jobs provided by the UK SWS (small wind systems) sector continued to rise in 2008. Based on current industry practice, it is estimated that for every manufacturing company level employee, there are two jobs created upstream (e.g. supply chain, components, etc.), and a further two created downstream (e.g. installer, distributor, etc.). BWEA estimates that by 2020, the SWS sector could be employing 5,800 people with a market revenue size of £750+ million. Assuming UK market saturation and continued participation in fast expanding export markets, BWEA estimates that the UK SWS sector could provide over 10,000 UK-based jobs and revenues measured in the billions of pounds annually."



	2005	2006	2007	2008	2009	2010
UK-based jobs	485	845	1315	1880	2585	3850

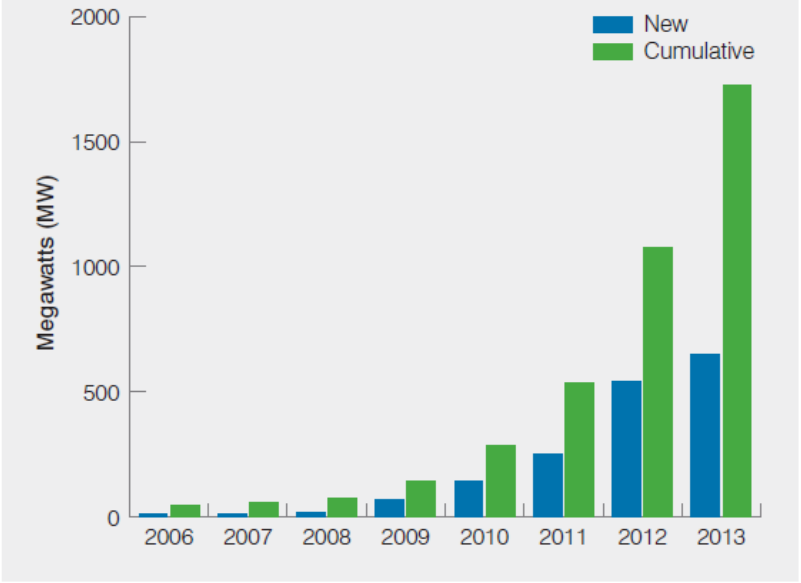
This projection is based on the market growth expectations as indicated in the following figure from the same report.



	2005	2006	2007	2008	2009	2010
Annual deployment (UK)	1163	2232	3787	3453	4487	12125
Annual deployment (Export)	2082	2686	2927	3204	9537	13793

The American Wind Energy Association in their "AWEA Small Wind Global Market Study (2008)" also indicates a large increase in the manufacture and installation of small wind systems. The figure below gives an indication of the market trends for small wind systems.

FIGURE 4: U.S. MARKET GROWTH PROJECTIONS



The international market for small wind systems is clearly growing rapidly, with thousands being sold in the UK, US and other international markets. It appears that the annual number of megawatts of SWS will increase by at least a factor of five by 2013. If we assume that an Irish small wind industry

could develop to the scale of the projected BWEA 2010 levels by 2015, then this would mean an additional 3800 jobs for Ireland.

Ultimately the market will be huge as the world makes the transition to a sustainable energy future, and we are only at the very beginning of this transition. Ireland has not yet "missed the boat" to become a major player in the small wind market place, and it is only right that a country that will be largely powered by wind should have expertise in the design and manufacture of wind turbines.

Small Wind System Manufacturing

There are basically two manufacturing areas for small wind systems: turbines and components. Let us consider "micro" wind to be less than 10kW rated power and "small" wind to be less than 100kW. The following table shows an approximate breakdown of components and their sources.

Component	**Micro-scale**	**Small-scale**
Blades	Custom	Generic
Hub and mainframe	Custom	Custom
Generator	Custom or Generic	Generic
Tower	Custom or Generic	Generic
Controls	Generic (e.g. Windy Boy)	Custom or Generic

It is common that micro-scale machines have custom-made components, made or specified in-house by the turbine manufacturer (with the exception of the inverter control system). Given the scale of the development effort for up-sizing micro turbines to the "small" category, it becomes more common to seek out existing generic components. For example, micro-scale wind turbine blades can be injection moulded as specified by the turbine manufacturer, without a huge development effort. In contrast the eight metre blade required for a 50kW wind turbine has a large development cost, both in terms of personnel and materials, and therefore it might make sense to simply choose a standard design from an existing blade manufacturer.

At present there are few component suppliers for small-scale turbines, owing to the heretofore limited market. Therefore in addition to having a substantial small wind system manufacturing base, there is an opportunity for Ireland to enter the small wind turbine generic component market, particularly generators and blades.

National Support Schemes to Micro Generator Manufacturers

It is suggested that a National Support Scheme for micro generators should be developed to encourage an Irish manufacturing base, job creation, together with an incentive for critical mass of installations. The scheme should consider providing the initial "block" funding support to current and new Irish (owned and based) manufacturers, allowing for a discounted end product for the Irish marketplace. This scheme will reduce the cost and time scales of the programme administration due to reduced applications and process, and will assist with the current workload, resources and staff restrictions for administration by Government Departments. It can also be used to ensure that the manufactured product is of good quality by only awarding grant funding to those manufacturers that meet the standards.

Examples of the support allocations for discount at retail point can be based on a balanced Net Present Value, or simple payback, profile e.g. (based on current electricity prices and export tariff structure (January 2010). A capital grant of between 30 -50% of the cost is recommended

This support level is within the margins of EU state aids clearance and will be required to establish the marketplace, where the key objective is financial viability. In order to reduce the level of support it will be necessary to increase the REFIT structure price, and raise cap level on export units. A balanced approach is required to gain critical mass in this industry and marketplace, creating smart green employment.

IWEA to investigate options in relation to promoting small wind manufacturing in Ireland.

Small Wind R&D Challenges

Much of the research and development in the wind industry, small and large, is carried out by wind turbine manufacturers. This is particularly the case with large wind, which has had the benefit of a rapidly expanding utility-scale market for their products over the past decade and more.

This will eventually become the case for small wind, however at the present time most small wind manufacturers have a core team of multi-tasking committed individuals, with limited funds for detailed research and development. They are trying to survive on the basis of income from a limited but growing market, and are generally struggling as is typical of many start-up businesses. It is difficult to employ the necessary engineers and technicians for proper R&D on this limited income.

This limits their scope for product development, testing and certification. This leads to a larger number of operating failures than otherwise would be, which in turn results in the need for costly product support. This can lead to the demise of the company, and the tarnishing of the reputation of the small wind industry.

Enterprise Ireland has at least two mechanisms in place to set up such industry support. One is the "Applied Research Enhancement" programme, which supports the development of centres of expertise in various areas in Institutes of Technology. Another is their Competence Centre programme. Competence Centres are collaborative entities established and led by industry that are resourced by highly-qualified researchers associated with research institutions who are empowered to undertake market focussed strategic R&D for the benefit of industry, and are supported by Enterprise Ireland.

Therefore IWEA recommend the development of a centre or centres of competence to assist the small wind industry with design, development, evaluation, testing and certification of small wind turbines.

Conclusion

Microgeneration will play an important part in assisting Ireland to reach its targets for electricity generated from renewable sources. In order to encourage the uptake of small wind systems it is essential that the existing barriers to development are removed. It is important that there is adequate incentivisation in terms of grants for the purchase of equipment and a Feed in Tariff that represents the green value of the electricity generated for all units and by all suppliers. The standards for equipment and installations need to be defined and enforced. It is also important to improve the process by which larger generators can connect to the system in order to allow for greater harvests in line with the on-site demand of some units. There needs to be a more uniform approach across planning departments and the existing exemptions need to clarified. Once these barriers are removed Ireland will be in a position to take advantage of the exceptional wind resource at its disposal.

The IWEA Microgeneration and Small Wind Committee intends to move forward with the issues outlined in this document by addressing the main issues to allow the micro generation industry to develop to its full potential through discussion with the relevant stakeholders.