

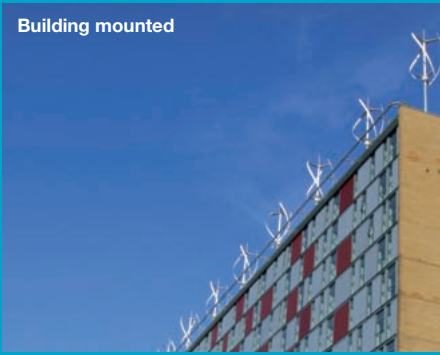
Small Wind Systems

UK Market Report

April 2011



Building mounted



Free standing



HAWT



VAWT



On grid



Off grid



RenewableUK is the trade and professional body for the UK wind and marine renewables industries. Formed in 1978, and with 650 corporate members, RenewableUK is the leading renewable energy trade association in the UK. Wind has been the world's fastest-growing renewable energy source for the last seven years, and this trend is expected to continue with falling costs of wind energy and the urgent international need to tackle CO₂ emissions to prevent climate change.

In 2004, RenewableUK expanded its mission to champion wave and tidal energy and use the association's experience to guide these technologies along the same path to commercialisation.

Our primary purpose is to promote the use of wind, wave and tidal power in and around the UK. We act as a central point of information for our membership and as a lobbying group to promote wind energy and marine renewables to government, industry, the media and the public. We research and find solutions to current issues and generally act as the forum for the UK wind, wave and tidal industries, and have an annual turnover in excess of five million pounds.

Small Wind Systems UK Market Report 2011

Summarised Statistics

2,853 (-25% on 2009)

The number of small wind system (SWS) units deployed in the UK in 2010.

16,768

The number of SWS units deployed in the UK between 2005/2010.

14.23MW

The UK capacity in 2010 (+65% on 2009).

42.97MW

The Cumulative installed capacity between 2005/2010.

£29.27 million

The UK's market size (+70.9% on 2009).

£6.34 million

The UK's manufacturing export revenue (-15% on 2009).

3,392

The number of SWS units exported in 2010 (-23.7% on 2009).

18,738

The number of SWS units exported by UK manufacturers between 2005-2010.

56%

The Proportion of output exported by UK manufacturers.

61%

The percentage of the UK market supplied by UK manufactured products.

167%

The estimated UK market growth for 2011 (£78.22 million).

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About this report: small wind systems technology

This is the fourth annual Small Wind Systems UK Market Report undertaken by RenewableUK and drawing on data from across the world.

With over twenty UK-based manufacturers there are a wide variety of small wind systems (SWS), designs and setups.

The two most common designs are the horizontal axis wind turbines (HAWTs) and the vertical axis wind turbines (VAWTs). Small wind systems generate clean renewable energy and can be connected to the mains electricity supply (on-grid) or used to charge batteries (off-grid).

Small wind system technology can be sub-divided into three categories: micro wind turbines (0-1.5kW), small wind turbines (1.5-15kW) and small-medium wind turbines (15-100kW).

The production of energy by small wind systems over a year depends critically on the annual average wind speed at the site – higher wind speeds produce more energy. Sites located only a hundred metres apart can be significantly different.

To assess the average wind speed at a particular site, on-site wind speed data and careful measurements should be taken over a period of time, prior to installation.

The report examines the current size of the small wind system sector in the UK, provides commentary on the current dynamics of the UK domestic and export market and explores some of the key opportunities and challenges to future market development. The contributions of those active within the micro and small wind industry provide the basis for the statistical findings contained within this report.

The study gathers data relating to turbines between 0 – 100kW in order to estimate the number of installations and installed generation capacity at the end of 2010.

If you would like to find out more about small wind systems, please visit the RenewableUK small wind system website at www.renewable-uk.com.

Figure 1: Small wind systems

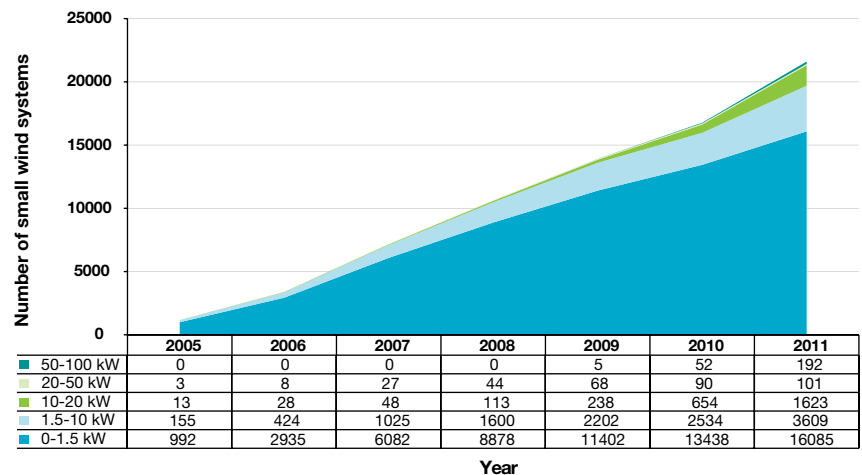
	Power (kW)	Annual energy production (kWh)	Total height (m)	Total installed cost (£k)
Micro wind	0 – 1.5	Up to 1,000	10 – 18	0.5 – 5
Small wind	1.5 – 15	Up to 50,000	12 – 25	2 – 50
Small-medium wind	15 – 100	Up to 200,000	15 – 50	50 – 250

Note: The average UK domestic household consumes approximately 4,400 kWh per year.

The industry's growing contribution

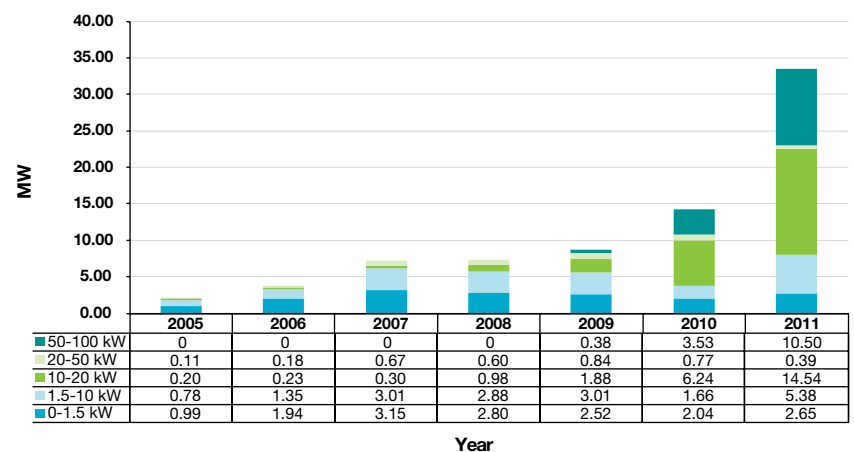
This report shows that annual deployed capacity from small wind systems rose by a record high of 65% (14.23MW) in the twelve months to December 2010, up from the 8.62MW reported for the end of 2009. This year of unprecedented growth in installed small wind capacity brought the UK's total installed small wind capacity to 42.97MW at the end of last year. Based on 2008 projections, RenewableUK remains confident that the UK could have 1,300MW (1.3GW) of installed small wind system capacity by 2020, if the appropriate policies are put in place to support it.

Figure 2: Cumulative installed UK small wind system capacity (MW)



Based on a 2011, RenewableUK survey, the trend demonstrates a continued market shift toward larger, grid-connected turbines, as opposed to micro-turbines. The annual capacity growth during 2010 came predominantly from the 10 – 20 kW and 50 – 100kW market segments. It is anticipated that the Government's financial incentives, introduced in April 2010, will continue stimulating the take up of larger scale turbines.

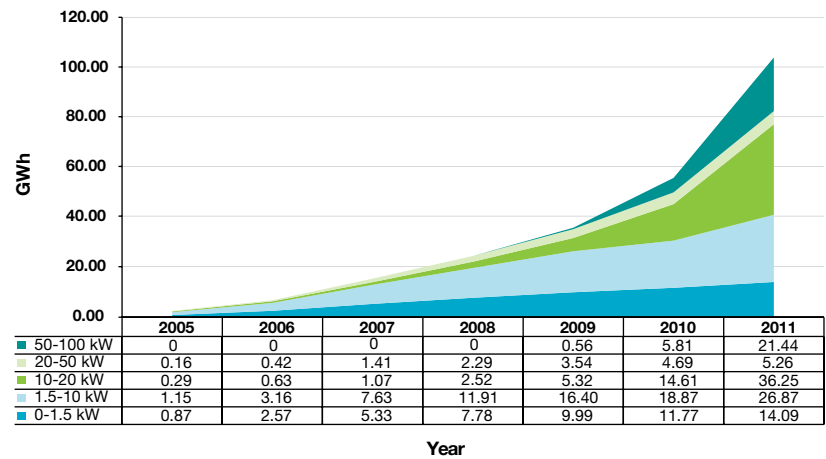
Figure 3: Annual deployed UK small wind system capacity (MW)



The UK small wind system sector continues to make an increasing contribution to national energy requirements, with 42.97MW of renewable energy capacity now generated through small and micro-wind systems, providing an estimated 55.75 GWh in 2010. RenewableUK believe that the current generation capacity of the small wind sector is only a fraction of what might be possible in the future. RenewableUK estimates that if barriers to market growth are adequately addressed by 2020, the UK small wind system sector could generate 1,700 GWh (1.7 TWh) of renewable electricity annually.

It is also estimated that the level of energy generated from small wind system would have otherwise emitted 35,158 tonnes of carbon dioxide if sourced from the national grid (Digest of UK Energy Statistics).

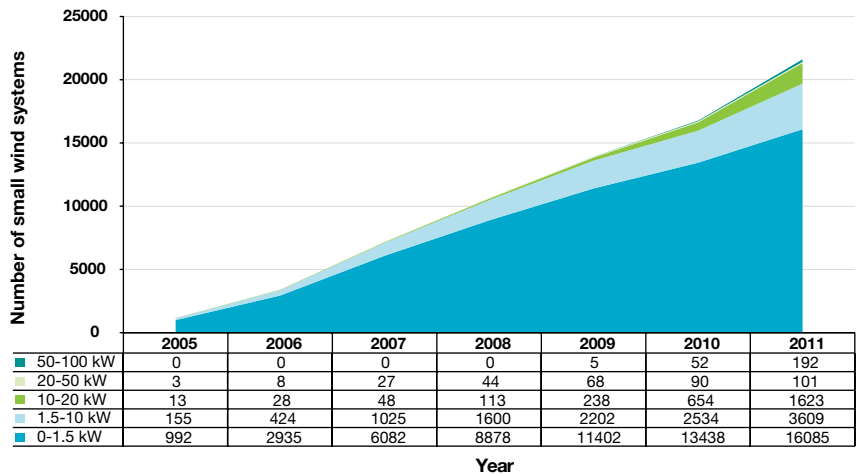
Figure 4: Annual UK small wind systems energy production (MW)



Cumulative deployment

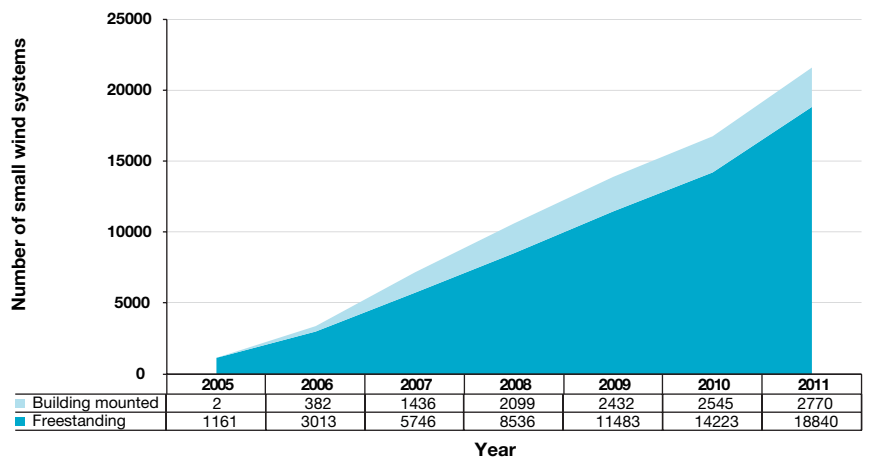
The UK's attractive Feed-in-Tariff incentives, combined with corresponding and growing levels of consumer interest and increasing levels of inward investment make the UK's small wind market more attractive than ever before. The industry anticipates that future technology cost reductions coupled with increases in the consumer price of fossil fuels will result in substantial future growth. As public and commercial awareness of the benefits of micro-generation expands, an increasing number of sites will become commercially attractive for small wind systems across the UK. As a result, RenewableUK estimates that there is potential for over 600,000 small wind systems to have been installed in the UK alone.

Figure 5: Cumulative number of installed UK small wind systems



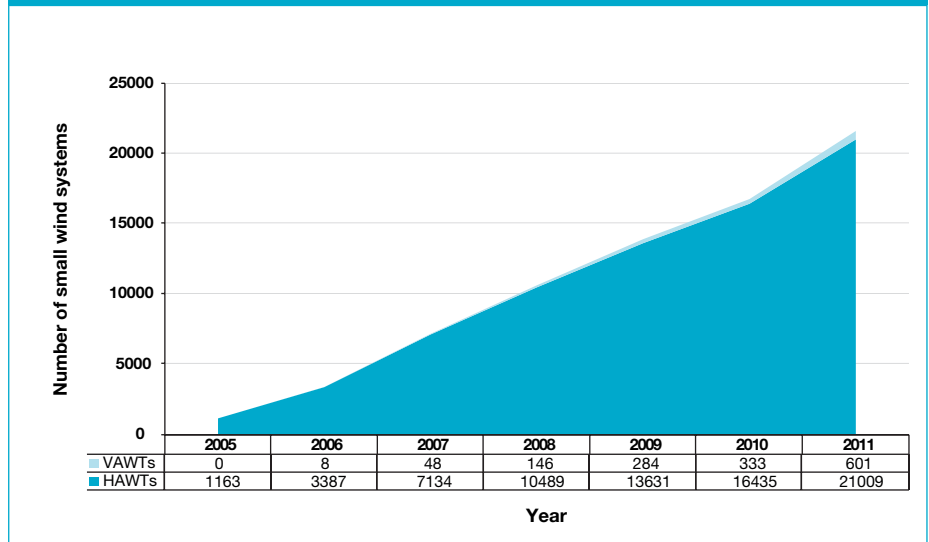
In line with recent trends, the industry expects to see the deployment of grid connected systems continue to increase as a proportion of total small wind deployment. It is also anticipated that free standing turbines, rather than building mounted turbines, will continue to make up the predominant share of existing installations for the foreseeable future.

Figure 6: System setup (cumulative)



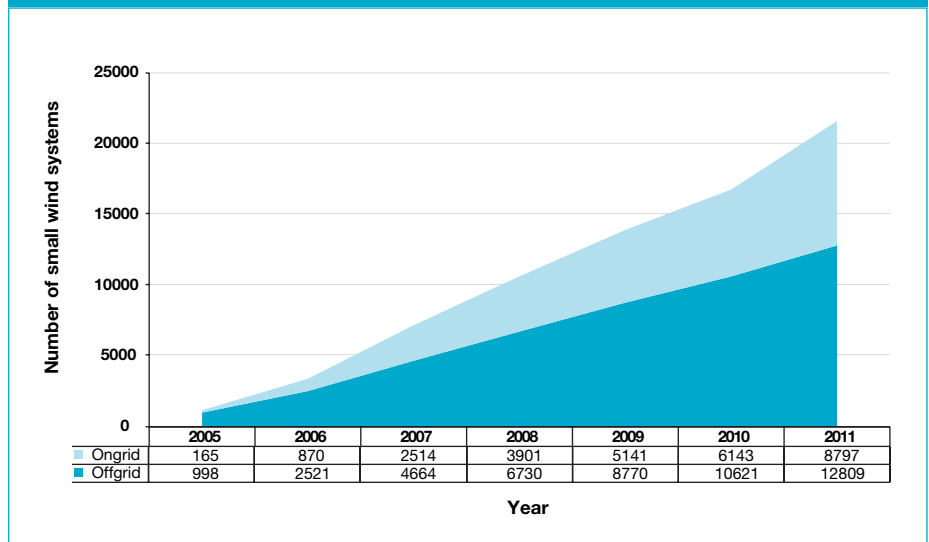
In general terms, horizontal axis turbines (HAWTs) remain the most popular design installed across the UK. Based in experience to date, RenewableUK anticipate that horizontal axis designs will continue to maintain a majority share of the domestic installation market. However, while vertical axis designs (VAWTs) are a relatively new entrant in the mainstream small wind system sector, RenewableUK anticipates that vertical axis turbines will continue to make a growing contribution to UK installed small wind capacity, as the overall market grows.

Figure 7: System design



Since 2005, nearly 17,000 small wind systems have been deployed in the UK. Historically these turbines have predominantly come from the micro-wind segment, each generating 0 – 1.5 kW, with the majority of these serving off-grid applications. Mounting turbines on buildings is a relatively new application of small wind system technology and has seen modest growth in 2010. While siting and performance challenges have limited the size of this market, it is anticipated that the introduction of General Permitted Development Orders and future changes in Building Regulations will increase the take-up of building mounted systems.

Figure 8: Cumulative number of UK small wind systems (ongrid/offgrid)



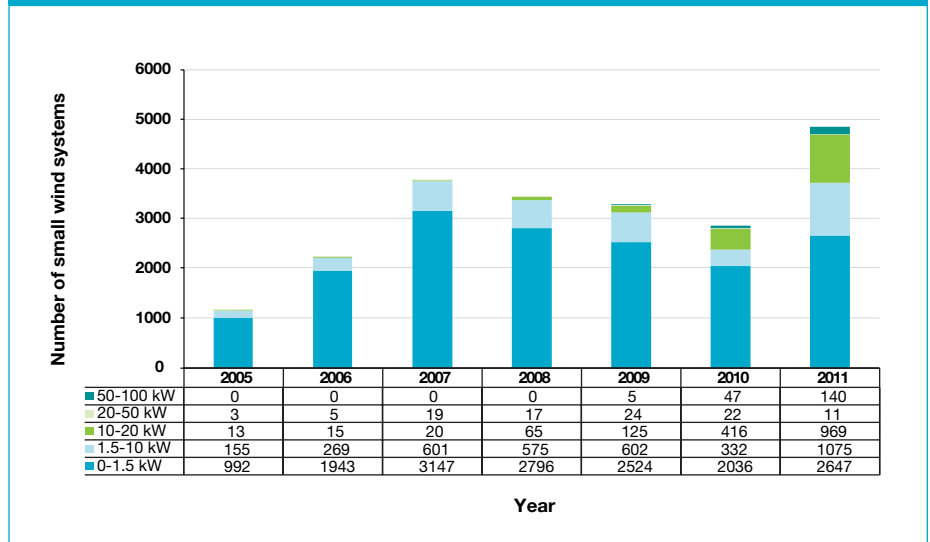
Annual deployment

Total deployed capacity grew by 65% this year, to 14.23MW up from the 8.62MW capacity recorded at the close of 2009. This represents the greatest year-on-year increase in the contribution of the small wind sector to the UK's generation of renewable energy, and a growing public interest in the installation of small wind systems of an increased capacity. The average size of turbines installed almost doubled last year, from 2.6kW in 2009 to 4.9kW in 2010. This is largely explained by a significant growth seen in the 50 – 100kW size category over the course of last year. The UK's attractive financial incentives are predicted to continue to stimulate growth in this previously dormant small-medium wind market.

However, the total number of small wind turbines newly deployed in 2010 fell by 25% against the previous year. The annual deployment of small wind systems throughout 2010 has been lower than anticipated and represents the continuation of a trend that began in 2008. The industry believes that this trend is primarily due to delays in the introduction of streamlined planning policy, namely General Permitted Development Orders. The Government's failure to deliver on its commitment to implement GPDO by 12th July 2010 continues to cause many consumers to postpone the purchase of small wind systems.

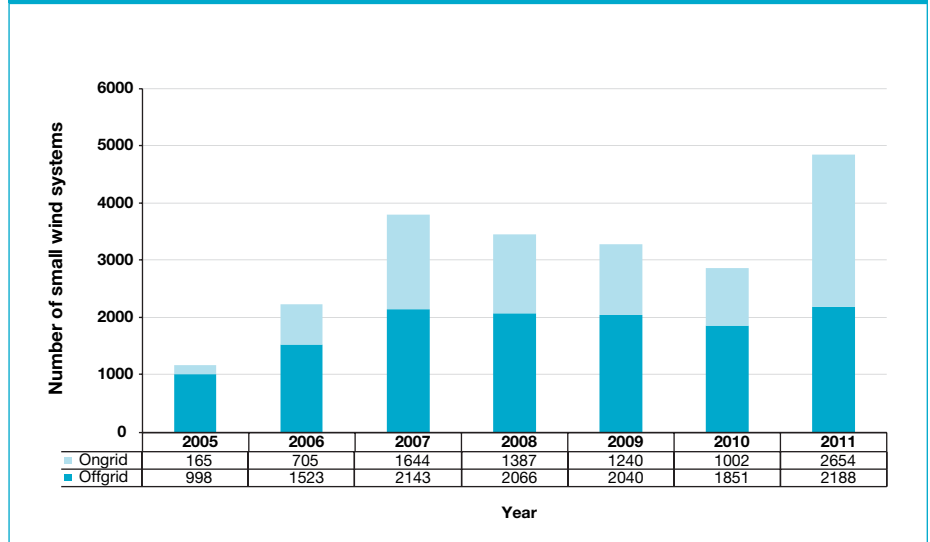
A number of additional factors, including the continued uncertainty experienced in the wider planning system, and the recent economic recession have led manufacturers to pare down future growth projections since last year's report.¹

Figure 9: Annual deployed UK small wind systems



Nonetheless, RenewableUK expect that the contribution of small wind systems will continue to grow in response to continued financial incentives and increasing consumer interest in the small wind market. Significant growth in the number of installations continues to be experienced in some market segments, most notably in the growth of the 10 - 20kW market. With 416 units reported to have been installed in the UK in the 12 months to December 2010, up from 125 installed in the same size range over 2009, this can be seen as part of a wider trend, with a growing interest in larger, grid connected small-wind turbines likely to continue over the next few years.

Figure 10: Annual deployed UK small wind systems (ongrid vs offgrid)



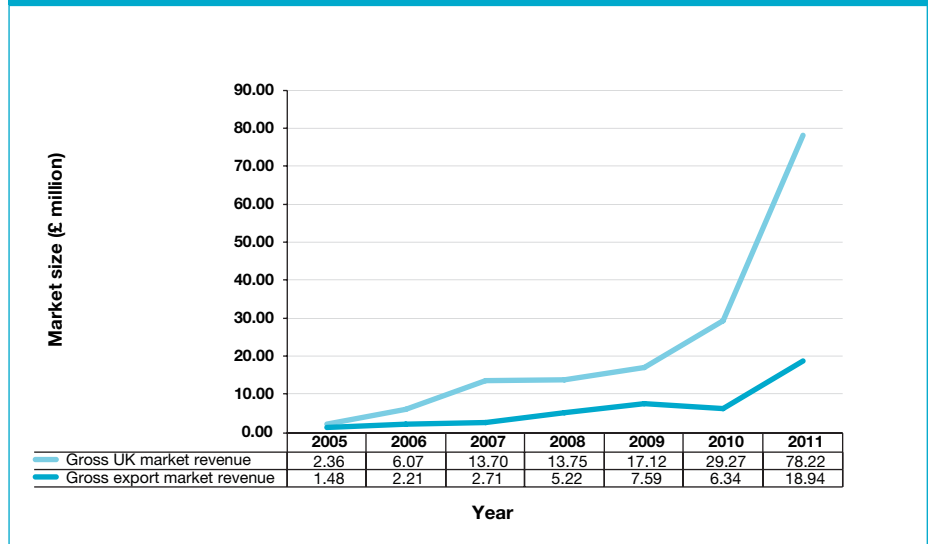
UK and export markets

While interest in small wind system has increased significantly in the UK following the introduction of the Feed-in-Tariff, RenewableUK believe that consumers are delaying purchasing decisions in anticipation that general permitted development rights (GPDR) for small wind systems will be introduced in the near term. The uncertainty that delays in the introduction of GPDR have caused, and wide spread inconsistencies in the way applications are treated within the local planning system are reported to be the single biggest barrier to further growth of the UK small wind market. As a result, planning barriers are cited as one of the main reasons why last year's projected growth in UK small wind installations were not realised.

The most attractive financial incentives will fail to deliver wide-spread take-up of micro-generation technologies across the UK if non-financial barriers are not tackled at the national level. The industry therefore looks forward to the new Microgeneration Strategy, due to come into effect in the summer of 2011, and a renewed Government commitment to addressing the non-financial barriers affecting deployment levels in the UK small wind industry, thereby stimulating further growth in this sector.

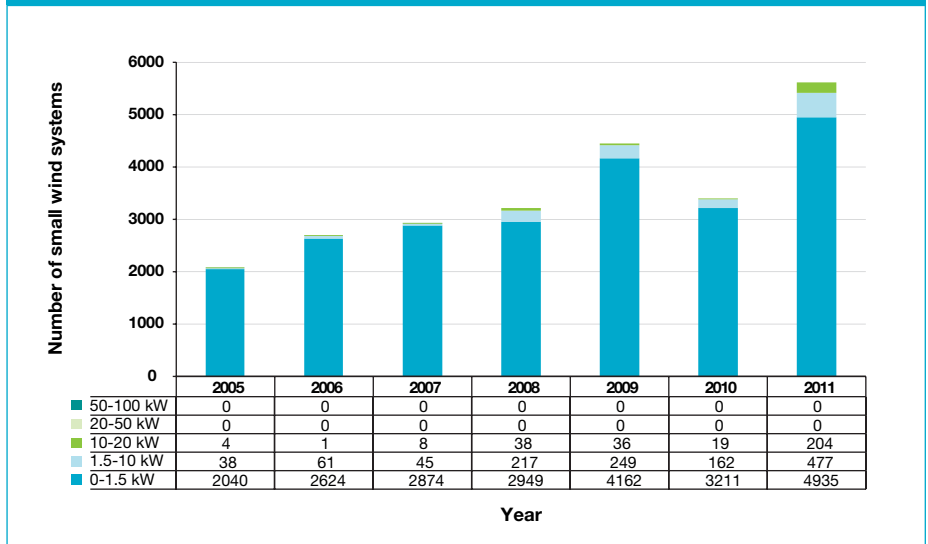
Nonetheless, manufacturers remain optimistic about future market growth, forecasting industry-wide revenue increases of up to 167% in 2011. Such growth can only be achieved if these barriers are adequately addressed.

Figure 11: Market size (UK, Export)



Due to remaining barriers in the domestic market and the continued success of UK small wind manufacturers, 2010 witnessed more small wind systems being exported by UK manufacturers than were installed in the UK. Steady export markets in 2010 have been reported across the sub 20kW range of small wind systems, with a reported jump in the sales of micro-wind turbines (0-1.5 kW

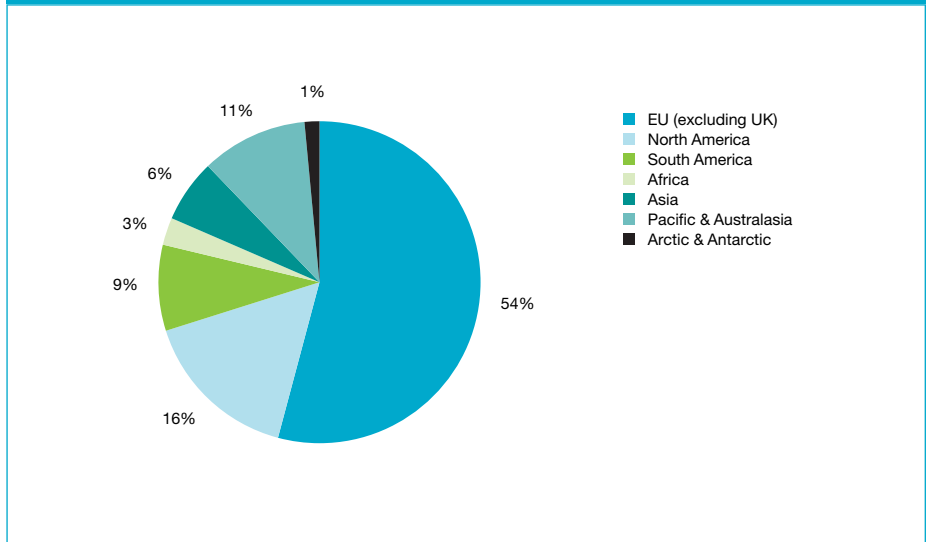
Figure 12: Annual number of exported small wind systems



The EU, North America, Australia and the Pacific were the dominant markets for UK exports in 2010. The US in particular provided significant growth for UK sales.

UK manufacturers continue to enjoy a significant share of their domestic market. However, as predicted last year, internal competition grew as a result of attractive Feed-in-Tariff incentives with UK market share dropping from 75% in 2009 to 69% in 2010.

Figure 13: 2010 export markets for UK-manufactured product (£6.34 million)



Sector employment and UK policy framework

Employment

RenewableUK and Energy & Utility Skills jointly commissioned Cambridge Econometrics (CE), the University of Warwick Institute for Employment Research (IER) and IFF Research to conduct a study of current and future employment and skills associated with the development of the UK wind and marine energy industries.

The study found that 800 full-time-equivalent employees (FTE) are working in the small wind systems sector in the UK. Given the industry's strengths in terms of manufacturing and export, it is not surprising that the study found that half of these are employed in either design and manufacturing or construction and installation.

Feed in Tariff incentives

As you will have seen from data shown in Figure 5, the introduction of the Feed-in-Tariff in April last year has provided much needed stimulus to the UK small wind market. With 2010 deployment having risen by 65% (14.23MW) on 2009 figures, this represents the most significant year-on-year growth in the UK small wind market seen to date and should provide great encouragement for the future expansion of the sector.

However, the UK Government's recently announced review of the current Feed-in-Tariff mechanism for large-scale solar, launched on the 11 March, and the Government's plans to bring forward the introduction of revised tariff levels from April 2013 to April 2012 risks a short-term slowing in the growth of the UK micro-generation sector as a whole. In order to ensure that any slowing in deployment levels and market growth are only temporary, it will be important for the Government to demonstrate continued confidence in the small wind sector in the form of attractive tariff rates and a stable incentive mechanism.

RenewableUK will be responding to the review in the coming months and working closely with the Department of Energy and Climate Change (DECC) to ensure that forthcoming Government proposals enable the continued growth of the small wind sector in the UK, and minimise the risk of future uncertainties.

Planning and General Permitted Development Rights

RenewableUK is also working across Government to explore ways in which uncertainties in the planning system can be reduced, as many applicants wanting to install small wind turbines are experiencing long and sometimes costly delays in receiving a planning decision. Evidence from our members and RenewableUK's experience of the large wind sector suggests that these delays are often caused by uncertainties and inconsistencies in the approaches that planning officers take to the assessment of small wind turbine applications.

There is a well documented need for the provision of detailed guidance to local planning authorities on planning for small wind systems and RenewableUK continues to work with central Government and Non-Departmental Public Bodies across the UK's differing jurisdictions to provide useful direction. However, the pressure on local planning officers is only exacerbated by the Government's failure to come forward with General Permitted Development Rights for small wind systems.

The effectiveness of the Feed-in-Tariff incentive will depend, in large part, on the ability of the UK's planning system to facilitate micro-generation deployment. The most attractive feed-in-tariff rates will be of little value without a timely and consistent consenting framework through which small wind systems can be delivered. The UK's planning and wider environmental regulatory systems must work together if we are to maximise the deployment potential of our indigenous small wind system technologies and provide an annual generation of around 1,700 GWh (1.7 TWh) of renewable electricity by 2020.

Table of data

	UK 05	TOTAL* 05	UK 06	TOTAL* 06	UK 07	TOTAL* 07	UK 08	TOTAL* 08	UK 09	TOTAL* 09	UK 10	TOTAL* 10	UK 11	TOTAL* 11
Number of deployed units in that year														
0-1.5kW	992	3032	1943	4567	3147	6021	2796	5745	2524	6686	2036	5247	2647	7582
1.5-10kW	155	193	269	330	601	646	575	792	602	851	332	494	1075	1552
10-20kW	13	17	15	16	20	28	65	103	125	161	416	435	969	1173
20-50kW	3	3	5	5	19	19	17	17	24	24	22	22	11	11
50-100kW	0	0	0	0	0	0	0	0	5	5	47	47	140	140
Total	1163	3245	2232	4918	3459	6714	3453	6657	3280	7727	2853	6245	4842	10458

System application														
Ongrid	165	205	705	745	1644	1763	1387	1848	1240	2298	1002	1853	2654	5814
Offgrid	998	3040	1523	4173	2143	4951	2066	4809	2040	5429	1851	4392	2188	4644

System setup														
BM	2	2	380	384	1054	1091	663	853	333	1194	113	542	255	795
FS	1161	3243	1852	4534	2733	5623	2790	5804	2947	6533	2740	5703	4617	9663

System design														
HAWT	1163	3245	2224	4910	3747	6674	3355	6557	3142	7579	2804	6194	4574	10090
VAWT	0	0	8	8	40	40	98	100	138	148	49	51	268	368

Sales (£ thousand)														
0-1.5kW	573	1678	2425	3923	3713	5595	3033	5359	2648	6590	1779	5513	2300	9517
1.5-10kW	1301	1612	3093	3745	7663	8133	8001	9862	7969	10692	5673	7676	21767	33477
10-20kW	251	317	261	321	399	759	1515	2545	3455	4375	12232	12832	32847	32847
20-50kW	235	235	292	292	1920	1920	1200	1200	2156	2156	1430	1430	715	715
50-100kW	0	0	0	0	0	0	0	0	895	895	8160	8160	20600	20600
Total	2360	3842	6071	8281	13695	16407	13749	18966	17123	24708	29274	35611	78229	97156

*TOTAL = UK deployment & export from UK manufacturing

2005-2010 data is based on historic manufacturing records

2011 data is based on manufacturing forecasts

HAWT = Horizontal axis wind turbine

VAWT = Vertical axis wind turbine

Contributors

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Fortis Wind Energy
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Kestrel Wind Turbines
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Llumarlite Energy Systems Ltd
Mariah power
Marlec Engineering Co Ltd
NaREC
Northern Power Systems Ltd
Perpetual Energy
Proven Energy Limited
Quietrevolution
Renewable Devices Ltd
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