2014 update | SMALL WIND WORLD REPORT

SUMMARY

Presented by:

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WWEA

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Small Wind World Report 2014

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WWEA Head Office
Charles-de-Gaulle-Str. 5
53113 Bonn, Germany
Tel. +49 (228) 369 4080
www.wwindea.org

New Energy Husum

www.new-energy.de

Authorǎ: Stefan Gsänger l·yŘ WŜl·y˜ tλúúŜf2dzŘ
Layout: Jean Pitteloud

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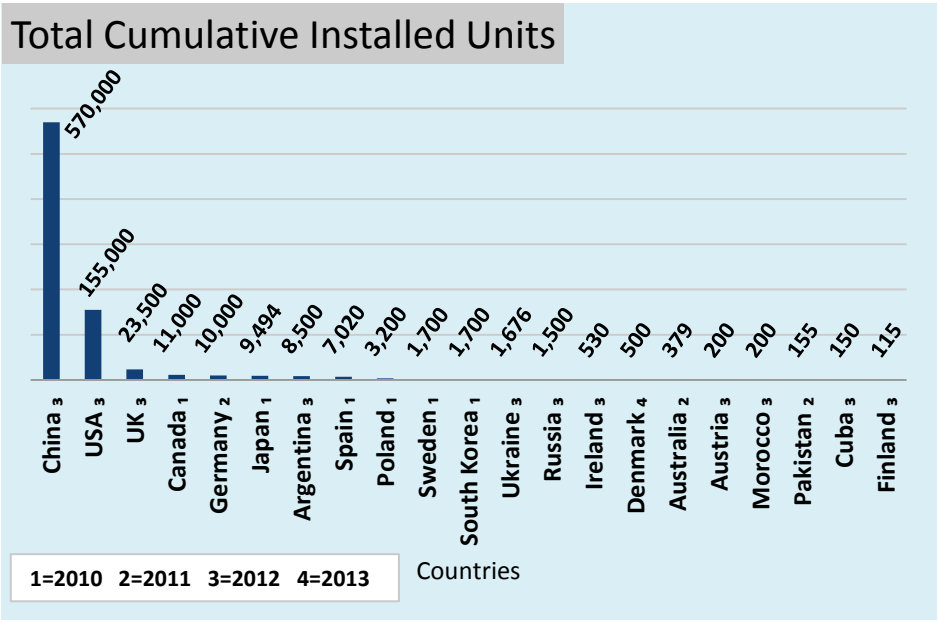
Small Wind World Market continue growing

The world market for small wind has continued to grow: As of the end of 2012, a cumulative total of at least 806'000 small wind turbines were installed all over the world. This is an increase of 10 % compared with the previous year, when 730'000 units were registered.

Most of the growth happens in only three countries: China, USA and UK. This situation is a clear indication that the world market for small wind turbines is still in its infancy stage. In most countries you can at least find a handful of small wind turbines, but the vast majority of these countries is far from market size which would enable companies to reach mass production. More and better policies are imperative for making small wind a success all over the world.

The numbers presented here are based on available figures and even exclude major markets such as India and Italy so that WWEA estimates an actual total number of close to one million units to be installed worldwide.



China is still the by far largest market in terms of units ever installed, and the number of cumulative installed units grew by 70'000 to a total of 570'000 by end of

the year 2012. This represents 70% of the world market in terms of total as well as new installed units. According to estimations, around half of the turbines continue to produce electricity in China given that this market started already in the early 1980s.

The second largest market can be found in the USA with a total of 155'000 units installed, clearly behind China, but well ahead of a number of medium-sized small wind markets. The UK, Canada, Germany, Japan and Argentina are all medium-sized markets with total number of small wind turbines between 7'000 and 23'500 units.

In terms of new installations China is again leading by far with 70'000 units, followed by two countries: The US and the British market had both similar size, with 3'700 respectively 3'646 units installed in 2012. However, both markets have only 5 % of the size of the Chinese market.

18 % Registered increase in Global Small Wind Capacity

The recorded small wind capacity installed worldwide has reached more than 678 MW as of the end of 2012. This is a growth of 18 % compared with 2011, when 576 MW were registered. In 2011, the growth rate was still at 21 %.

China accounts for 39 % of the global capacity, the USA for 31 % and UK for 9,4 %.

These three leading markets, China, USA and UK installed together around 89 MW of new capacity in the year 2012 (80 % of the world market), a capacity increase of 16 %, slightly below the global growth rate.

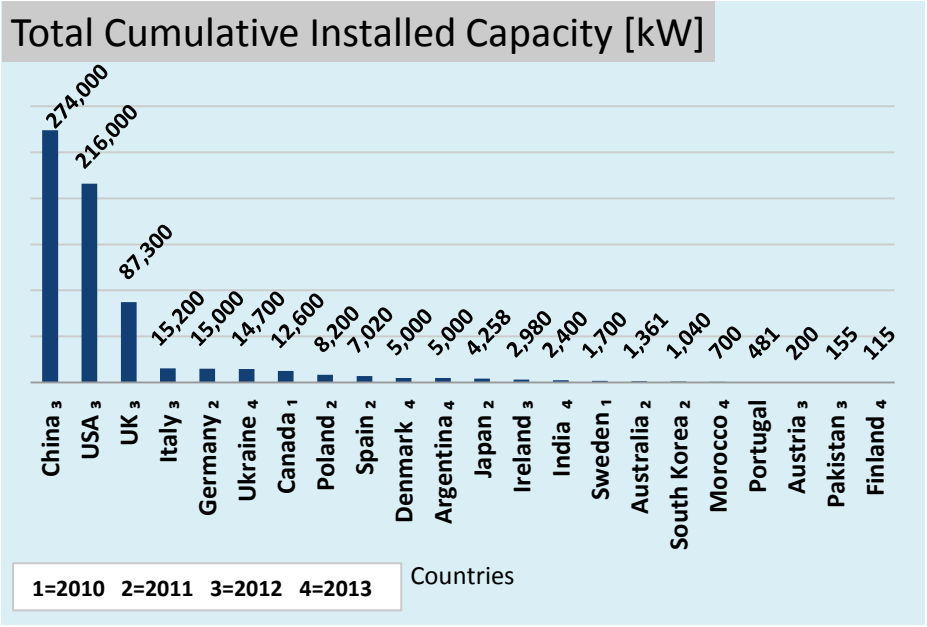
The USA small wind market grew by 18,4 MW in 2012, representing around 3'700 installations and $101 million in investment. On a unit basis, small wind turbines comprised 35% of all 2012 USA wind installations[1].

In the UK, the small wind market witnessed further growth in 2012 mainly driven by the Feed-in tariff scheme. 37 MW were installed during 2012 with the biggest growth rate observed in the 15 kW - 100 kW size range.

Globally, an increase in the average size of small wind turbines can be observed: In 2010y, the average installed size was 0,66 kW, in 2011 0,77 kW, and in 2012, it has already reached 0,84 kW.

[1] 2012 Market Report on Wind Technologies in Distributed Applications, U.S. Department of Energy

Country wise, the average size is quite diverse: While the average Chinese turbine has a capacity of 0,5 kW, small wind turbines in the US have an average capacity of 1,4 kW and in the UK even 3,7 kW.



Small Wind Turbine Manufacturing

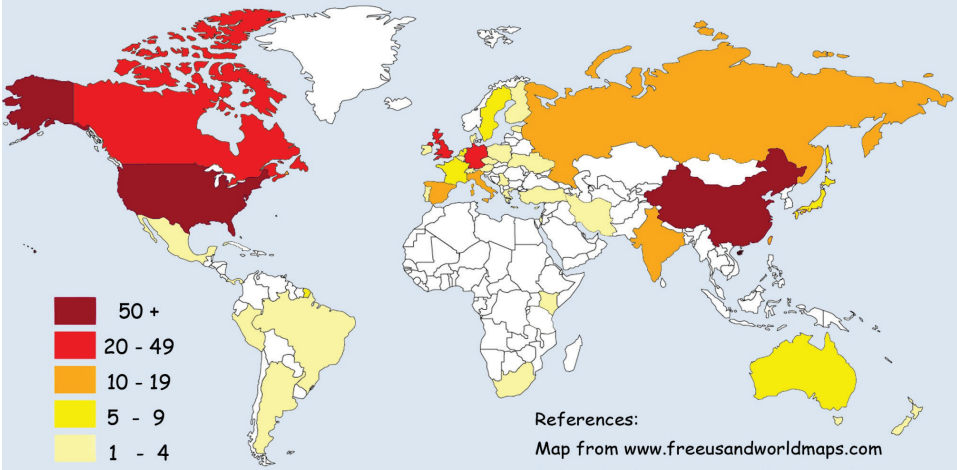
Five countries (Canada, China, Germany the UK and the USA) account for over 50 % of the small wind manufacturers. By the end of 2011, there are over 330 small wind manufacturers that have been identified in the world offering complete one-piece commercialised generation systems, and an estimate of over 300 additional firms supplying parts, technology, consulting and sales services.

Based on the world distribution of turbine manufacturers, the production of small wind remains concentrated in few world regions: in China, in North America and in several European countries. Developing countries continue to play a minor role in small wind manufacturing. It is obvious that the tremendous wind resources of Africa, Southeast Asia and Latin America, where many regions are ideally suited for small wind application, have not yet lead to the establishment of domestic small wind industries and it would be worthwhile joint efforts of these countries and the international community to set up international programmes to change this.

However, in general the small wind industry has already demonstrated remarkable growth in the past decade, as consumer interest was increasing and many new companies have entered the sector. Figure 4 illustrates the raise of the small wind industry in the past decade: More than 120 new small wind manufacturers were established between 2000 and 2010 worldwide. China alone has an exceptional manufacturing capacity of more than 180'000 units per annum (as of 2011).

This impressive size illustrates how large the small wind sector could become also in other world regions and on the global scale. Compared with its global potentials, the small wind industry outside China is still very small.

Small Wind Manufacturers Map Distribution Worldwide

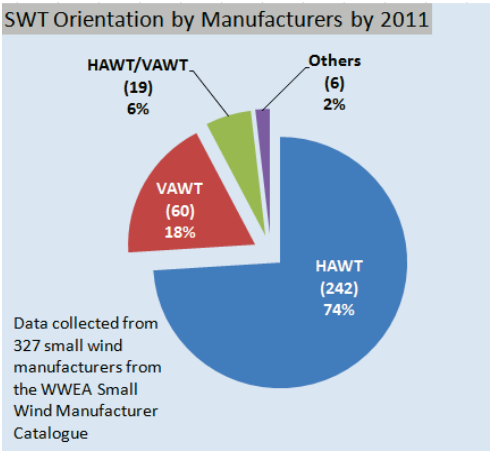


Technology and Major Applications

Actually, what is seen today as "Big Wind" started in the size which is today defined as small wind. Until the 1970s and 1980s, most wind turbines had a capacity of less than 100 kW. In rural, isolated areas e.g. in China or USA, such small wind turbines

where very common for residential and farming needs, including for water-pumping stations, still a common technology in many developing countries. Today, common applications of small wind turbine include:

- Residential
- Commercial and industrial
- Fishery and recreational boats
- Hybrid systems
- Pastures, farms and remote villages
- Potable systems for leisure
- Pumping
- Desalination and purification
- Remote monitoring
- Research and education
- Telecom base stations



The early HAWT technology has dominated the market for over 30 years. Based on the study of 327 small wind manufacturers as of the end of 2011, 74 % of the commercialised one-piece small wind manufacturers invested in the horizontal axis orientation while only 18 % have adopted the vertical design. 6% of the manufactures have attempted to develop both technologies. As the majority of the vertical axis models have been developed in the past 5 to 7 years, the scale of market share remains relatively small. The average rated capacity of VAWT is estimated to be 7,4 kW with a median rated capacity of merely 2,5 kW. In comparison with the traditional horizontal axis orientation, the average and median rated capacity are much smaller. Out of the 157 models of vertical turbines catalogued in this report, 88 % of which are below 10 kW and 75 % are below 5 kW. This corresponds well with the actual market demand, as the average unit sold in 2011 had a capacity of 1,6 kW.

Despite a market trend that leans towards a grid-tied system with larger capacity, off-grid applications continue to play an important role in remote areas of developing countries. Off-grid applications include rural residential electrification, telecommunication stations, off-shore generation, and hybrid systems with diesel and solar. Over 80 % of the manufacturers produce stand alone applications. In China, off-grid units comprised 97 % of the market in 2009, and 2,4 million households still lack electricity. For this reason off-grid systems will continue to play a significant role, in China and in many other countries with non-electrified areas.

In recent years, the market for larger, grid-tied systems, has increased in particular in some industrialised countries, e.g. in the USA, UK or Denmark.

As of the end of 2011, 25 small wind manufacturers in the world have the capability to fabricate turbines between 50 kW and 100 kW.

Driving Factors

The future of the small wind industry depends on the cost of the technology, the enactment of supportive policies and economic incentives, fossil-fuel prices, investor interest, consumer awareness, certification and quality assurance, permitting processes and regulations, and wind evaluation tools. Financial, wind, and energy experts anticipate high growth rates for the production of SWTs if consumer demand increases.

Costs

Cost remains to be the one of the main factors and challenges in the dissemination of small wind.

In the USA, the installed cost estimates of top ten small wind turbine models in 2011 ranged between $2'300/kW and $10'000/kW, and the average installed cost of all SWTs was $6'040/kW, an 11 percent increase from 2010. The Chinese small wind industry yielded, in comparison, a significantly lower average turnover of 12'000 Yuan/kW (1'900 USD – 1'500 EUR).

The small wind industry is still under development and without doubt economies of scale will help to reduce manufacturing cost in the future. However, in order to achieve such cost reductions, it is important that the small wind markets will see further growth, which requires appropriate legal frameworks and support schemes. Hence political incentives continue to play a key role for the wider deployment of small wind.

Policies

Like most other renewable energy technologies and in particular the market for “big wind”, the success of the small wind market depends on stable and appropriate support schemes. Today, feed-in tariffs, net metering, tax credits, and capital subsidies are the major energy policies geared specifically towards small wind. The small wind sector has especially benefited from the growing global trend of feed-in tariffs (FITs). Unfortunately, only few countries have yet implemented specific FIT

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schemes for small wind which can be seen as the best tool for grid-connected small wind. Whenever the wholesale electricity prices are sufficiently high, net-metering has also been an effective incentive, e.g. in Denmark. Additional policies that encourage the use of renewable sources of energy also play an important role in the growth of the small wind industry.

However, tax credits and capital subsidies may not be as effective as production based incentives because they promote directly the sales of the hardware, but not the energy generation itself, and hence may not encourage sufficiently investment in efficiency.

Standards & Certification

The development of standards and certification, already in progress, will serve to promote the sales of better-performing SWTs, and the growth of a healthy and well-established market. As safety and noise have grown important due to the proximity of the technology to users, the internationally accepted IEC 61400-2 (3rd edition, 2013) standard from the International Electrotechnical Commission stipulates specific safety design requirements. In 2009, the American, Canadian, and British Wind Energy Associations (now RenewableUK) coordinated efforts to develop the Small Wind Turbine Performance & Safety Standard, a subset based on IEC61400-2 (SWTs design), IEC61400-12-1 (performance) and IEC61400-11 (acoustics). The derived standards were later adopted by the AWEA and RenewableUK for their certification programs Small Wind Certification Council (SWCC) and Microgeneration Certification Scheme (MCS), respectively.

The International Energy Agency's IEA Wind Task 27 has been preparing a consumer label for small wind turbines which aims at enabling customers of small wind turbines to easily get the basic information about safety and performance of the turbine while reducing the efforts for the certification process compared with large wind turbines. The first consumer labels have been issued respectively are about to be issued.

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Table. Small Wind Feed-in Tariff Pricing Worldwide

Country/ Region	Size Limit	EUR/kWh	Country/ Region	Size Limit	EUR/kWh
Chinese Taipei	1-10kW	0,185	**Japan**	< 20kW	0,418
Canada				≥ 20kW	0,167
Ontario	< 10kW	0,074	**Lithuania**	< 10kW	0,095
Nova Scotia	< 50kW	0,332		10-350kW	0,092
Cyprus	< 30kW	0,220	**Portugal**	< 3,68kW	0,432
	Off-grid	0,190	**Slovenia**	< 50kW	0,095
Greece	< 50kW	0,250	**Switzerland**	< 10kW	0,247
	> 50kW	0,090	**UK**	< 100kW	0,207
	Off-grid	0,100	**USA**		
Italy	1-20kW	0,285	**Indiana**	5-100kW	0,130
	20-200kW	0,262	**Hawaii**	< 20kW	0,123
	0,2-1,0MW	0,146		20-100kW	0,105
Israel	< 15kW	0,250	**Vermont**	< 15kW	0,181

Wind Resource Assessment

The basic condition in order to harvest wind power successfully is of course the availability of wind: Hence the accurate prediction of the wind speed is essential to calculate the electricity output of a small wind generator, representing the basis for its economic performance.

As wind assessment tools are costly in relation to the cost of a small wind turbine, this evaluation currently presents a real challenge for the small wind industry, however, it is important to underline the importance of such data at the site where the wind generator is supposed to be installed.

Special challenges can be found in urban environments: The shading and turbulence effects of surrounding obstacles may produce complex wind patterns that are difficult to predict. Traditional wind resource maps prove inadequate as wind conditions are evaluated at a greater altitude of 50 m while most SWTs do not reach above 30 m. As a result, the vast demand for inexpensive and efficient methods of predicting and collecting local wind data is another key driving factor that requires further innovation and cost reduction in the technology.

World Market Forecast 2020

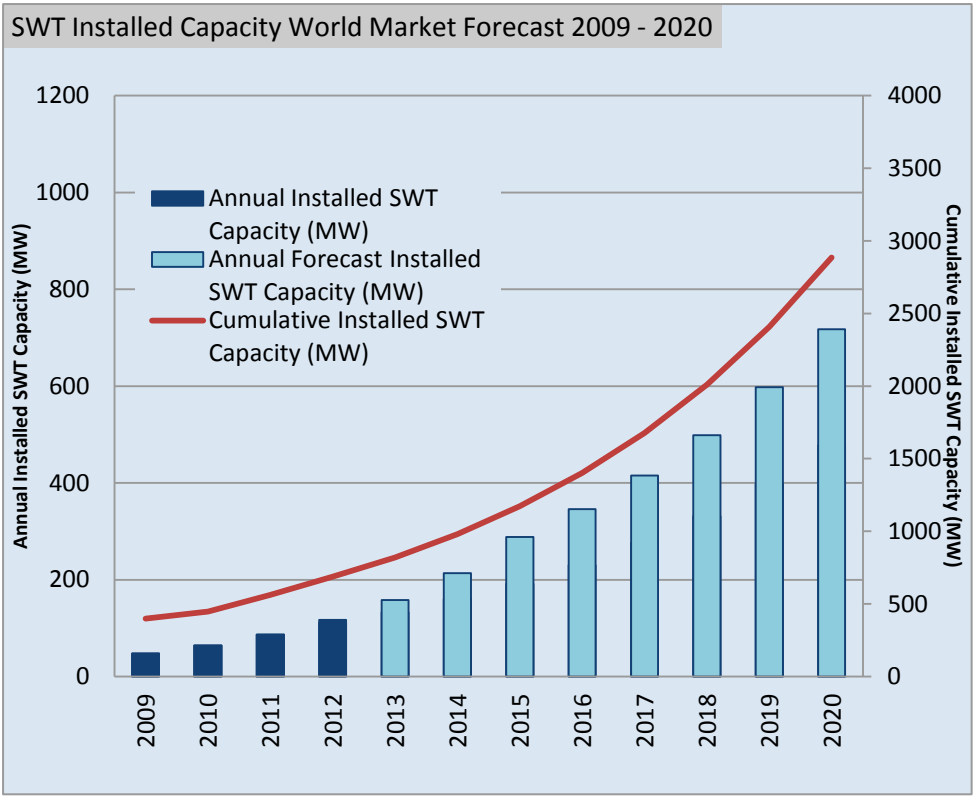
The increasing demand for clean and affordable energy all over the world will without doubt lead to an increasing demand for small wind. In particular in the developing countries, small wind can easily and fast contribute to electrify millions of people in rural areas. Governments and international organisations such as IRENA have started to understand this potential and are now more and more including small wind in their renewable energy programmes. Also several industrialised countries have ambitious small wind targets and corresponding policies in place. In general, political support can be expected to increase the installed capacity of small wind in the upcoming years further.

Increasing fossil fuel prices, global warming and the ever-growing electricity demand will continue to be the three long-term drivers of the small wind industry. In order for the small wind technology to mature, however, the industry must be driven by supportive policies and standards.

The forecast is based on opinions of industry experts, growth pattern of the large wind industry, and the historical growth trend of the solar PV renewable industry for

the past decade that shares many characteristics in common with the small wind industry. Accordingly, the small wind industry can be expected to follow similar growth patterns of the large wind and solar industry until 2020.

Recent trend of the small wind industry has shown an annual 19 - 35 % increase in the new installed capacity for the past years. The rate of growth is anticipated to continue until 2015, reaching an annual installation of 190 MW of SWTs. Within this time frame, individual countries and the international small wind community will be able to establish more rigorous and structured standards and policies to regulate the market and support investments. Based on a conservative assumption, the market could subsequently see a steady compound growth rate of 20 % from 2015 to 2020. The industry is forecasted to reach approximately 480 MW of newly installed capacity added annually in 2020 and achieves a cumulative installed capacity of close to 3 GW by 2020.



Definition of Small Wind

There is still no globally unified definition of small wind. Originally, small wind was defined by its characteristics to produce small amount of electricity for house appliances or to cover various household-based electricity demand. However, this definition does not make sense on a universal level as energy consumption patterns are very different in the different parts of the world: While an American family would need a 10 kW turbine to cover its full consumption, a European household demands a 4 kW turbine while an average Chinese household requires as small as a 1 kW turbine.

Technically, there are several definitions of small wind turbines: The most important international standardisation body, the IEC, defines SWTs in standard IEC 61400-2 as having a rotor swept area of less than 200 m^2, equating to a rated power of approximately 50 kW generating at a voltage below 1'000 V AC or 1'500 V DC. In addition to this standard, several countries have set up their own definition of small wind. The discrepancy of the upper capacity limit of small wind ranges between 15 kW to 100 kW for the five largest small wind countries. The major pattern of today`s upper limit capacity leans towards 100 kW. This is largely caused by the leading role of the North American and European market. Over the past decades, a growing average size of the small wind capacity has been observed. This pattern is largely caused by the increasing interest in larger grid-connected systems and a comparatively diminishing market of standalone systems. Nevertheless, in order to create a standardised and healthy small wind market share, an agreeable definition of small wind should be agreed upon. This report intends to bring forward the discussion on the definition of small wind and aims to create eventually a unanimous international classification system of small wind accepted by all parties of the industry. For the purpose of generating comparable graphs, figures and charts in this report, 100 kW is chosen as the temporary reference point. The definition, however, requires further discussion until a globally harmonised agreement is reached In practise, the major pattern of today's upper limit capacity leans towards 100 kW, although the IEC defines a limit of equivalent to 50 kW. In order to create a standardised and healthy small wind market share, an agreeable definition of small wind should be agreed upon. This report intends to bring forward the discussion on the definition of small wind and aims to create eventually a unanimous international classification system of small wind accepted by all parties of the industry. For the purpose of generating comparable graphs, figures and charts in this report, 100 kW is chosen as the temporary reference point. The definition, however, requires further discussion, until a globally harmonised agreement is reached.

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	Department/ Association	Turbine Classification	Rated Cap.kW	Additional Remarks
International	International Electrotechnical Commission	Small Wind Turbines	≈50	IEC 61400-2 defines SWTs as having a rotor swept area of less than 200 m^2, rated power of approximately 50 kW, voltage below 1'000 V AC or 1'500 V DC
Canada	Natural Resources Canada (NRCan) Canadian Wind Energy Association (CanWEA)	Mini Wind Turbine	0,3 - 1	Adopted in the Survey of the Small Wind by Marbek Resource Consultants
		Small Wind Turbine	1 - 30	
China	Renewable Energy & Energy Efficiency Partnership (REEEP)	Small Wind Turbine	< 100	Adopted in the recent National Policy, Strategy and Roadmap Study for China Small Wind Power Industry Development
Germany	Bundesverband WindEnergie (BWE)	Small Wind Turbine	< 75	Adopted in the recent BWE-Marktübersicht spezial – Kleinwindanlagen
United Kingdom	RenewableUK	Micro wind	0 - 1,5	0,5 - 5 m Height / Up to 1'000 kWh Annual Energy Production
		Small wind	1,5 - 15	2 - 50 m Height / Up to 50'000 kWh Annual Energy Production
		Small-medium wind	15 - 100	50 - 250 m Height / Up to 200'000 kWh Annual Production
	Microgeneration Certification Scheme (MCS)	Micro & Small Wind Turbine	< 50	Only turbines smaller than 50 kW qualify for the MCS feed-in tariff programme in UK
USA	American Wind Energy Association (AWEA)	Small Wind Turbine	< 100	Adopted in the most recent AWEA Small Wind Report 2010 and the AWEA Small Wind Turbine Global Market Study

Eocycle

www.eocycle.com

Products type: HAWT
Products size (kW): 25
Applications: GC, SA
Presence: Canada

Eocycle Technologies Inc. develops, manufactures and commercializes worldwide the EOCYCLE 25, a state-of-the-art 25 kW direct-drive wind turbine for distributed wind energy applications.

Capitalizing on more than 12 years of internal R&D and prototyping, Eocycle Technologies stands out from its peers by being an integrated technology and manufacturing company.

Eocycle Technologies holds all intellectual property and commercial rights for every key component of its wind turbine, including Eocycle's patented Transverse Flux Permanent Magnet (TFPM) generator technology, which is capable of achieving – in a smaller and lighter package – much higher torque and power at lower rotational speeds than competing technologies.

Bergey Windpower

www.bergey.com

Products type: HAWT
Products size (kW): 1, 6, 7.5, 10
Applications: GC/SA
Presence: USA, Worldwide

Bergey Windpower is the oldest and most experienced manufacturer of residential-sized wind turbines in the world.

Thirty years ago Bergey pioneered the radically-simple "Bergey design" that has proven to provide the best reliability, performance, service life, and value of all of the hundreds of competitive products that have come and gone in that time. With only three moving parts and no scheduled maintenance necessary, the Bergey 10 kW has compiled a service record that no other wind turbine can match. We back it up with the longest warranty in the industry.

Endurance Wind Power

www.endurancewindpower.com

Products type: HAWT
Products size (kW): 5/35/50/225
Applications: GC
Presence: Canada, Italy, UK, USA

Endurance Wind Power is a manufacturer of advanced wind turbines designed specifically for distributed wind power applications.

The E-3120 50kW is the largest and fastest growing global fleet of distributed wind turbines in its class size and in 2013 Endurance will launch the Norwin-designed X-29 225kW wind turbine.

Endurance's line of modern, induction based wind turbines bring efficient, reliable, safe and quiet renewable energy within reach of homeowners, businesses and institutions across the United Kingdom, Italy, North America and an expanding global market.

Together our team strives to provide Endurance wind turbine owners with the best products and support in the market today!

www.PartoSystem.com

Ghrepower

www.ghrepower.com

GHREPOWER
Powering Your Future

Products type: HAWT
Products size (kW): 0,3/0,5/2/3/5/10/30/50/100
Applications: GC/SA
Presence: China, Belgium, France, Italy, UK, USA

GHREPOWER is a leading wind turbines manufacturer which specializes in R&D and manufacture in China.

We have an integrated design, production, installation, commissioning, sale and after-sale service, and our products are widely applied for mobile communication, military, maritime monitor, home use, commercial business and remote area etc.

Our products export to all over the world, such as Germany, UK, France, Italy, Korea etc. The company's wind and solar hybrid energy system installed base also exceeds 10'000 units.

HY Energy

www.hyenergy.com.cn

HYE

Products type: HAWT
Products size (kW): 0,3/0,4/0,6/1/1,5
Applications: GC/SA/HB
Presence: China

HY Energy Co., Ltd is a high-tech enterprise engaged in designing, manufacturing, marketing and severing in wind-solar hybrid power system integration technique.

HY Energy Co., Ltd has made tremendous contributions to improve national wind generator manufacturing level under the breakthrough technique on wind turbine design conception and production craft since 2001.

KLiUX energies

www.kliux.com

KLiUX energies

Products type: VAWT
Products size (kW): 1.8/3.6
Applications: GC/HB
Presence: Spain

Kliux Energies is a Spanish company, with international presence, that specializes in DISTRIBUTED ENERGY SOLUTIONS based on renewable sources. Kliux has worldwide exclusivity rights to manufacture and sell the GEO1800 VERTICAL AXIS WIND TURBINE, developed by Geolica Innovations which also integrate into hybrid system with solar photovoltaic technology. Its unique aerodynamic design results in a noiseless, energy generating turbine that also performs extremely good in architectural integration and visual impact. THE TRULY URBAN WIND TURBINE.

www.PartoSystem.com

Montanari Energy

www.montanarienergy.it

Montanari Energy

Products type: HAWT
Products size (kW): 1/2.5
Applications: GC/SA
Presence: Italy

We at Montanari Energy believe in the value of wind and our objective is to develop the finest technology in order to allow everyone to generate all the energy they need from this free, clean and endless resource.

Designed by some of the finest Italian engineers operating in the small-wind sector, our turbines are excellent products incorporating Italian design at its best.

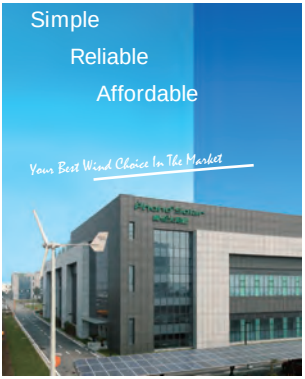
We at Montanari Energy believe that everyone can one day be pioneers of the world again. It will be a freer and richer world, a world that deserves our full attention.

PhonoWind

www.phonowind.com

Phono® Wind

Products type: HAWT
Products size (kW): 0.3/1/2/3/5
Applications: GC/SA/PP
Presence: China, Germany, UK, USA



Phono Wind manufactures high quality, competitively priced photovoltaic small wind turbines. Since 2004, Phono Wind turbines have been used widely throughout the world – in Germany, Spain, Italy, Japan, Czech Republic, Slovakia, Israel and the United States.

ShenZhen Effsun Wind Power

www.effsun.com

深圳市艾飞盛新能源有限公司
SHENZHEN EFFSUN NEW ENERGY CO.,LTD

Products type: HAWT
Products size (kW): 0,3/0,4/0,5/1/2/3/5/10/20
Applications: GC/SA/HB
Presence: China

ShenZhen Effsun Wind Power CO.,LTD is a High-tech Enterprise of the wind power industry in China.

Our company owns a strong technical force, we have build a long term technical cooperation with South China university of technology and Central South University. Our company is a manufacturer integrating R&D, manufacturing, sales, after-sales service.

Our annual production capacity is over 20'000 units, most of them are sold to domestic market, and exported to over 40 countries, such as the United Kingdom, France, the United States, Canada, New Zealand, Australia, Argentina and India.

www.PartsSystem.com

Superwind

www.superwind.com

Products type: HAWT
Products size (kW): 0,350
Applications: GC/SA/HB
Presence: Germany, Worldwide

The Superwind 350 is a small wind generator for professional use, which even under extreme conditions works autonomously and automaticly. It is often used on sites where there is no grid available. The electric power generated by Superwind charges batteries and can be used directly for 12V- or 24 V-appliances.

Ideal fields of application for example are navigational aids, traffic control systems, environmental monitoring stations or transmitters, but also sailing yachts, campers, summer cottages and mountain shelters. Concerning the rural electrification in remote areas of developing countries, Superwind generators provide electric power for whole families.

S&W Power Systems

www.s-und-w-energie.de

Products type: HAWT
Products size (kW): 5.5, 7.5, 15
Applications: GC/SA/HB
Presence: Germany

S&W Power Systems sells windturbines from 5 to 15kW. The inovative design allows most extensive maintenance, low noise, and high efficiency. S&W offers battery storage systems for the wind turbines, so that the power consumption can be maximazed. In addition, S&W Power Systems is a competent partner for the planning and construction of photovoltaic systems.

Turbina Energy AG

www.turbina.de

Products type: VAWT
Products size (kW): 0.25, 0.5, 1, 4
Applications: GC/SA/HB
Presence: Germany

Vertical axis wind turbines (VAWT) from TURBINA Energy AG are first choice for an economical, independent and full-year power supply.

The uniqueness of our turbines is based on the innovative combination of the rotor and stator blades, which allows a maximum output of energy even at lowest wind speeds.

Since 2009 we supply customers from our headquarters in Unterhaching/Munich.

Our turbines are serving clients on all 5 continents and under all weather conditions.

Experience the unique characteristics and advantages of our products!

www.PartoSystem.com

Gresa Group

www.ggc.com.ua

Products type: HAWT
Products size (kW): 0.8, 1.6, 4, 20, 45
Applications: GC/SA
Presence: Ukraine

The company operates since 1991, continuously evolving and constantly expanding range of services and equipment, as detailed in the section " OUR COMPANY ".

Initially 90 company is one of the first supply and install for the banking system of Ukraine and enterprises - uninterruptible power supply (UPS), which allowed a fragile power system to maintain a constant running mode servers banks and enterprises in Ukraine.

Company occupies a special place in the market of heat supply, heating, water, air, electricity, renewable energy, thermal insulation of buildings.

Zhejiang Huaying Wind

www.huayingwindpower.com

Products type: HAWT
Products size (kW): 2/5/10/30
Applications: GC/SA/DH/PP
Presence: China

Zhejiang Huaying Wind Power Generator Co.,Ltd, a member of Tongkun group--china's leading industrial conglomerate, is a high tech startup company specialized in research, production and marketing of small and middle sized wind turbine system. Located 120km away from Shanghai, the company enjoys excellent traffic convenience.

The company has made a pioneering step in the development of a brand new series of downwind- variable blade pitch wind turbines. ISO9001 quality system established and CERoHs certified, the company has a complete series of strict testing and quality guarantee methods for all of the wind turbine and system.

ZKEnergy Technology

www.zkenergy.com

Products type: HAWT
Products size (kW): 0.4/0.6/1
Applications: GC/SA/HB
Presence: China

In ZKEnergy Technology Co., Ltd. is a professional high-tech enterprise engaged in the development, production and application in the field of clean energy, small and medium-sized wind power and solar integrated application systems.

Innovation, cooperation, responsibility and integrity are our core values.

The International Renewable Energy Trade Fair

6th World Summit for Small Wind (WSSW) & the leading international trade show for small wind turbines

Make a note: 19 - 22 March 2015 Husum, Germany

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