

Enter the Dragon

How China will impact
Europe's renewable energy landscape





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About the research

This report provides insight into M&A and project financing deal activity between European and Chinese renewable energy companies. It also examines trends in non-transaction orientated expansion initiatives such as technology licensing and localised manufacturing. The findings are based on a survey of 120 senior business executives split equally between Europe and China.

The survey and report were written in collaboration with Clean Energy pipeline, a specialist provider of clean energy news, data and research. Transaction data has been extracted directly from Clean Energy pipeline's deal databases. Clean Energy pipeline is a division of VB/Research.

The survey was conducted in July 2011 and was completed by five types of respondents: corporates, investors, debt providers, service providers and government agencies. To supplement the survey, interviews were also conducted with the following individuals:

- Stephen Cai, CEO of China Sunergy, a leading manufacturer of solar photovoltaic cells and modules.
- Simon Parker, CEO of DP Cleantech, a provider of biomass energy solutions across China and Europe.
- Gino Van Neer, CEO of Enfinity APAC, a developer of solar photovoltaic projects across Europe, North America and Asia.
- Dirk Wassmann, Director of Epic Asset Management, a Hong Kong-based asset manager specialised in real estate and renewable energy.
- Eric Bakker, CEO of EWT Holdings, a wind turbine manufacturer headquartered in The Netherlands.
- Barry Lynch, Head of Procurement & Project Delivery at Mainstream Renewable Power, a global developer of wind and solar projects.
- Carl Griffiths, CEO of Seren Photonics, a developer of highly energy efficient LED lighting technology.
- Jukka-Pekka Mäkinen, CEO of The Switch, a leading supplier of megawatt-class permanent magnet generator and full-power converter packages for wind and other renewable energy applications.
- Hamish Curran, CEO of TMO Renewables, a developer of advanced technology for the production of a range of bio-based products from non-food, organic feedstocks.

Foreword

As the economic powerhouse for the first decade of the 21st century and the area of the greatest investment in renewables in 2011, one might expect China to have an active role in international investment. However the statistics tell a different story. International deal activity between Chinese and European renewable energy companies has been almost non-existent to date. Those hoping that Chinese money will help plug the funding gap currently constraining the development of the European renewable energy sector have been disappointed. But are we now set to witness a sudden upsurge in investment levels and deal activity as Chinese companies fix their sights on foreign shores in a much more focused way than in the past, or will China simply take market share by driving out competitors?

This report sets out to analyse that question and to understand more about the forces that might shape a Chinese investment strategy. Which sectors are most attractive and why? What are the key motivating factors? What role will the Chinese play? It is inconceivable that China will not play a key role in the development of this sector, but what shape will that role take and where will Chinese influence be strongest?

Our report also looks at the drivers behind European investment in China as it seeks to develop its own renewable energy sources on a characteristically grand scale. What are the Chinese looking for on home soil? How safe is Western IP? What shape will Western investment take?

In undertaking this report we wanted to start to examine these important questions. But we also see this report as part of a broader debate about the future of the sector. The Taylor Wessing Future Energy Forum aims to stimulate dialogue around important issues facing the energy sector and those who are dependent on it. Through a combination of events, reports, and round-table discussions we are providing an additional resource for those who are active in developing, financing and commercialising these energy sources.

Taylor Wessing has had a long-term involvement in the cleantech and renewables sectors and provides expert legal advice across the investment cycle, from early-stage fund raising and venture capital through commercialisation to full-scale project development and finance. We advise companies, investors and financiers in the cleantech and renewable energy sectors across Europe.

We hope that this report sheds some light on how the renewable energy sector here in Europe and further afield will evolve as China begins to assert its economic might in the sector.

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Executive Summary

China to underpin cross-border deal activity with Europe

International deal activity between Chinese and European renewable energy companies has been virtually non-existent to date – only 5 cross-border acquisitions and 23 project financing deals have taken place since the beginning of 2009.

Driven by the search for higher margins outside of China and the need to import technology into China, survey respondents are confident that activity will pick up over the next 18 months. However, there is much more certainty that Chinese acquisitions and investments in Europe will increase rather than the other way round.

Some 80% of respondents predict that the number of Chinese acquisitions of European projects and companies will increase over the next 18 months. In contrast only a third are confident that activity will increase in the other direction. The same disparity in forecast activity is expected in project finance.

Technology transfer offers the greatest opportunity for European companies

Despite the rapid growth potential of China's renewable energy sector there are very few opportunities for European companies to acquire or invest in China, primarily due to the dominant position of incumbent players. China's renewable energy manufacturing industry is already the largest in the world and competing with it domestically is likely to be a daunting prospect.

The principal opportunity for European firms to access China's burgeoning market is through technology licensing. To date, the emphasis among Chinese manufacturers has been on scaling up as rapidly as possible, with less focus on quality or technological innovation. This has contributed to a number of large-scale wind farm power outages during the first half of 2011. The combination of grid regulators introducing tougher technology requirements in light of these outages and the constant need to improve performance in the face of increasing competition is forcing Chinese equipment manufacturers to acquire innovative technologies developed outside China that can be integrated into their existing solutions.

However, for Chinese companies to succeed in licensing technology from Europe they will need to allay fears over IP exploitation. This remains a very real issue as evidenced by American Superconductor's allegations that Sinovel, China's largest wind turbine manufacturer, has stolen a strand of its intellectual property. European technology companies are certainly willing to license their IP to Chinese companies assuming it is protected appropriately – half of European survey respondents expressed an interest in licensing technology to China, making it the second most favoured expansion method behind forming strategic partnerships with project developers.

Localised manufacturing is not on the agenda

Chinese and European companies are equally disinterested in establishing manufacturing facilities in each other's region. Only 10% of Chinese respondents intend to establish a European manufacturing base while only a third of European respondents expressed an interest in manufacturing in China. The reasoning behind their lack of enthusiasm for localised manufacturing is very different. For Chinese companies, manufacturing in Europe is unattractive because the low cost at which equipment can be produced domestically ensures that products are competitively priced in European markets even after shipping costs have been taken into account.

For European manufacturers, the dominance of local production giants in China makes establishing a Chinese facility a highly risky undertaking. This obstacle is most acute in wind, where the oligopolistic nature of the project development industry in China ensures that a very small number of firms acquire the majority of turbines. Most developers already have deep ties with Chinese manufacturers, making it almost impossible for European firms to establish a meaningful presence.



Europe faces stiff competition to attract Chinese investment

North America and Europe will compete head-to-head to attract outbound Chinese investment – some 67% of Chinese survey respondents plan to acquire and invest in Europe, only marginally ahead of the 63% intending to seek opportunities in North America.

One of the draws of North America is that it has fewer established equipment manufacturers than Europe, making it easier for Chinese firms to compete. Many respondents also believe that North America is a much faster growing market than Europe, which decelerated in the first half of 2011 as governments reduced their renewable energy incentive mechanisms.

There is no consensus as to whether Europe will be favoured over North America or vice versa. Indeed 56% of respondents agreed that Chinese expansion is more likely to occur in North America than Europe, while 44% disagreed. However, what is clear is that North America and Europe are competing head-to-head for Chinese attention.

China will provide debt financing for strategic projects

Chinese investment in the European renewable energy sector is likely to be underpinned by Chinese equipment manufacturers forming partnerships with project developers that are already well-established in Europe. Three quarters of Chinese survey responses expressed an interest in this approach, making strategic partnerships the most favoured method for expansion. This is already occurring, with turbine manufacturers such as Sinovel forming partnerships with Mainstream Renewable Power in Ireland and Public Power Corporation in Greece this year.

Under these partnerships the Chinese equipment manufacturer not only supplies products to projects, it will also bring project financing from Chinese banks at more favourable rates than European lenders can offer. Chinese banks are willing to support these initiatives because they promote exports of Chinese products.

Established European markets are not set for a bailout

Chinese investment and acquisition activity directed at Europe will primarily be targeted at small renewable energy markets where the growth potential is compelling. Two thirds of Chinese respondents are planning to invest or acquire in Europe, although less than one third plan to invest in the major European markets of Germany, Italy, France, Spain and the UK. Developers in major European markets are unlikely to be able to rely on Chinese investment to plug their domestic funding gaps.

Instead, China will focus its investment on countries with less mature renewable energy industries that are just beginning their project build-out phase. Recent moves by Chinese firms confirm this prediction. As outlined above, Sinovel has formed strategic partnerships with developers in Greece and Ireland in 2011, both of which are relatively nascent renewable energy markets.

Understanding the Chinese – European deal landscape

Chinese and European renewable energy deal activity – one way traffic?

Cross-border deal activity between European and Chinese renewable energy companies has been virtually non-existent to date. Since the beginning of 2009 there have been only five completed cross-border acquisitions between the two regions.

Chinese wind turbine manufacturers have been busy addressing an explosion of domestic demand, while their European counterparts have preferred to serve the more easily addressable markets of Europe and North America. The solar sector is where Chinese and European companies have enjoyed the greatest international success, much of which has been achieved through organic growth rather than M&A or project financing.

However, this is now changing, as China's leading renewable energy equipment manufacturers start to expand globally in search of higher margins to counteract domestic pricing pressures. For European firms, China's emphasis on cleantech and renewable energy in its recent five and ten year plans combined with its resolve to improve quality standards, is opening up opportunities to supply cutting-edge technology and know-how.

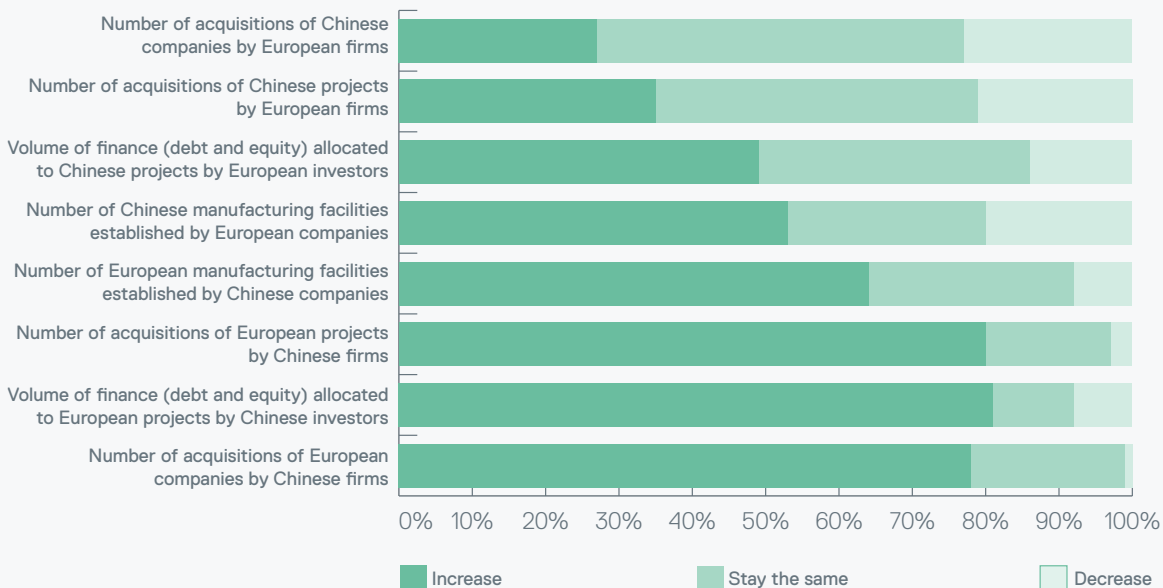
International project financing activity has been as infrequent as cross-border M&A. Chinese banks have only financed one European renewable energy project during the last two and a half years. European banks have been more active, investing \$1.3 billion in 22 Chinese projects since 1 January 2009, but this represents less than 5% of their total international lending by volume to renewable energy projects.

Survey respondents are unequivocal in forecasting an increase in cross-border M&A and project financing between China and Europe during the next 18 months. The majority also forecast that the landscape will be dominated by Chinese firms acquiring and investing in Europe, with only a third expecting an increase in the opposite direction. While about 80% of respondents predict that the number of Chinese acquisitions of European projects and companies will increase over the next 18 months, only a third are confident that the number of acquisitions of Chinese projects and companies by European firms will increase.

Project financing displays the same trend – 81% of respondents forecast an increase in the volume of financing allocated to European projects by Chinese investors, while only half forecast an increase in financing allocated to Chinese projects by European firms.



Over the next 18 months, how do you expect the following aspects of cross-border renewable energy deal activity between China and Europe to change?



One of the primary reasons behind survey respondents' lack of confidence that European investment in China will increase is the lack of potential players – only 38% of European renewable energy equipment manufacturers are expected to be frequent acquirers in China, while 63% of Chinese manufacturers are expected to be strong acquirers in Europe.

Localised manufacturing is not on the cards

The majority of European and Chinese respondents show little or no interest in establishing manufacturing facilities in each other's regions, despite most respondents predicting that this type of activity will increase. Some 90% of Chinese respondents stated that they had zero or limited interest in establishing a European manufacturing base.

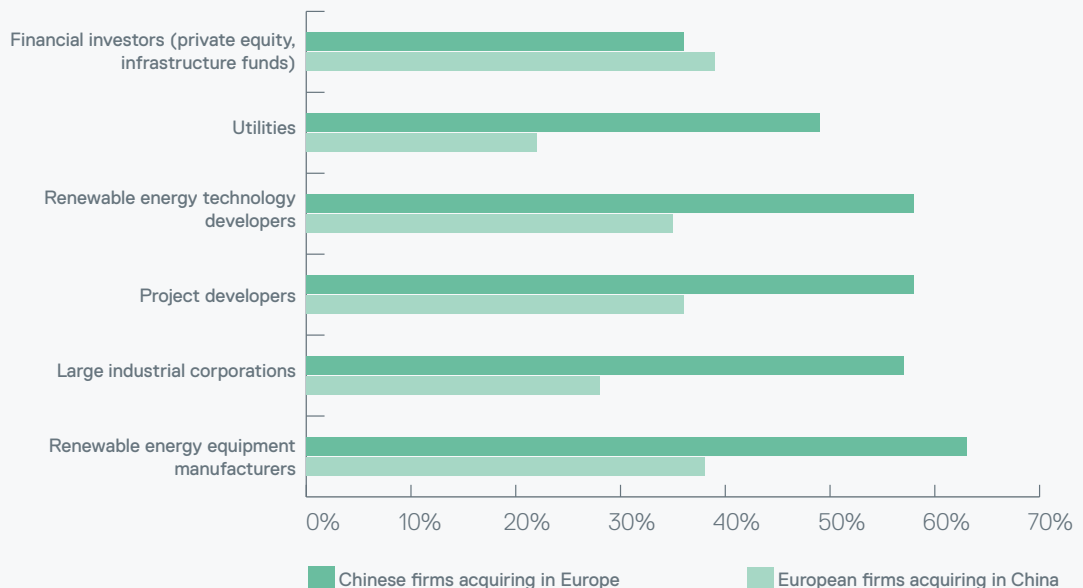
Approximately 80% of Chinese respondents had no or limited interest in acquiring a European manufacturer despite the fact that leading European renewable energy equipment manufacturers are currently trading at all time lows. As an example, the leading German solar product manufacturer Q-Cells currently had a market capitalisation of Eur89 million in early October 2011, which is a 76% decline since the beginning of January.

The reality is that many leading Chinese renewable energy equipment manufacturers, supported with generous subsidies from the central government, have already managed to carve out market share in Europe by shipping product from China. This is particularly true in the solar sector, where a lack of local demand has forced Chinese manufacturers to focus on international markets. China-based Suntech, which is the world's largest manufacturer of solar PV cells and panels, generated two thirds of revenue from Europe in 2010. Suntech has manufacturing operations in China, Japan and North America but nothing in Europe, in common with other Chinese solar equipment manufacturers.

It is interesting to note that while Chinese manufacturers seem reluctant to build manufacturing capability in Europe, they have taken great strides to establish US-based operations. Leading solar module manufacturer China Sunergy recently opened an office in California and is exploring local manufacturing possibilities. However, it has no plans to establish equivalent operations in Europe.

"We will allocate additional resources in the US market and will set up our own company," said Stephen Cai, CEO of China Sunergy. "In the US we will have a different approach

Over the next 18 months, what type of firms will be amongst the most frequent international acquirers in Europe and China?



(to Europe). If successful then we will certainly consider establishing a local manufacturing presence. However, there is no need to localise manufacturing in Europe. Look at the manufacturing costs, they are significantly higher. Acquiring manufacturing assets is out of the question. There are also lots of competitors there already.”

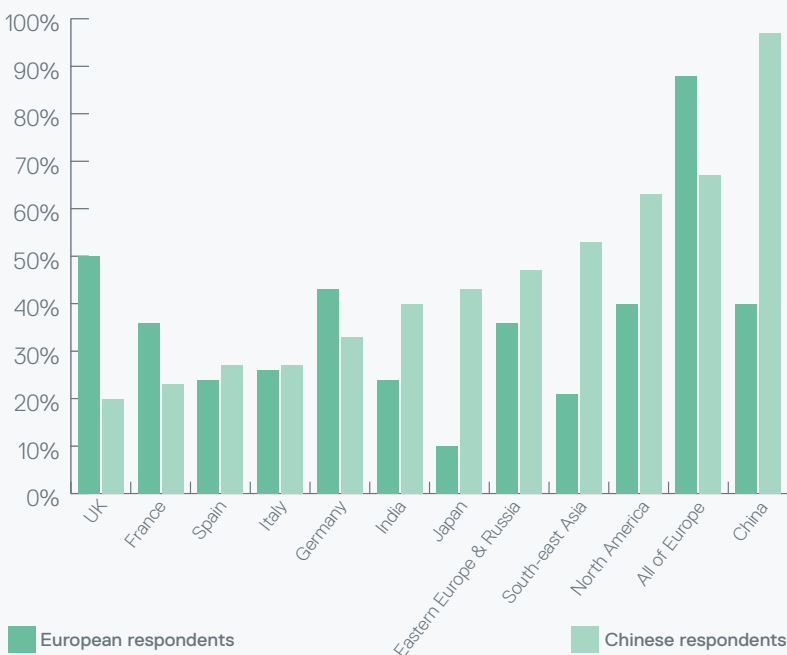
Similarly, there is little appetite amongst European respondents to establish or acquire manufacturing operations in China – a third of respondents expressed an interest in setting up manufacturing activities in China while only 6% expressed an interest in acquiring an established Chinese manufacturer. To date, no European renewable energy company has acquired a China-based manufacturer.

“I wouldn’t acquire a Chinese manufacturer,” stated Eric Bakker, CEO of EWT, a Dutch wind turbine manufacturer. “The top five are going to get the majority of the sales, but buying one of these would be very expensive. Buying a small turbine manufacturer would be suicidal as the top six utilities, who buy 98% of turbines installed in China, are forced by the Chinese government to place orders with the leading five manufacturers.”

While some European renewable energy equipment manufacturers have established production operations in China, this has been limited to the market leaders. Gamesa, for example, has a turbine manufacturing facility in Tianjin and operates ten wind farms across the country. Vestas also owns six production facilities in China. EWT has established a Chinese manufacturing presence through a joint venture with the Chinese Academy of Launch Technology, although other examples of mid-sized manufacturers establishing Chinese manufacturing bases are limited.

Some European manufacturers that have established Chinese operations are now showing signs of retreating after failing to win significant orders. For example the German wind turbine manufacturer REpower Systems, a subsidiary of Suzlon, announced in September 2011 that it will sell its 54% stake in a Chinese manufacturing joint venture with the steel and engineering company North Heavy Industry Corp, its only manufacturing operation in China. The company blamed ongoing protectionism that puts foreign

Over the next 18 months, which countries/regions will you seek to acquire/invest into?



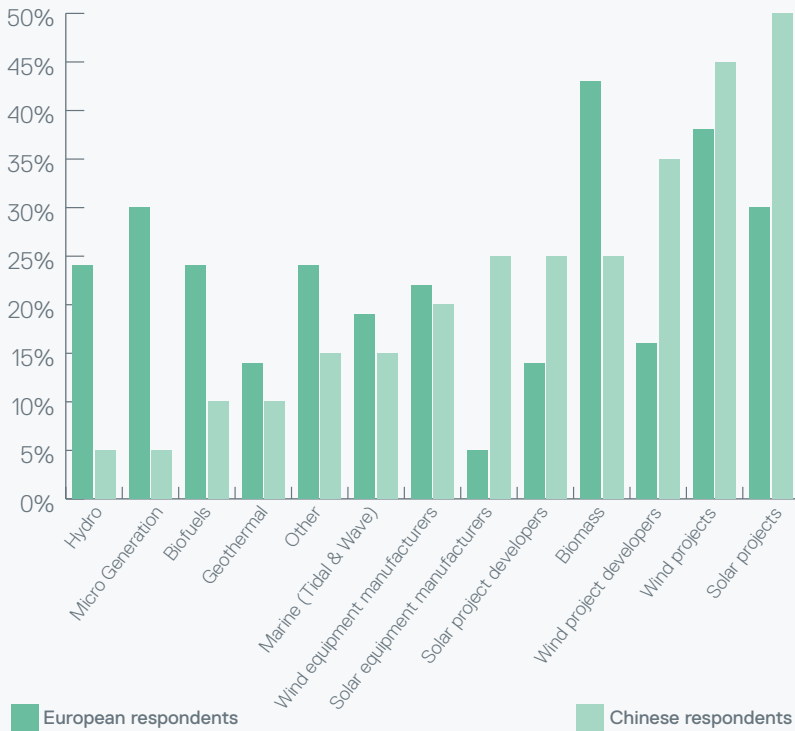
competitors at a competitive disadvantage for its failure to penetrate the Chinese market.

Chinese and European companies will rarely compete for international targets

Chinese and European companies intend to acquire and invest in very different geographical regions. Chinese companies are focusing their expansion endeavours on less mature European renewable energy regions, where there is the greatest potential for growth and relationships between manufacturers, developers and financiers are less established. They also see greater opportunities in Asian countries outside China and North America. In contrast, European respondents plan to target mature European renewable markets such as the UK and Germany and have little appetite to invest in non-Chinese Asian countries.

“The Chinese will go to where the strong onshore markets are,” said Barry Lynch, Head of Procurement & Project Delivery at Mainstream Renewable Power. “There is not a lot going on in onshore wind in the UK, there is nothing in Spain and the same is true in Germany. You will see the Chinese doing deals in growth markets such as

Over the next 18 months, which sectors will you seek to acquire/invest in within Europe?

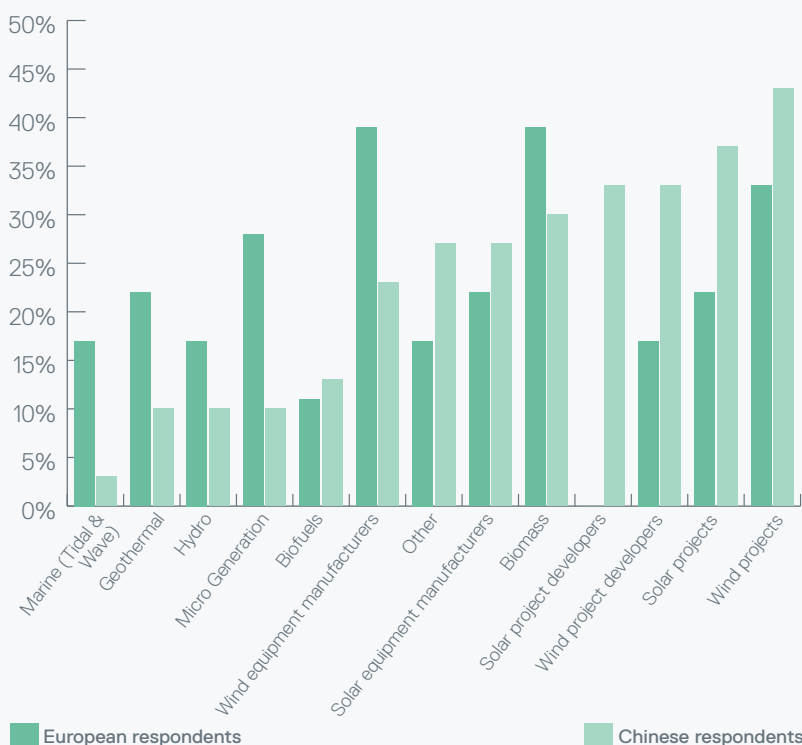


Greece, Ireland, Turkey, Romania, Sweden and Poland in the next twelve months.”

This view is shared by Chinese survey respondents, who are twice as likely to invest in growth markets in Eastern Europe and Russia as they are in the more mature European markets. Almost half of Chinese surveyed companies and investors are seeking to acquire or invest in Eastern Europe and Russia, ahead of Germany (33%), Italy (27%), Spain (27%), France (23%) or the UK (20%).

Sinovel, China's largest wind turbine manufacturer and the second biggest in the world behind Vestas, is a prime example. In April 2011 it announced a strategic partnership with the Greek state-owned utility Public Power Corporation (PPC) to develop wind farms, its first partnership of this kind in Europe. This was followed in July by the announcement of a deal with project developer Mainstream Renewable Power to supply 1 GW of wind turbines to projects built in Ireland during the next five years. Crucially, this agreement allows Mainstream access to cheap project financing from Chinese banks. In a similar deal, the Chinese wind turbine manufacturer XEMC Windpower announced in August that it is to co-develop three wind farms totalling 13.6 MW across Ireland under development by Gaelectric.

Over the next 18 months, which sectors will you seek to acquire/invest in within China?



Companies operating in the more mature European economies will not be able to rely on Chinese investment to finance their renewable energy projects. The onus will fall on European investors, who in contrast to their Chinese counterparts are twice as likely to invest or acquire in Europe as they are internationally. Europeans are also very regionally selective, which means that some European countries will not attract financing from Europe or China. The most attractive local markets for Europeans are the UK (targeted by 50% of respondents), Germany (43%), France and Eastern Europe & Russia (36%). Italy (26%) and Spain (24%) were deemed significantly less attractive.

It is interesting to note that European companies have very little interest in investing and acquiring in Asian countries outside China. Just over 20% plan to expand in south-east Asia and India, while only 10% are seeking to move into Japan.

Solar, wind and biomass are all the rage

Solar, wind and biomass are the most attractive sectors to Chinese and European companies making acquisitions in international markets. Half of Chinese respondents aim to invest in or acquire solar projects in Europe while 45% will seek to invest in wind projects. The marine, geothermal, biofuels, micro generation and hydro industries are set to be ignored – between 5% and 15% of Chinese firms plan to target these sectors.

Biomass represents China's most compelling sector for acquisitions and investments for European respondents. As explored in the "Biomass in focus" section later in this report there are significant opportunities for European biomass technology and engineering companies to supply expertise to China, which intends to install 13 GW of biomass capacity by the end of 2013. This is more than double the current installed capacity of 5.5 GW.

Interestingly, European respondents were slightly keener to acquire and invest in China's wind sector than its solar sector even though its growth potential is lower. This is because European expansion into Chinese solar will be driven by technology licensing and engineering contracts rather than direct acquisitions and investment.

It is also likely that there will be tremendous opportunities for European firms to expand into sustainable markets beyond renewable energy, the core focus of this report. Energy efficiency and pollution control are two prime examples. The need for foreign technology is driven by China's long-term economic growth plans, which place an increasing emphasis on sustainability. "China's latest seven-year plan has specified cleantech and renewable energy as one of its key themes," said Carl Griffiths, CEO of Seren Photonics. "Unlike the rest of the western world they also actually have the money to make it happen. Municipal governments pick up these plans and think 'how are we going to achieve this – which technologies do we need to bring in from outside of China?'"





Chinese expansion to Europe

Key drivers and opportunities

Heightened domestic competition and emerging European markets fuel Chinese interest

Chinese renewable energy equipment manufacturers are being pushed and pulled into European expansion. The big pull factor in Europe is the dynamic growth potential for renewable energy deployment in less mature markets in eastern and southern Europe, which have only recently introduced renewable energy incentive mechanisms and are just embarking on an extensive build-out phase. Major European players are less established in these markets, making it easier for Chinese renewable equipment manufacturers to make an instant impact.

Romania, where wind capacity grew to 469 MW as of the end of 2010 from only 14 MW at the end of 2009, is a prime candidate. In July the European Union approved its lucrative green certificate programme, which is expected to unlock substantial investment in the country's renewable energy sector. Industry experts predict that the country's wind energy capacity could reach 3.6 GW by 2015. Unsurprisingly "strong market growth potential" and "strong government incentives" were cited by 75% and 70% of Chinese respondents respectively as an important driver for European expansion.

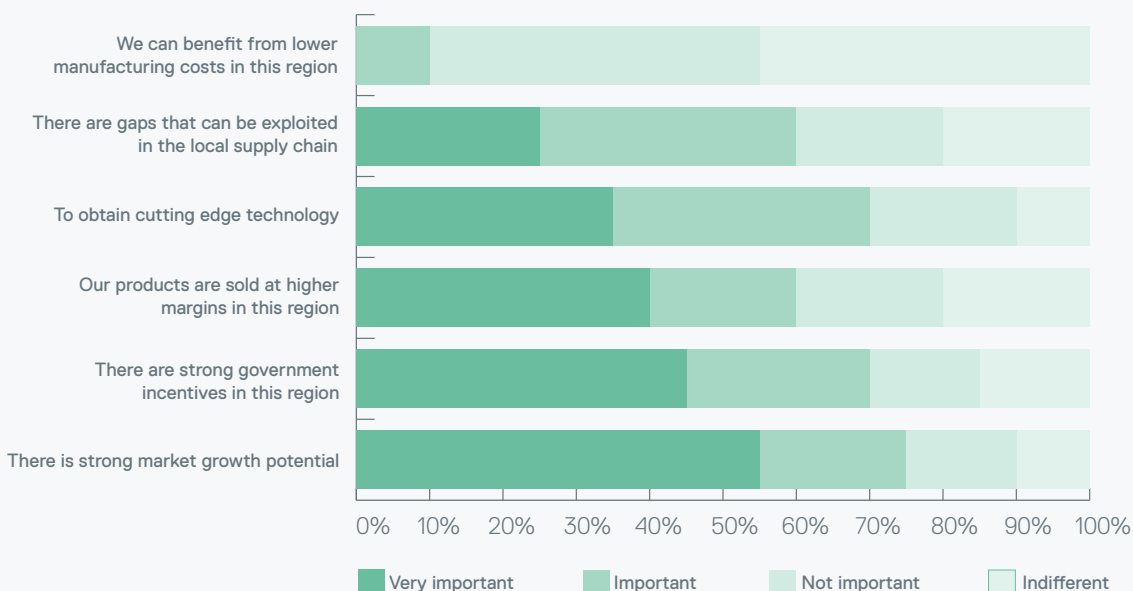
In parallel, more intense competition in the Chinese equipment manufacturing industry is

forcing domestic producers to cut costs to remain competitive, which is having an adverse effect on margins. Higher interest rates and grid connectivity issues are also weakening domestic demand. The problems are most acute in the wind sector after a massive growth spurt last year when 19 GW of capacity was brought online and China surpassed the USA as the world's largest wind energy market. This year Goldwind, the country's second largest wind turbine manufacturer, only expects moderate growth in the best case scenario, and under 15 GW of new capacity as the worst case scenario.

The dismal financial results of China's leading wind turbine manufacturers in the first half of 2011 highlights the current state of the country's wind sector. Sinovel, China's largest turbine maker, generated revenues of \$827 million in the first half of 2011, down 61% on the corresponding period in 2010. Net income fell 48% to \$103 million. Meanwhile Xinjiang Goldwind, China's second largest manufacturer, posted revenues of \$807 million in the same period, down 17% on 2010. Net income fell 45% to \$66 million.

This environment is forcing renewable energy equipment manufacturers to search for higher margins in Europe – about 75% of Chinese respondents agreed with the statement that "European expansion is important as a highly competitive Chinese manufacturing market is eroding margins domestically".

Which of the following factors are driving you to acquire/invest in European companies? (Chinese responses)



Exposure to construction-ready projects is crucial

Some 75% of Chinese respondents are looking at expanding in Europe through strategic partnerships with project developers already active there. Pre-construction phase projects allow Chinese companies to deploy their own wind turbines and solar modules in Europe. European project developers also look favourably on Chinese equipment manufacturers as they can often contribute cheap project financing from Chinese banks.

“For us it’s (forming partnerships with Chinese equipment manufacturers) three things: the lower cost of equipment, the support of financing institutions in China, and project level investment opportunities at the operational phase from Chinese utilities,” explained Mainstream Renewable Power’s Barry Lynch, who has established turbine supply contracts with both Sinovel and Goldwind, China’s top two turbine manufacturers. “We wouldn’t have won a development contract last year in Illinois if we had not partnered with Goldwind and utilised their technology and cost of energy.”

The appetite of Chinese solar equipment manufacturers to target pre-construction stage projects has increased in recent months with rising inventory levels across the supply chain, caused by

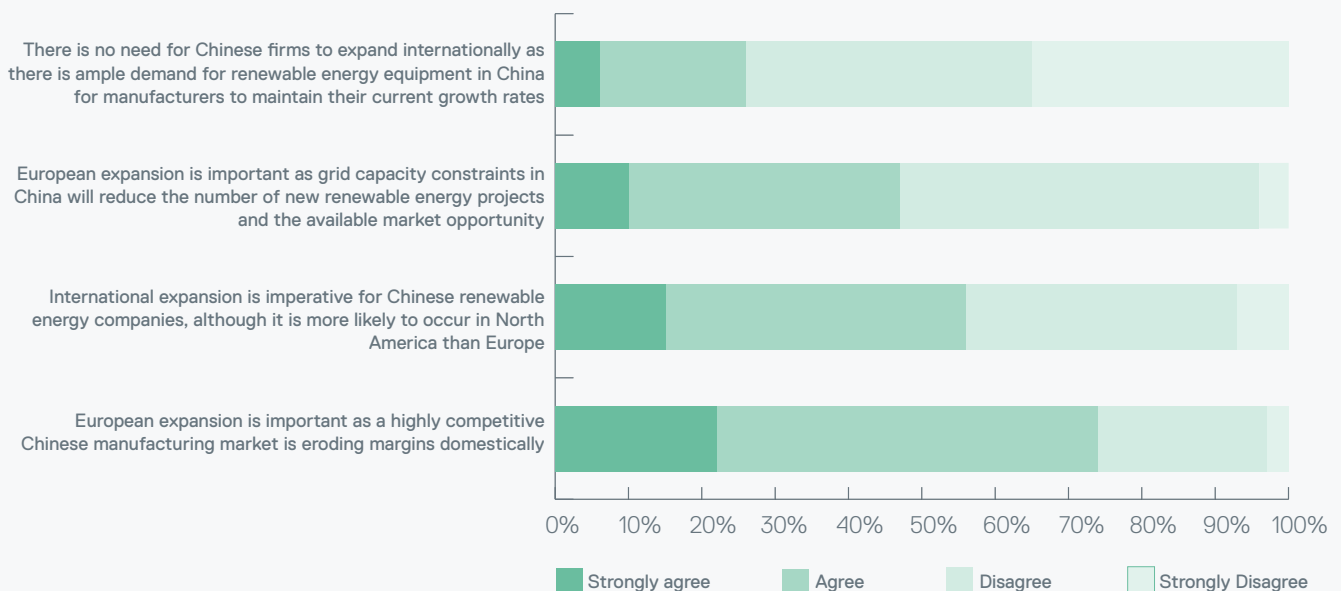
lower-than-expected demand throughout Europe and oversupply in Asia. “Mid-sized Chinese solar module manufacturers have way too much stock on their hands at the moment,” said Dirk Wassmann, Director of Epic Asset Management. “The only way to sell this is to invest in pre-construction stage projects so that they can ensure their own equipment is used. They have no interest in owning these projects for the lifetime of the feed-in tariff so will look to sell them once they become operational.”

Access to construction-ready projects in Europe is preferred to be attained through partnerships rather than acquisitions. Three quarters of Chinese respondents expressed an interest in forming strategic partnerships with project developers already active in Europe. Only 45% intend to acquire European project developers and pre-construction stage projects. This makes sense, as a partnership with a project developer provides access to a wide range of projects and ensures that development is undertaken by a partner with local expertise.

Certain Chinese utilities are targeting operational European projects

A handful of Chinese companies (15%) are also planning to enter Europe through acquisitions of or investments in operational projects. This will not be driven by equipment manufacturers, as an

To what extent do you agree with the following statements relating to the expansion of Chinese renewable energy equipment manufacturers into Europe?



operational project essentially represents a financial investment with no strategic opportunity for turbine deployment, but by Chinese utilities seeking to expand their international generation capacity. This trend is already becoming apparent. Earlier this year China Longyuan, one of the country's largest wind power producers, announced that it is seeking to amass 200-300 MW of operational and construction-stage wind capacity outside China by the end of 2011.

"You will start to see Chinese power producers entering the European wind market," said Barry Lynch. "They are looking for construction-ready and operational projects. Lots of the leading utilities have established separate renewable divisions which they have floated, so they are well capitalised."

Access to technology is also essential

To date, Chinese companies have built a renewable energy manufacturing base by manufacturing at scale and at a low cost. There has been limited emphasis on technological innovation. Now, as domestic competition heats up, leading firms are aiming to acquire innovative technology developed outside China to maintain their domestic competitive advantage.

The main sector in which this is likely to occur is wind, where Chinese turbine manufacturers are increasingly emphasising quality over quantity.

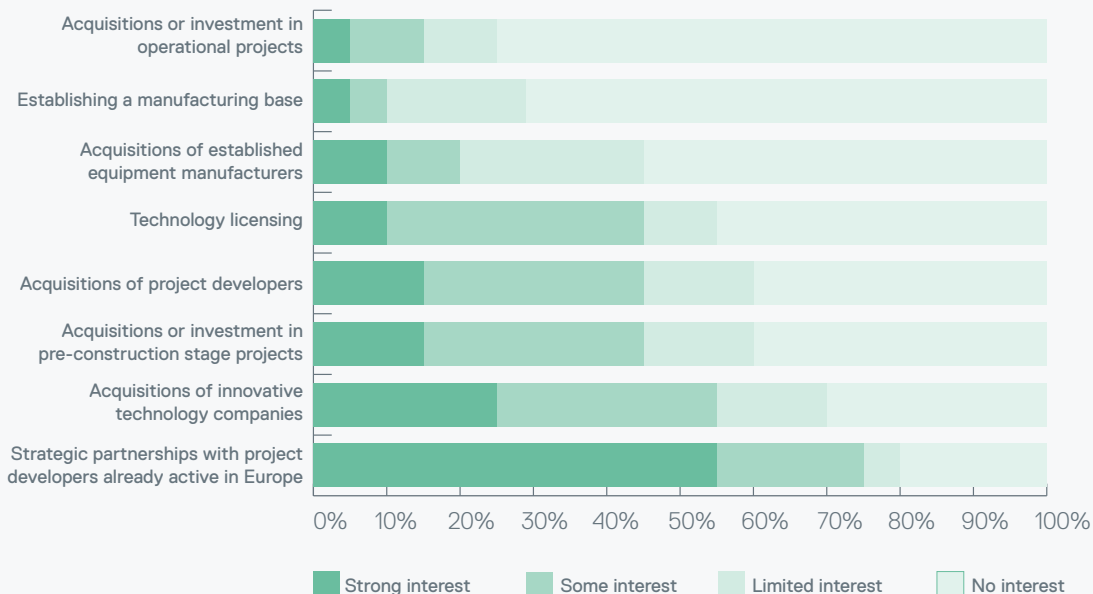
This in part stems from a series of stricter quality standards that regulators are enacting following several power outages in the northern Gansu province during the first half of the year. It is also motivated by the need to produce turbines to the standards required by western developers and to ensure that equipment can be manufactured at an ever-decreasing cost.

"The development of China's wind power industry has entered a crucial phase, where its focus is shifting from size and speed to quality and efficiency," said Chuanwei Zhang, CEO of China's fifth largest wind turbine manufacturer Ming Yang in its 2011 second quarter earnings review. "In the past three years, Ming Yang has laid a solid foundation by focusing on quality product development and R&D."

Whilst Chinese wind turbine manufacturers acknowledge the need to incorporate more sophisticated technology into their turbines, it is unclear whether this will be achieved by acquisitions, technology licensing or by technology development themselves. Over half of Chinese respondents were interested in acquiring European innovative technology companies. However to date, most Chinese renewable energy companies have gained access to European technology through purchasing manufacturing equipment or via licensing technology as opposed to direct acquisitions.



Over the next 18 months, which of the following initiatives will your company adopt to facilitate expansion into Europe? (Chinese responses)





European expansion to China

Key drivers and opportunities

China is recognised as one of the world’s fastest growing renewable energy markets. It overtook the USA as the world’s largest wind market by installed capacity last year and has set ambitious targets for solar, biomass and energy efficiency. It is therefore unsurprising that 78% of survey respondents cited “strong market growth potential” as an important driver behind Chinese expansion. As Carl Griffiths of Seren Photonics noted: “China is by far and away the biggest and fastest growing market in this area. Ten years ago we would have tried to sell into North America but not now. China is currently the growth market.”

Strong incumbents limit opportunities for Europe

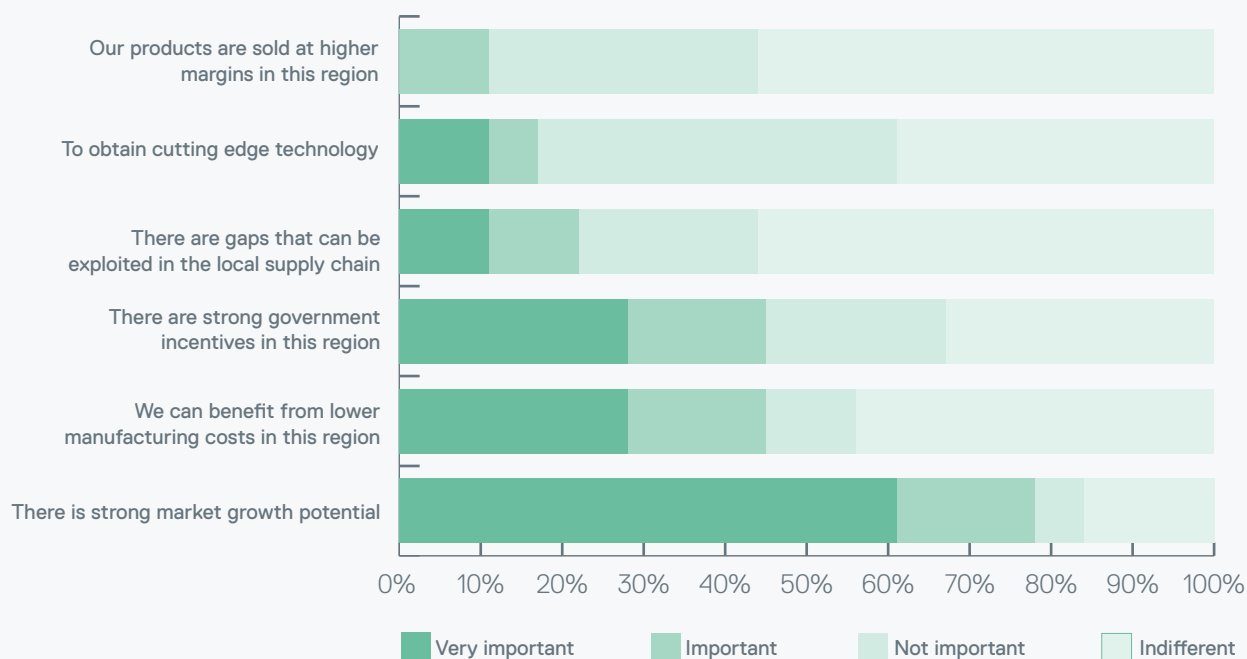
The issue for European companies is that there are numerous Chinese project developers that have already established a strong domestic market presence. European project developers have little chance of competing with Chinese project developers, many of which are subsidiaries of large state-owned enterprises. “It’s a hard place to develop as there are a lot of established players there,” stated Barry Lynch of Mainstream Renewable Power. “We don’t see an

opportunity for us to develop onshore in China. If you weren’t there four to five years ago then it’s very hard to enter now.” Surveyed respondents agree – over 60% of European respondents have no interest in acquiring Chinese renewable energy projects and 89% have absolutely no interest in acquiring Chinese project developers.

Licensing – the greatest opportunity but fears remain over IP protection

Technology transfer represents the greatest opportunity for European companies to tap into China’s burgeoning renewable energy market. Indeed, half of European respondents will seek to facilitate European expansion through technology licensing. As outlined earlier, Chinese renewable companies have historically focused on scaling manufacturing operations as rapidly as possible, investing minimally in technology development. “There is little technology evident in China,” said Hamish Curran, CEO of the biomass to biofuels technology developer TMO Renewables. “Our main competitors are in the US where historically there has been the greatest demand for this type of technology. Demand is increasingly growing in China due to concerns over energy security.”

Which of the following factors are driving you to acquire/invest in Chinese companies? (European responses)



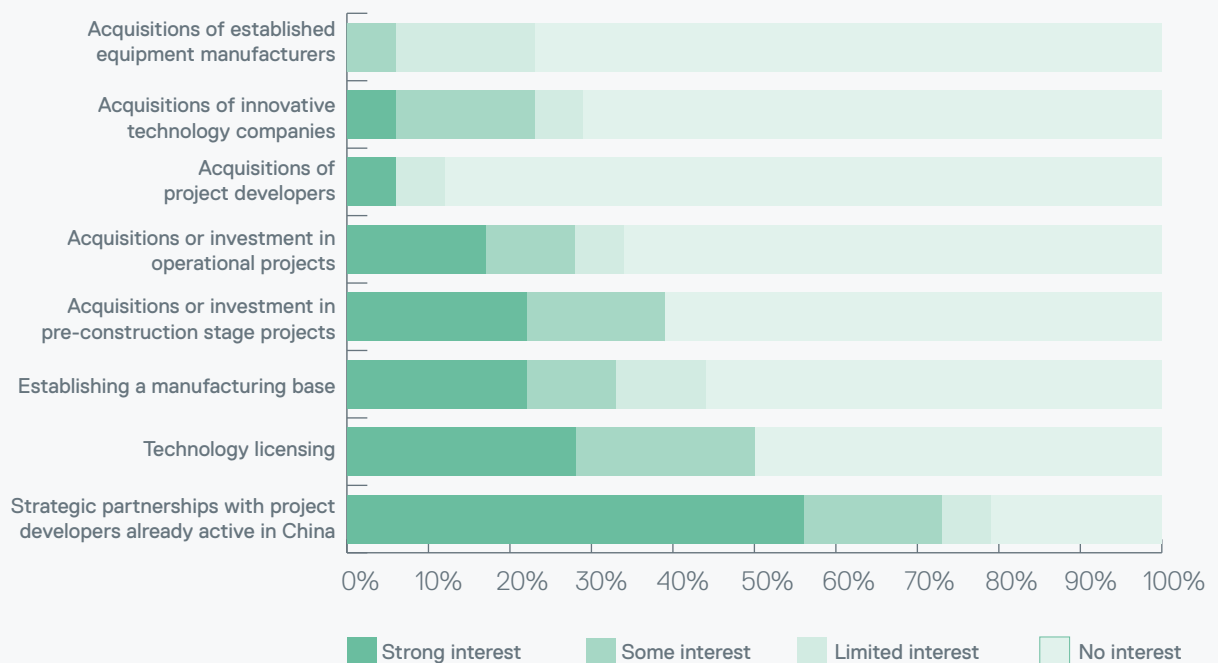
The conventional licensing approach offers tremendous advantages, particularly to relatively early-stage European technology developers. The age-old concern for European licensors surrounds the loss of control of IP, of which there have been many instances in the past. However, the growing maturation of China's renewable energy industry means that multinational, and in many cases state-owned companies, are seeking to license European technology. These entities appear less likely to exploit IP than smaller private corporations.

Hamish Curran summarises the mindset of a relatively early-stage European renewable energy technology company that is seeking to license to China: "The traditional concern is 'will my IP get nicked if I license to China?' There are many instances where that has happened although we are not particularly concerned. Anyone could copy a widget but when you are licensing a complex biotech process – that is difficult to rip off. We are engaging with some of the biggest state enterprises. They are interested in promoting the well being of the whole of China, not in ripping off a foreign company. The political will is there to work with foreign firms."

Concerns amongst European companies considering licensing technology to China will have been exacerbated by the announcement in September that American Superconductor, a US supplier of power components to the global wind industry, is pursuing legal action against Sinovel, its largest customer, over the alleged theft of certain intellectual property. American Superconductor claims that senior Sinovel employees have stolen IP that enables them to upgrade their 1.5 MW wind turbines to meet new Chinese grid codes and potentially to integrate core electrical components from other manufacturers, allegations which Sinovel denies.

Even if these concerns are overcome, many industry stakeholders doubt that a pure licensing arrangement will satisfy the desires of Chinese companies. "They (Chinese companies) don't license in technology as they have no concept of the value of IP," said Carl Griffiths. "They don't understand why we do not manufacture in Europe. The way to get technology into China is through entering into a joint venture with a local partner, where the technology provider contributes IP and the manufacturing partner contributes capital."

Over the next 18 months, which of the following initiatives will your company adopt to facilitate expansion into China? (European responses)



Joint ventures of this kind offer other advantages. As Carl Griffiths explains: “There are many local incentives to set up manufacturing operations. The municipal government will cover 50%-70% of capital expenditure and 50% of electricity bills for a number of years. It will also assist with land acquisition and employment. The central government is very concerned about keeping employment high. Licensing technology doesn't help with that but manufacturing certainly does.”

Cross-border project financing hindered by local market dynamics

To date European banks have been relatively apprehensive about providing debt to Chinese renewable energy projects. From the perspective of European banks the main issue surrounds the way in which projects are developed in China, which puts more risk on the developer and financier in comparison to Europe.

“It is a relatively open market, although the major challenge is that the business practises and attitudes towards risk management are very different,” stated Simon Parker, CEO of the biomass solutions provider DP Cleantech. “For example, in China you are expected to conduct initial engineering work before you have a contract in place. European investors are not used to this. The time pressure from contract to operation is often considered not possible in a European context.”

European banks confront the same problems with respect to solar projects. “In China you have to build a project, connect it to the grid and only then can you start negotiating for a feed-in tariff,” said Gino Van Neer, CEO of Enfinity APAC. “In Europe you know what the feed-in tariff is before you start developing. This is hard for foreign developers and investors to accept.”

Another factor limiting project financing flows from Europe to China is the inability or unwillingness of Chinese developers to provide banks with the granular level of information necessary for comprehensive due diligence to be undertaken.

“We are aware of a number of Chinese projects for which foreign project debt and equity is very welcome,” said Simon Parker. “However foreign banks are not yet satisfied with the level of due diligence on technology, equipment, feedstock and EPC contracting that Chinese counterparts are used to.”

Despite the current differing attitudes to risk mitigation, half of all survey respondents believe that project financing flows from Europe to China will increase over the next 18 months – only 14% expect a decrease.

“Foreign banks and the industry are maturing, project financing is becoming more prevalent but is still more the exception in China where balance sheet lending from large corporates for smaller infrastructure projects is the norm,” Simon Parker argued. “Over time we will see a convergence in the attitudes towards risk from Chinese and European banks, which will result in more lending between the two regions.”





Sectors in focus

Solar

While China is the world's largest manufacturer of solar equipment, the country's volume of installed solar power capacity is surprisingly low. Only 860 MW of solar capacity had been installed as of the end of 2010, compared with 280 MW a year previously. The Chinese central government is keen for solar to account for an increasingly higher proportion of the country's power mix. In March 2011 it announced its latest five-year plan for the period between 2011 and 2015, which called for 5 GW of solar capacity to be installed by 2015, a target that was later doubled in the aftermath of the Fukushima nuclear disaster.

Due to the relatively small number of operational solar projects in China, the main area where European companies will be able to partake in China's rapidly growing solar market is the provision of project development expertise. This is exactly what the European project developer Enfinity did when it jointly built China's first 10 MW solar PV array in 2009. "Chinese companies can do the procurement and construction themselves but at the moment they still need foreign expertise in plant design and engineering and in the actual operation of solar farms," said Gino Van Neer of Enfinity APAC. "The Chinese have never really operated solar projects and Europe has a lot of expertise in monitoring the performance of farms. In this regard there are still opportunities for Europeans to form joint ventures with Chinese companies to bring solar farms online."

Nonetheless, the opportunity for European specialists to participate in China's solar market in this way may be short-lived. Gino Van Neer outlined the reality of the situation: "At the beginning the Chinese needed technical assistance from Europe to install solar projects. China will soon become the biggest solar market and as the industry grows the window of opportunity for overseas participants will close. The spirit in China is to do everything themselves."

This type of partnership is already starting to materialise. By way of example, in September 2011 leading Chinese utility Dongfang Electric Corp established a partnership with the Spanish solar PV equipment manufacturer and project developer Solaria. Together the two companies will seek to bring online 100 MW of solar capacity

across Asia annually over the coming years. As part of the deal Dongfang will also provide Solaria with a \$30 million credit line to acquire solar cells and other necessary equipment.

It is also unlikely that European investors will have any opportunity to provide project financing to Chinese solar farms as there is a sufficient number of well capitalised domestic debt and equity providers. "To be brutally honest a debt-laden Europe has little to offer or teach China about financing," said Hamish Curran of TMO Renewables. "CNOOC, which is one of our customers, just spent \$2.5 billion on acquiring Canadian oil fields. These are well capitalised companies."

Chinese firms have little incentive to invest in European expansion, primarily as they are already well established and regard Europe as their largest market. For this reason, acquisitions or partnerships at the project development stage that are starting to take place in wind are unlikely to occur in solar. "Chinese solar manufacturers went global a number of years ago and are already established, so there is less motivation for them to enter into these types of deals," said Barry Lynch. "In three years Chinese wind turbine manufacturers will have reached this stage."

If anything, Chinese solar equipment manufacturers are likely to regard themselves as over-exposed to Europe's major solar markets and may elect to invest more in other growth markets such as North America. Nearly every leading Chinese company in the solar supply chain downgraded its earnings forecast during July due to lower-than-expected demand in Germany and Italy. Virtually no solar projects were built in Italy in March and April due to uncertainty surrounding feed-in tariff revisions. In Germany analysts now predict a mere 2.8 GW of new solar capacity will come online this year, compared with 7.45 GW in 2010. For Suntech, which is China's largest solar power equipment producer, European revenues as a percentage of total sales have fallen year-on-year since 2009, accounting for 74% of total revenues in 2009, 66% in 2010 and 53% in the first half of 2011.



Wind

In total contrast to solar, China's wind energy industry has already reached a critical mass in terms of installed capacity. As stated earlier, China reached installed wind capacity of 41.8 GW by the end of 2010, dramatically more than 860 MW of solar capacity and the 5.5 GW of biomass power capacity as of the same time.

In comparison with solar, there are no opportunities for European engineering and project development firms to offer development expertise to Chinese wind farm developers. The only area in which European companies may be able to access China's wind market is through exporting innovative technology. Poor turbine quality has been blamed by some in the industry for the recent slowdown in China's wind installation levels.

"Wind capacity installation will be down about 20% this year. It's mainly because of financing problems, interest rates have been increased and there is a general move to being more cautious," said Jukka-Pekka Mäkinen, CEO of The Switch. "There are also technical problems. Last year the emphasis was on getting units in the field, which has resulted in some problems with power quality and product quality. Focus is now being put on quality rather than quantity, which is slowing things down. There are opportunities for European companies due to this. Not many Chinese companies have shown the ability to build quality products, especially not at quantity."

Opinion is divided as to whether Chinese turbine manufacturers will respond to the need for greater technology through acquiring or licensing innovative technology. Some 70% of Chinese survey respondents said that the need to obtain cutting edge technology was an important factor behind acquisitions or investments in European companies. However, Eric Bakker, CEO of EWT, is a firm believer that the Chinese will take the less costly route of importing technology from the western world via licensing as opposed to acquisitions. "They need new innovative technology," he stated. "Once they have it they are good at getting it to scale but they are not good at creating new technology. Give them three to five years and they will."

While the opportunity for European companies to access China's wind market seems to be limited to technology licensing, China looks to be much better positioned to tap into Europe's wind energy market. As explained earlier in this report, China's expansion into Europe will be driven by renewable energy equipment manufacturers gaining access to pre-construction phase projects in emerging European markets, and utilities acquiring operational projects.

"There will be more acquisitions in the future," said Jukka-Pekka Mäkinen. "The Chinese are seeing the success that the Japanese have had in getting boots on the ground in international markets. It will be driven by both Chinese utilities acquiring projects worldwide and equipment manufacturers responding to domestic overcapacity."

There are however questions over whether China will turn to Europe first or look elsewhere when considering international expansion. "There is a huge incentive for Chinese turbine manufacturers to sell outside of China as the margins are much higher and there are export incentives," said Eric Bakker. "The Chinese like a large market opportunity. North America provides them with this platform. Europe also does so but to a much lesser extent."

Biomass

Although Europe is home to some of the world's largest biomass markets, the sector has failed to achieve its true potential due to issues surrounding feedstock supply. This issue is particularly pertinent to larger-scale facilities, which need a continuous supply of feedstock. Despite China being behind Europe in its installed biomass capacity, many industry observers believe China will be the first to surmount the issue of feedstock uncertainty. "There is an immense amount for us to learn from China," said Hamish Curran. "The inbound supply chain in the biomass sector is a problem that is yet to be solved in the west. They have a more immediate feedstock source in China, so it is likely that the first refinery-scale facilities will be built there."

In July the Chinese government announced that over the next five years it will increase subsidies for biomass power plants to attract more project developers into the country. The country aims to install 13 GW of biomass capacity by the end of 2013, more than double the current installed base of approximately 5.5 GW.

"The environment in China is healthy and maturing," said Simon Parker. "The decision was taken some years ago by the central government to grow the biomass industry. In the first phase of growth there wasn't enough control in terms of issuing licences, it was something of a land-grab for developers. Some developers secured licences without having financial backing so many projects never got built. In some cases they got built but used the wrong or inadequate technology and resources resulting in poor economic returns. Since then the government has increased incentives for biomass power and are regulating licensing more heavily to ensure that there isn't an undersupply of feedstock. This is a positive development as it will lead to sustained growth in the long term, although there may be a slowdown in the short term."

This represents a compelling opportunity for European biomass firms. "The potential for foreign firms to participate in China's biomass market is definitely there," said Simon Parker. "There is potential for foreign investors to take ownership interests in and control of biomass power plants and for firms to export technology, equipment as well as design and engineering expertise to China."

A number of foreign companies have already stated their intent to invest in China's biomass industry. In May 2011 Itochu announced it will purchase Chinese biomass fuel facilities as part of a \$5.6 billion investment programme in the country's energy and natural resources sector. European companies will almost certainly follow in their footsteps once China's central government has clarified its incentive mechanisms.

Chinese firms have yet to invest in Europe's biomass sector. Industry players expect this to change very soon. As Hamish Curran notes, "I expect that (Chinese firms investing/acquiring into the European biomass/biofuels sector) to happen, not because I am privy to any pending deals but because I am an oil man and have done deals in this sector for decades. I know that the Chinese like to invest in resources and technology that furthers energy security. Some of the opportunities they invest in will be for repatriation to China, although they will also invest for profit."



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