

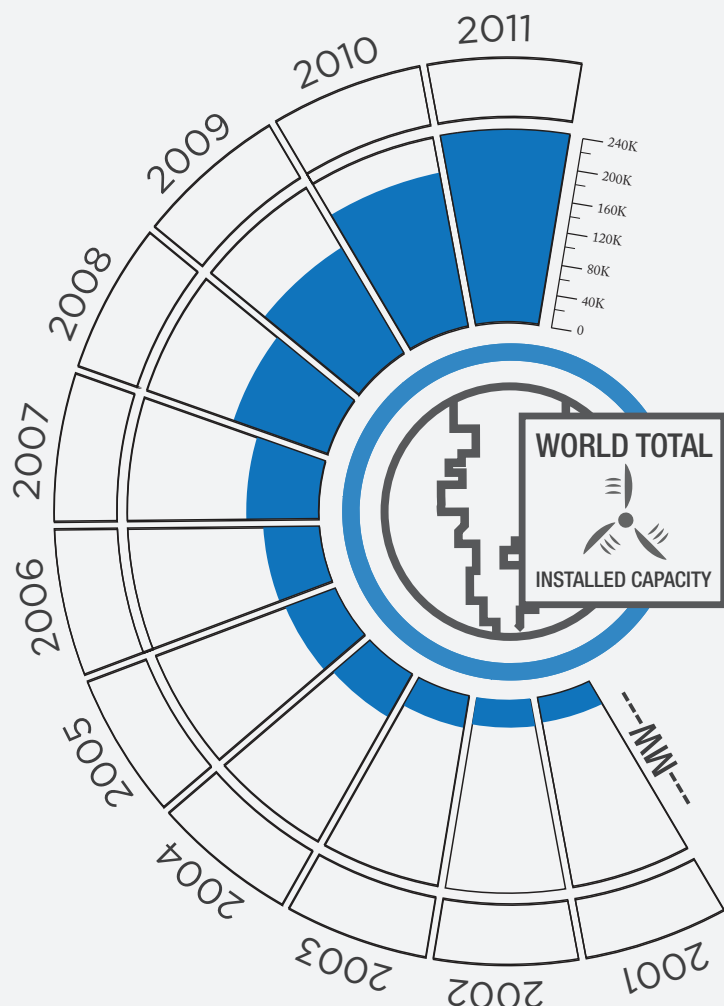
Aol Energy. WIND RUSH

A wind rush is sweeping the world, with record installations in 2011 and planned for 2012. In 2011, worldwide wind capacity reached 239 GW, a rise from 17.4 GW in just a decade according to the World Wind Energy Association.

"It's come a long way in terms of installed capacity, geographic diversity, the maturity of the technology, and the size of the turbines. Growth has been dramatic, with scope for further growth on- and offshore," says Brian Smith of the National Wind Technology Center at the National Renewable Energy Laboratory, and former chair of the International Energy Agency executive agency on wind.

According to the World Wind Energy Association, an incremental 42 GW of wind turbine capacity were installed by the end of 2011.

The boom comes as great relief for wind developers and manufacturers who continue to weather the European debt crisis, battles in the US Congress over the budget deficit, political uncertainty in a US presidential election year, cheap electricity due to record-low natural gas prices and almost universal low rates of economic growth.



But amid the boom, there are worrying signs of a market slowdown on the horizon as critical US tax credits are set to expire, turbines oversupply floods Asian markets and Spain, once the poster child of the European wind industry, axes its feed in tariffs.

Just as these storm clouds of economic and regulatory uncertainty gather on both sides of the Atlantic, European and US leaders in turbine manufacturing steel themselves for China's aggressive price wars that extend the shadow of Solyndra to the wind sector.

UNITED STATES: CLIFF CAUTION

US developers celebrated a bumper crop of installations in 2011. The US industry installed 6,810MW last year, a 31% increase from 2010 that brought total cumulative capacity to 46,919, according to the American Wind Energy Association.

"This shows what wind power is capable of: building new projects, powering local economies and creating jobs," said Denise Bode, CEO of the American Wind Energy Association on the release of the results. *"Traditional tax incentives are working. This tremendous activity is being driven by the federal Production Tax Credit (PTC)—which leveraged an average of more than \$16 billion a year in private investment over the last several years and supported tens of thousands of manufacturing jobs."*

Analysts at IHS Emerging Energy Research (IHS EER) have identified 9,159 MW of wind projects targeting 2012 activation. At least 1.9 GW of wind power purchase agreements were signed between August and November 2011. Engineering, procurement and construction contractors are reporting surges in demand for their services.

But the industry is accelerating towards a cliff, says Matt Kaplan, associate director at IHS EER for the US market.

"The North American wind market is approaching a cliff. 2012 is positioning to be the largest installation year on record for wind energy. But there's a lot of uncertainty as to what happens after 2013 because the PTC is set to expire."

Kaplan and colleagues are now forecasting 1.5GW if the PTC is allowed to expire on 31 December 2012, leaving

demand mostly driven by state-based Renewable Portfolio Standards.

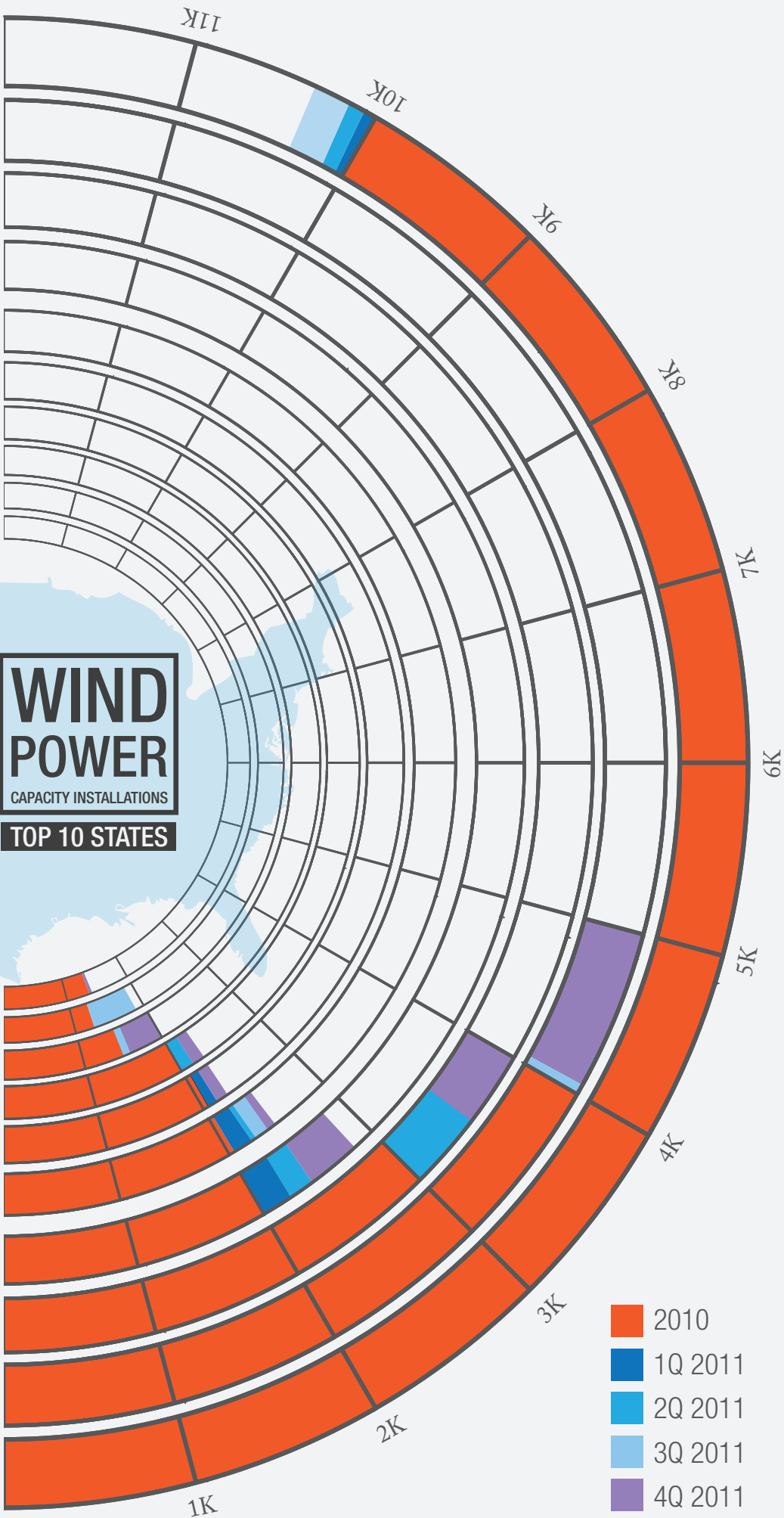
"If we witness a period of very low growth in the wind industry it's not going to be possible for all of the manufacturers to be able to weather the current market uncertainty or a prolonged wind development without the PTC."

A lack of clarity with regard to extending the PTC leaves developers in a precarious situation. The industry needs craves certainty, particularly wind developers who create demand through the manufacturing supply chain.

"On the developers side, we're already seeing several developers say that without the PTC in place it's going to be difficult for them to continue building wind projects altogether," says Kaplan. "That might shift developers to look for opportunities outside, perhaps in Latin America or Canada."

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- MINNESOTA
- ILLINOIS
- CALIFORNIA
- IOWA
- TEXAS



In January, Vestas announced 2,335 planned redundancies from its global workforce of 22,721. The world's leading turbine manufacturer has also anticipated an additional 1,600 employees in the US would also be made redundant should the PTC expire. In mid-February, the company "eliminated" an undisclosed number of jobs in the US.

"We are very busy in our Colorado factories as we prepare for the construction and installation of as many as 20 new wind farms this year in the US and Canada," says a company spokesman. "However, we are preparing for a potential slowdown in the US market in 2013 in the event the PTC is not extended. The PTC is crucial to the continued growth of US manufacturing and domestic energy production. Many jobs in our Colorado factories could be affected later this year. Vestas will make a decision concerning its US manufacturing facilities later in the year based on the status of the PTC and the outlook for the markets served by the US factories."

EUROPE: 2020 TARGETS HEAD OFFSHORE

Meanwhile, despite angst in Europe over the debt crisis and warnings of a double-dip recession, the wind industry has been buffered to an extent by the EU's binding targets to source 20% of electricity from renewables by 2020. The European Union's 2009 Renewable Energy Directive have helped bring 93,957 MW online by the end of 2011, enough to supply around 6.3% of the EU's electricity. Projections over the next decade are stable.

"We expect the sector to deliver another 89 GW by 2020, increasingly from offshore wind and repowering of older onshore installations. To players looking to capture part of this market, key challenges include increased financial uncertainty as well as revised legislative and political frameworks as governments across the region struggle to define how to reach ambitious renewables targets for 2020," said Magnus Dale, European wind analyst for IHS Emerging Energy Research.

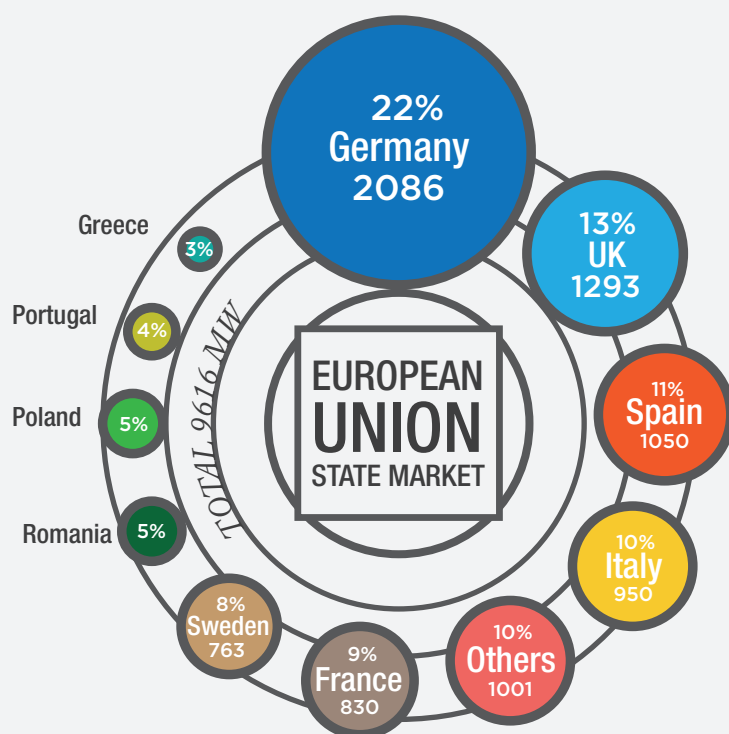
By contrast to the boom and bust in the US, Europe's 2020 targets have been vital in developing a mature wind industry where developers and manufacturers can survive economic storms.

"The European wind industry hasn't always looked the way it looks today," says Dale. "Obviously, political support has been key to build out the wind capacity that you see today."

Although Spain and Germany account for about 57% of the installed capacity combined, France, Germany and particularly the UK are all driving the market for offshore wind.

In mid-2011, France announced 3 GW of offshore wind tenders, an addition to its existing commitments of 3 GW, with an overall target for on- and offshore of 25 GW by 2020, according to Ernst & Young's renewables attractiveness indices 2011.

EDF Energies Nouvelles and Areva Wind, spinoff from France's nuclear generation giants, are leading consortia that include Alstom, which already has supply agreements for its gigantic 6 MW turbines for the UK offshore market.



SHARES FOR NEW CAPACITY INSTALLED DURING 2011 IN MW

As at the end of June 2011, Germany's offshore wind installed capacity was a mere 198 MW, even though it leads Europe with a total capacity of 27,214 MW in 2010. But in response to the Fukushima disaster, Germany's plan to decommission its nuclear plants by 2022 has invigorated offshore wind opportunities.

Germany's environment ministry and KfW Development Bank have launched a €5 billion program to provide financial incentives to offshore wind projects. Ernst & Young noted that a consortium of 16 commercial banks and the European Investment Bank have agreed to provide €1 billion in financing to build a 400 MW wind farm in the North Sea, scheduled for completion in 2013.

The UK has 4 GW of onshore wind installed capacity in operation with another 11 GW in the pipeline. The UK has approximately 1.3 GW of offshore wind capacity and 6 GW in the pipeline, with an overall target of 18 GW.

The goal for 2020 is for onshore wind installed capacity to reach up to 13 GW, despite the discovery through a freedom of information request that nearly half of all onshore wind farms are rejected at the planning stage.

CHINA: ENTER THE DRAGON

China added 19.1 GW in 2010, and 16 GW in 2011, bringing its cumulative tally to 62,000 MW which put it well on track to meet the country's target of 100 GW by 2020. Despite a 48% global market share of turbine supply, even China has not been immune to market pressures, mostly of its own making, as supply has outstripped demand.

China's assembly capacity surged by 50% to 30 GW between 2009 and 2010, while grid-connected installations increased by only 18.5%, according to an IHS advisory note shared with AOL Energy.

Caitlin Pollock, China wind analyst at IHS Emerging Energy Research, said: "The Chinese government has done a good job of building up the wind industry. But the market has grown more rapidly than they anticipated."

Oversupply in China's domestic market caused average Chinese turbine prices to drop 17% between June 2010 and June 2011, to roughly RMB3.77 million (\$590,000) per megawatt, she says.

As wind capacity has outstripped grid capacity, transmission companies have begun to invest heavily in grid infrastructure. China Southern Power announced that it plans to invest roughly \$61 billion and State Grid Corporation, the largest utility in the world, aims to improve grid by investing approximately \$371 billion between 2011 and 2015.

"The Chinese market likely won't experience the growth levels that we've seen in recent years," Andy Wickless, associate director of energy at analysts Navigant, said. "Lack of transmission infrastructure is a real issue. Historically transmission build-out has not kept pace with wind farm installations."

AN UNCERTAIN FUTURE IN THE US

Tension between market certainty and market potential is perhaps nowhere greater than in the US.

The Production Tax Credit has been the primary federal financial support mechanism for wind, which rewards developers and investors with 2.2 cents per kWh over 10 years. The main source of revenue for projects are PTCs, direct electricity sales and trading renewable energy market certificates (RECs).

"The goal of the tax credit is the more we build the cheaper it will become. That has been borne out over time," says Richard Caperton, a senior policy analyst with the energy opportunity team at Center for American Progress. "Wind is a very healthy industry that is viewed as a mainstream investment by utilities. It's been very effective."

This lifeblood of the wind sector has helped the US industry reach a robust level of 46,919 MW installed by the end of September 2011, with more than 8,400 MW under construction.

The PTC has driven down the costs of wind energy to the point where it can compete with coal or gas-fired power plants, the American Wind Energy Association claims. State-of-the-art wind power plants can generate electricity for less than 5 cents/kWh with the PTC in many parts of the US, it says. AWEA also estimates that the PTC has attracted \$60 billion of investment since 2005.

Analysts at IHS Emerging Energy Research say that the PTC's presence since 2005 has supported wind energy growth averaging 5.6 GW a year, and the installation of 83% of nameplate wind capacity in the US.

"The industry is at a very interesting inflection point where technology and innovation are really helping to drive down the cost of wind substantially," says Matt Kaplan. "But the problem is that the industry still needs the PTC to sustain a sizeable level of build each year. Wind would have a very challenging time competing without the PTC that much is clear."

BOOM AND BUST

Although an attempt to extend the PTC through the payroll

tax cut failed, action in Congress will continue throughout the year, says North America wind energy analyst Matthew DaPrato at IHS Emerging Energy Research.

"That's the way it's operated historically - the PTC has lapsed and been reinstated," he says. "Everyone is in election and campaign mode positioning for the November elections. It's going to be tough to get it passed despite efforts on both sides for it. But it's going to come down to the wire."

Without the PTC installations could collapse from an annual peak of 10.5 GW in 2012 to as low as 1.5 GW in 2013, IHS EER forecasts.

"There are a lot of investments that have been made since we saw the last expiration of the PTC and the industry has really grown by leaps and bounds," says Kaplan. "It's unfortunate we're back to where we were several years ago with a potential boom and bust in the tax credit. With that can come a very low and dark time for the industry."

An estimated 75,000 US wind energy jobs at more than 400 factories in 42 states could be at risk, according to AWEA.

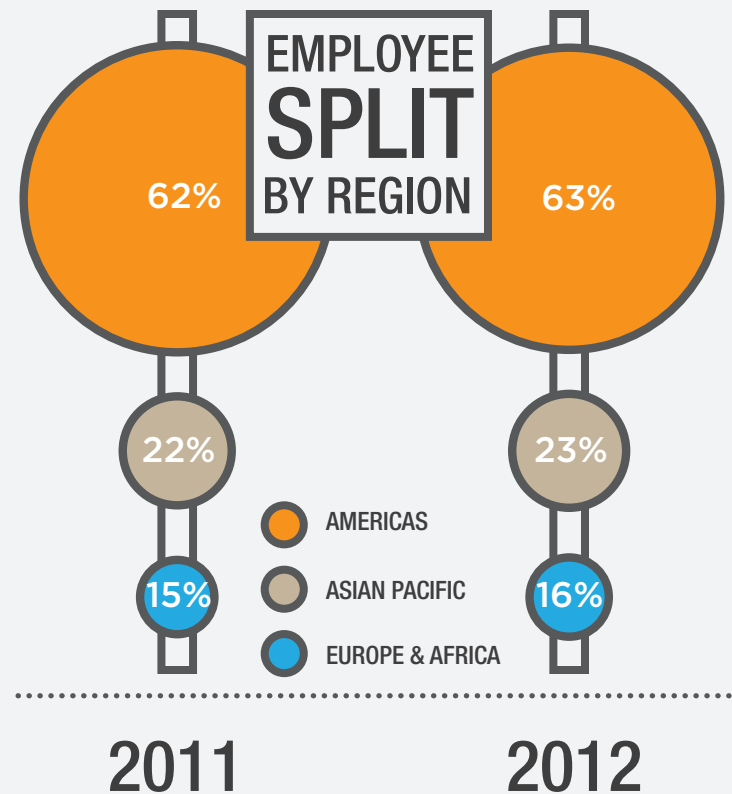
Additional domestic manufacturing capacity created partly by stimulus funding such as the 48C tax credit under the American Recovery and Reinvestment Act of 2009 would also be lost, says AWEA.

Developers are clearly on tenterhooks. Andy Wickless, associate director of energy at analysts Navigant, says: "We've talked to manufacturers and developers over the last few months and it's all about certainty. When you don't know what the numbers are going to be and you don't know what the plug is in your spreadsheet that's the worst thing that could happen. Folks need a decision now because they're in a holding pattern in terms of their business plans and they don't know where to place their chips."

Patrick Woodson, the chief operating officer at E.ON Climate & Renewables North America, says that his company needs to know as soon as possible whether the PTC will be extended so that it can adjust its business plan. PTC extension has faced setbacks and if it is not dead, it appears to be on life support.

"We need to have a clear indication so we can properly plan to acquire equipment. We're a global wind company. We have a number of on- and offshore European markets so

we're competing for capital internally. As a company we need to decide in the next few months where we're going to put dollars in 2013. We really need some kind of signal or those dollars could very easily go elsewhere. Primarily that would be Europe, but that's not to say that we couldn't see some other markets emerge as well."



US REMAINS A POWER IN WIND

"We love being in the US because we had really just gotten started on developing the onshore resource. We have massive amounts of land still that can be developed for power production and really good wind resource," Woodson says. "But there is a good deal of opportunity still in places like the UK. But as long as it remains a viable market economically we think there's great potential in the US."

"The PTC is certainly not the most generous subsidy that exists across the globe," says Woodson. "But it is an important one in that it has offered the ability to make these projects economic. If that goes away we have to see a major change in the landscape either on costs or price of power to keep doing these projects."

E.ON Climate & Renewables North America began operating in 2007 after it bought a subsidiary of Airtricity, an Irish green power generation company. It now has 1,920 MW installed at 13 wind farms across the United States, with a further two additional wind farms in late stage construction totaling 300 MW.

LOOKING AHEAD TOWARD PROSPECTS IN ASIA

China's success in building a domestic wind industry has turned it into a victim of its own success as an aggressive price war has developed.

Companies from China and other Asian countries including Japan's Mitsubishi and South Korea's Samsung are now reaching previously untapped markets such as Bulgaria, Belarus and Macedonia, as well as debt-laden European countries such as Ireland and Greece.

"The byproduct [of oversupply] which is becoming more heated with all this pressure on margins, is that we're seeing a lot of very, very aggressive activity with Chinese manufacturers trying to go abroad, particularly targeting the offshore market," says Caitlin Pollock, China wind analyst at IHS Emerging Energy Research. *"They can also offer much more competitive prices. A lot of those prices are real and to an extent they are also promotional."*

Shipping costs and more rigorous regulations outside of China and demand in the US and Europe for high quality technology may foreshorten Chinese manufacturers margins overseas, says Pollock.

CASH IS KING

However, the European debt crisis has presented opportunities for Chinese manufacturers with long lines of credit, she says. Goldwind and Sinovel alone have secured €8.7 billion in overseas expansion funding from the China Development Bank, compared with European Investment Bank funding of €6.2 billion for all renewable energy projects in EU.

"A lot of manufacturers seem to be taking advantage of

almost crisis stricken markets," says Pollock. *"We can see that in the European Union ironically. They are coming in at a time that is both inopportune and opportune. Three or four years ago, western manufacturers were maxed out for years in advance and it was really hard to get turbines. Now there's an oversupply and inadequacy of financing, that's what they are taking advantage of."*

"One of their strategies in entering new markets is offering financing via equity and debt and offering extended warranties on their turbines which a lot of people say have very little track record."

In April 2011, Sinovel, China's largest manufacturer, signed an agreement with Greek Public Power Corporation to supply up to 300 MW of onshore capacity, with the potential for additional offshore development. Sinovel, which in 2010 knocked GE from second place in terms of global turbine supply, has also smoothed entry into the market with the promise of building a factory in the debt-stricken country.

In August 2011, Chinese manufacturer XEMC VVEC secured a supply agreement with Irish developer Gaelectric for 13.6 MW of wind turbine capacity. The initial deal appears small, but it may include an additional pilot offshore turbine. Sinovel may sign off on a larger deal for 1 GW Mainstream Renewable Power in Ireland over the next five years.

COUNTERING THE CHILL

"If you're a bank and you're looking at investing in certain markets it's a bit counter-intuitive," Pollock says. *"A lot of these companies are relying on strong credit lines that they are getting from the Chinese Development Bank and other banks so you would think there would be some sort of checks put into place to make sure it's a good investment."*

Tactics to undercut costs may be harder to emulate in wind than they were in solar PV after China recently agreed to terminate its Special Fund for Wind Power Manufacturing program following complaints filed by the US at the WTO.

Turbine manufacturers also dismiss that the "chilling effect" of the Solyndra price wars could extend to wind, with cheaper manufacturers snatching orders from them.

"Comparing wind and solar they're a decade apart," says Vic Abate, GE's vice president of Renewable Energy. "I'm bullish on solar, but if I look at the challenges we had in wind in 2002 and where it's come over the last decade, solar is going to do the same thing, it's just a decade behind. On the wind side, the cost curve is really in the build out phase."

EUROPEAN COMPANIES ACTIVE IN US MARKET

European wind companies have played a major role in the development of the US wind energy sector, even as shadows continue to loom over the industry and the global economy.

Vestas, the world's largest turbine manufacturer, clearly has high hopes for its US business, with a market share of 18.7% and room for growth. In recent years Vestas had invested in two blade factories, a nacelle facility and a tower facility in Colorado. It also has R&D hubs in Texas, Massachusetts and Colorado. All of its facilities are now being considered for consolidation.

It is not yet clear whether these facilities will feel the impact of a radical reorganization to reduce annual costs by at least €150 million. The company has stated that if the PTC is not renewed, it could lay off as many as 1,600 employees at its US factories.

Siemens, Acciona, Clipper and Gamesa are just some of the other companies from Europe that entered the US market because of its potential for growth and incentives such as the Production Tax Credit and the Section 48C program for advanced energy manufacturing facilities.

As part of the economic stimulus package, \$2.3 billion was set aside in tax credits for advanced energy manufacturing. It provided a 30% tax credit for investments in 183 manufacturing facilities across 43 states, generating more than 17,000 jobs, according to the Treasury. Despite GE's claims for the 48C credit on other parts of its business, the largest turbine manufacturer in the US says it scaled up manufacturing without the credits.

Vic Abate, of GE Energy's Renewables, says the incoming business was a good thing for the wind industry in the US: "If you have the demand in your country, you'll see the jobs. That's the beauty of wind."

"The European developers and manufacturers came to the US when they believed in the US market. Look at all the factories that opened. For you to be competitive, you have to be local. The currency risks, the transportation logistics, the service network, the customer facing you really have to be local."

COUNTING CREDITS

Treasury documents show that wind turbine manufacturers originating outside the US made full use of the 48C credit. Siemens USA claimed the largest single 48C credit--\$28.33 million--for its gear box component plant in Elgin, Illinois, closely followed by a claim of \$22.15 million from Nordex USA, a subsidiary of another German company Nordex. Siemens USA was also allocated a further \$4.33 million for its wind tower factory and \$3.45 million for its blade facility.

Overall, Vestas received two separate tax credits for blade facilities of \$21.59 million and \$8.58 million and a further \$21.6 million rebate for its wind tower manufacturing plant.

As the contracted turbine supplier for the 468 MW Cape Wind project, Siemens USA aims to emulate its success in Europe's offshore wind market in the US. According to the Ernst & Young renewables attractiveness indices 2011 which still rates the US as the number two overall investment opportunity after China and ahead of Germany, Siemens AG has publically agreed to provide some, or all, of the debt and equity for the project.

Meanwhile, Gamesa USA, a subsidiary of Spain's largest manufacturer, put in claims for almost \$31 million in 48C tax credits, only one of which was authorized, according to the company.

Gamesa was the first overseas wind manufacturer to set up full production facilities in the US in 2004. It now has four facilities in Pennsylvania, attracted by state and federal incentives. But it was state incentives, rather than federal, that attracted the Spanish company to the US.

Gamesa now has a blades factory in Ebensburg and a nacelle factory in Fairless Hills, attracted by \$15 million worth of state incentives from Pennsylvania, boosted by the Alternative Energy Portfolio Standard. But in 2008, it closed its tower manufacturing facility. Around 950 of its 8,267 employees worldwide are now based in the US.

"We've invested several hundred million dollars in the US, significantly more than the subsidies that we got," says David Rosenberg, a Gamesa USA spokesman.

But Rosenberg says that despite incentives, the potential expiration of the Production Tax Credit could result in factory closures.

"The US market is challenging. Without having a clear line of sight to what will happen to the PTC it's very difficult to predict what will happen after 2012. And we don't have an energy policy [in the US]. The combination of those two makes the future look very challenging and you also have the issues that Congress are debating right now regarding the debt.

"Without the PTC it's quite possible to see a number of manufacturing facilities either close down or see some level of consolidation in the industry. There's excess manufacturing capacity - roughly 13 GW-14 GW in the US today."

SPAIN'S POSTER CHILD

In its home country, Gamesa was Spain's poster child for the country's enthusiastic policies on wind energy, which supplied 16% of the country's electricity in 2010, putting the country on target to exceed its EU directive of 20% by 2020.

Such is the success of Spain's wind industry that during one hour on the afternoon of November 9, 2010, a record of more than 14,700 MWh was generated in Spain, covering 45% of the country's power demand.

Heikki Willstedt, energy policy director at the Spanish Wind Energy Association, says that Spain managed to export this clean power to other European countries, foreshadowing the planned common electricity market in the EU from 2014.

"In 2010, there was a lot of wind in Spain. This made the prices of the Spanish electricity market much lower than in France, which bought electricity from Spain and then sold it to Italy, which has Europe's most expensive electricity market. So we were helping Europe to have cheaper electricity."

Gamesa now has 32 production facilities in Europe, the US, China, Brazil and India and an annual production capacity of

4,400 MW.

In another sign that the market is slowing in Spain, 94% of the MW Gamesa sold were destined for markets outside the country as of September 2011. The country's total installed capacity was 21,673 MW in 2011. But the new governing party has introduced Royal Decree 1/2012 which places a moratorium on subsidies for new renewable projects at least until the end of the end of the year.

The forecast for Spain's indigenous industry looks dire, with manufacturers already warning that the industry will be blown away entirely as orders slumped from 1,500MW to 100 MW in 2011, according to the Spanish Wind Energy Association.

CAPTURING OFFSHORE WIND

In July 2011, Senators Tom Carper of Delaware and Olympia Snowe of Maine introduced the Incentivizing Offshore Wind Power Act that should extend investment tax credits for the first 3GW of offshore wind placed into service.

"These are the kind of incentives required to encourage investment in the early offshore wind projects," says Rosenberg.

"We see offshore as a growth opportunity when the market opens up," he says. "Incentives in the offshore market are going to be needed for the early projects... in moving the offshore markets forward."

But Gamesa is positioning to take up offshore opportunities in Canada and Mexico, even if the US market is slow to get going, and opened up three new markets and added 21 new customers in 2011 in pursuit of its internationalization strategy.

Gamesa is looking to Mexico for new orders after attempts to gain third-party traction beyond developers such as Iberdrola and Acciona Windpower in the US and Canada, says an IHS EER report.

Third quarter 2011 results showed sales in India accounting for 20%, Eastern Europe 13%, China 21% and the US 14%.

But the company's global market share slipped from third largest turbine supplier in 2008 to eighth place in 2010.

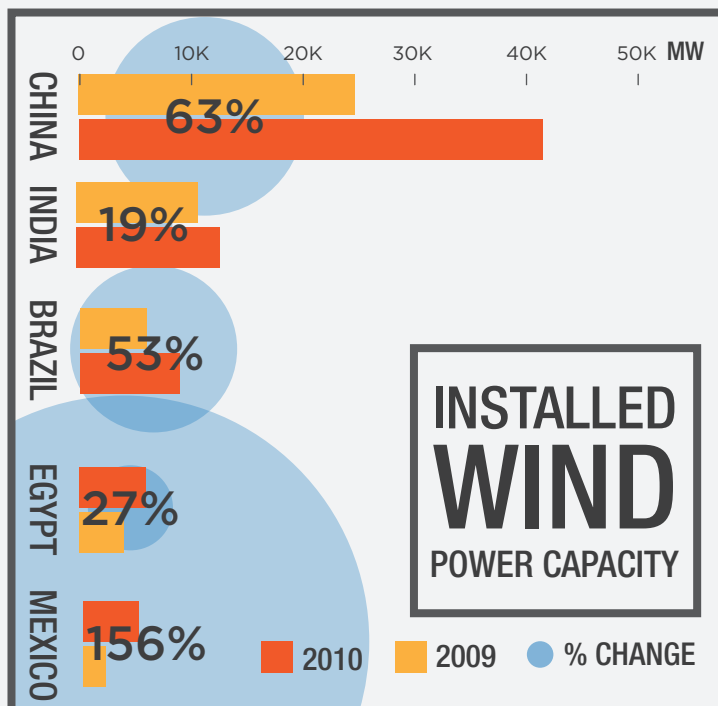
Gamesa still has 4.9% of the Chinese market, and is set to lead China-based foreign suppliers with a pipeline of nearly 1.4 GW, followed by Vestas' 500 MW book of announced orders, according to IHS EER.

WIND IN THE DEVELOPING WORLD

The developing world is often held as both the most challenging and the most promising market for the wind industry, as renewable energy sources have the potential to leapfrog traditional incumbent fossil fuels and serve distributed generation in communities without reliable connections but costs are also even more central to deployment than in developed markets.

Vestas has been operating in India since 1997, capturing just some of the growth from 12 GW installed capacity to a potential 49 GW.

But India's own leading manufacturer Suzlon, has dropped global market share from 6.6% to 4.7%, as other European players start to establish a production presence in India. While China leads the developing world's in total installed wind power capacity, Mexico showed impressive growth from 2009 to 2010, albeit from a comparatively low base.



Worldwide, all turbine manufacturers are struggling with oversupply, largely thanks to a 50% increase in Chinese assembly capacity between 2009 and 2010. But China's technical challenges with grid connections and transmission problems have driven Chinese manufacturers overseas to cash-strapped European countries and undeveloped or underdeveloped markets in South Africa, Turkey, Brazil and Australia.

CHINESE PUZZLE

Issues over quality and lack of experience could put still the brakes on Chinese companies' overseas ventures.

"If you are going to operate a wind farm for 20 years or more you want to have the certainty that the turbines will perform as expected. You need a track record and that [Chinese] track record in most cases is unknown to European and American developers," said Andy Wickless at Navigant. "We need to see more Chinese turbines in the American and European markets for investors and developers to feel comfortable that Chinese turbines can compete with GE or Vestas. The installed cost isn't really the right way to look at it - it's the life time cost of the wind farm."

Regulations introduced in China during 2011 may also moderate overcapacity. From June of that year, the Chinese government stopped giving preferential treatment to original equipment manufacturers unable to produce turbines with a capacity of 2.5 MW or higher, or with less than 1 GW of annual assembly capacity.

Caitlin Pollock at IHS says: *"Prices have really plummeted. One reason is that companies have managed to achieve economies of scale simply because of the volumes they're pumping out. But on another level there's just a price war to get an order to get into the market or defend market share."*

But many Chinese companies claim that shipping blades or towers can be achieved by tapping into its busy export shipping market, even though a nacelle alone can weigh around 60 tons, she says.

"It remains to be seen whether Chinese manufacturers can ship components to foreign markets cheaply enough. They say they don't find it to be that expensive. They say they have a

lot of in-house or industrial capacity," she said.

In China, market share of non-domestic manufacturers is being squeezed. Vestas's share of the Chinese market is tiny (4.9%), compared with its dominance in Sweden (54.3%), the UK (38%) and Italy (25.2%).

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But it's an open question as to whether the Chinese manufacturers will prevail globally against US and EU competitors, says Wickless.
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"Historically, less than 1% of the US and European wind markets has been served by Chinese turbine suppliers," he says. "In 2010, only 10% of the Chinese market was comprised of turbines made by EU and US companies," he says. "There really hasn't been significant global competition to date: you have China and then everything but China. As Chinese turbine manufacturers begin to compete more in the American and European markets, we don't know how this global market share will shake out.

"In the near term are the Chinese OEMs going to over take the US and European markets? No. In the long-term are they going to do so? We don't know yet."



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THE FINANCIAL CRISIS AND THE US STIMULUS PACKAGE

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The 1603 cash grant program was a flagship piece of the Obama administration's economic stimulus. But hundreds of millions of federal dollars were awarded to projects well under way before Barack Obama was inaugurated, despite the aim of the 1603 grant program to "primarily" stimulate new projects.

"When the financial crisis hit many developers found that they didn't have the tax liability that would allow them to claim the credits, so the program was developed to offer an alternative way to continue to incentivize renewable energy development," a Treasury spokeswoman says. "The 1603 program was primarily meant to incentivize new renewable energy projects, but it also supported some existing investments."

The 1603 grant program was introduced through the American Recovery and Reinvestment Act 2009 and funded with \$9.6 billion of the \$787 billion stimulus package. But that program expired at the end of 2011 after a 12-month extension.

The 1603 "cash" grant program was a payment for "energy property" in lieu of tax credits, such as the Production Tax Credit used mostly in the wind industry, and the Investment Tax Credit used mostly to encourage solar developments. Awards were equivalent to 30% of the project's total cost placed in service on 1 January 2011 or later. At least one payment has been made to a company after it went bust.

As of 31 October 2011, Treasury figures for the 1603 grant show that \$8.474 billion of a possible \$9.6 billion was split between 22,747 clean energy projects. Treasury claims these grants attracted an additional \$32.9bn in private and federal investment to fund 14.1 GW-worth of projects, with a total estimated electricity generation of 36.8TWh.

As of October 31, 2011, Treasury records show at least 95 solar and wind projects were awarded grants in 2009, which means it is almost certain that these projects were well under way before Barack Obama introduced the stimulus. Although there is no suggestion of wrongdoing, there is a question of additionality, a clear objective of the stimulus funds.