

Alternative energies in China: Which way will the wind blow?

INDUSTRIAL MARKETS

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Message by Nelson Fung and Andrew Thomson

KPMG in China and Hong Kong SAR is proud to be continuing its thought leadership series with an analysis of the market for alternative energies in China. We have seen growing interest in this subject among our clients, especially over the past 12 months. This comes against a backdrop of increased discussion around environmental and sustainability issues in public and private sector organisations around the world.

China's sheer size and rate of economic growth present formidable environmental challenges, which are now high on the government's agenda. The level of activity in the alternative energy space has intensified, and this has implications for both inbound and outbound investors. One example of this is China's wind power generating capacity, which doubled during 2006 and is set to grow at an equally dramatic rate over the next three years. Although still a small contributor to China's overall energy needs, energy production from alternative sources is now reaching levels comparable to those in Europe and North America.

Similarly, the government's commitment to alternative energy now provides incentives for investment, including research and development, into new technologies. This is driving the growth of domestic alternative energy companies, some of which are already at the leading edge and competing globally.

International oil and coal companies are also taking alternative energy seriously and investing heavily. This is not just a public relations exercise. They are not only seeing commercial opportunities, but also opportunities to diversify their asset portfolios. Investment in alternative energy sources can help to reduce exposure to oil and gas price volatility and stimulate investment in new areas around the world.

We hope our findings in this short report help you to understand better the significant changes that are taking place in China's alternative energy sector. As always, we will be delighted to receive comments on this paper.

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Introduction: In search of alternatives

China, like many other large industrial economies around the world, relies heavily on coal to meet its energy needs. Coal currently accounts for just under 70 percent of all energy consumed in China, and even under the most optimistic of scenarios this figure will only drop to below 60 percent by 2030.

Its role, however, is coming under review. In his speech opening this year's National People's Congress in early March 2007, China's premier, Wen Jiabao, stressed the need for the country's development to be increasingly green. While underlining that current policies aimed at maintaining a strong overall growth rate would be maintained, he made a clear-cut call for different ways of fuelling national development, saying: "We must make conserving energy, decreasing energy consumption, protecting the environment and using land intensively the breakthrough point and main fulcrum for changing the pattern of economic growth."

While not new, Wen's words have an added urgency, derived from the fact that China is currently struggling to meet two of its core energy-related goals — to improve its energy efficiency by cutting energy consumption per unit of GDP by 20 percent between 2006 and 2010, while simultaneously cutting its emission of major pollutants by 10 percent over the same period. Last year, it missed its targets on both counts: its energy consumption per unit of GDP dipped just 1.23 percent instead of the planned 4 percent, while its emissions of pollutants rose instead of falling.¹

As a result, the alternative energy sector, which has been developing in China over recent years, is set to grow in importance.

This paper considers the contribution of alternative energy sources, principally wind power, which is likely to emerge as by far the most important alternative source of energy between now and 2030. It also looks at solar energy, in which some Chinese companies are emerging as major players, and the biofuels sector, which the government has targeted as a significant source of fuel for vehicles over the same period.

China's energy consumption, 1990-2005

	Total energy consumption, (Million tonnes of standard coal equivalent)	Coal (%)	Crude oil (%)	Natural gas (%)	Hydro, nuclear & wind power (%)
1990	987	76.2	16.6	2.1	5.1
1995	1,311	74.6	17.5	1.8	6.1
2000	1,386	67.8	23.2	2.4	6.7
2005	2,233	68.9	21.0	2.9	7.2

Source: National Bureau of Statistics²

¹ "China sure to meet energy saving targets by 2010: official," *Xinhua News Agency*, 26 March 2007

² China Statistical Yearbook 2006, page 261

Renewable options

China's goal is for 15 percent of the country's primary energy to come from renewable sources by 2020, up from 6 percent in 2006. Aiding the development of both wind and other alternative energy sources is China's Renewable Energy Law, which came into effect on 1 January 2006. The law includes hydroelectricity, wind power, solar energy, geothermal energy and marine energy as renewable energy sources, and sets out a detailed plan for the development of each of these sectors across the entire country.

A large part of both its current and envisaged renewable energy will come from hydropower and nuclear energy, and of these, hydro will remain the most important for a long time to come. Currently, China has more than 100 gigawatts of hydro generating capacity installed, and by 2020 it aims to have trebled this figure to 300 gigawatts.³ Its nuclear installed capacity is now just 7 gigawatts, with plans to raise this to around 40 gigawatts with the construction of 30 new plants by 2020.

Neither hydropower nor nuclear power, however, are regarded as truly renewable sources — nuclear power, due to the problems of storing the radioactive waste it produces, and hydropower because of the impact large dams have on their immediate environment. For true alternative sources of power — ones that are carbon-free and environmentally sustainable — China is looking principally towards wind and, to a lesser extent, solar power. For vehicles, it is looking for biofuels to play a key role.

These sectors were given a substantial boost in May 2006 when the Ministry of Finance published a set of "Interim Procedures for the Management of the Special Development Fund for Renewable Energy Resources", by which companies can apply for financial support to develop projects using wind, solar, hydro, biomass, geothermal or ocean energy.

The Renewable Energy Law will be supplemented by an Energy Law, expected to be issued some time in 2007, which will set targets and incentives aimed at further encouraging the use of renewable energy sources by placing them in the framework of a national energy policy. It appears likely that the incentives will include financial ones for renewable sources, including giving them priority for dispatch into the country's power networks.



³ "Chinese hydropower to see installed capacity up 80 pct by 2010", *Xinhua News Agency*, 26 November 2005

Wind power

In the long term, estimates of China's wind potential are around two-and-a-half times its hydropower capacity — as the table below makes clear.

China's leading renewable energy sources

Source	Potentially exploitable	End 2006	Target 2010	Target 2020
Hydro	400 GW	100GW	160GW	300GW
Wind	1,000 GW	2.6GW	8GW*	30GW
Solar	NA	0.06GW**	NA	1GW

* Revised up from 5GW in January 2007.

** End 2004

NA = Not applicable

Source: China Economic Quarterly, Global Wind Energy Council⁴

By 2020, China will have already exploited around three-quarters of its hydropower potential. Beyond that point, the viability of developing further hydro facilities may start to diminish, as the remaining potential capacity will be in more remote locations. Over time, it is likely that wind power will be the energy source creating the most excitement, some of which is being felt today.

So far, however, although China is both one of the world's leading wind power generators and one of the fastest installers of new wind generating capacity (see tables), its wind energy generation contribution is tiny compared with that from coal or hydropower. Even by 2020, wind will not be a major source of energy — likely generating just 10 percent of the electricity coming from hydropower. However, to focus on how small a share this will represent would be to miss some important points.

For example, wind power receives particularly privileged treatment under China's Renewable Energy Law. Large-scale generation projects — those with a capacity of more than 100 megawatts — receive substantial central government support. Customs tax and value-added tax is waived on imported equipment, and operators have the right to agree long-term power purchase agreements with their local power grid, thus guaranteeing them revenues.

If China's target capacity of 30 gigawatts for 2020 is reached, its domestic industry will likely have reached a scale where it is a major player on the world stage. Certainly, the government hopes so. Already it insists that 70 percent of wind generating equipment must be manufactured in China, either by domestic or foreign-invested companies. These companies will get a big boost over the next four years — from 2007 to 2010 — as China plans to invest more than RMB 40 billion (about USD5 billion) in increasing its wind power generating capacity. The National Development and Reform Commission announced in January 2007

⁴ China Economic Quarterly, Q4 2006, page 35; Global Wind Energy Council, "Global wind energy markets continue to boom — 2006 another record year," 2 February 2007

that its target for installed wind capacity would be raised to 8,000 megawatts, from its previous 5,000 megawatts. Already, installed capacity more than doubled in 2006, from 1,347 megawatts at the start of the year, to 2,604 megawatts by the end.⁵

Growth in the Chinese wind industry will almost certainly bring with it a drop in the costs of wind generated electricity, as new technologies and economies of scale kick in. Already, wind generated electricity costs have dropped to around the same as those for nuclear power and natural gas — although, in China, this is still about twice the cost of electricity produced in one of the country's typical coal plants.

Wind power's biggest drawback is its unpredictability, and the fact that China's power grid has not yet been fully set up to handle an energy source that comes and goes, depending on whether the wind is blowing or not. In environments where alternative energy has been on the agenda for longer, power grids have established the necessary mix of energy sources that can counterbalance fluctuations in wind power output. A further consideration, points out James Brock, an independent energy consultant based in Beijing, is the fact that maintenance demands are heavy, meaning that it is largely operational issues that have replaced technological questions and installation costs as the major question marks over the widespread adoption of wind power.

Wind generating capacity installed, end 2006

	Megawatts	Share of world total, %
Germany	20,622	27.8
Spain	11,615	15.6
US	11,603	15.6
India	6,270	8.4
Denmark	3,136	4.2
China	2,604	3.5
Italy	2,123	2.9
UK	1,963	2.6
Portugal	1,716	2.3
France	1,567	2.1
Rest of the World	11,004	14.8
World total	74,221	100.0

Source: Global Wind Energy Council⁶

New wind generating capacity installed in 2006

	Megawatts	Share of world total, %
US	2,454	16.1
Germany	2,233	14.7
India	1,840	12.1
Spain	1,587	10.4
China	1,347	8.9
France	810	5.3
Canada	776	5.1
Portugal	694	4.6
UK	634	4.2
Italy	417	2.7
Rest of the world	2,405	15.8
World total	15,197	100.0

Source: Global Wind Energy Council⁶

⁵ "China to invest over 40 bln yuan in tripling wind power generation by 2010" AFX Asia, 14 January 2007

⁶ Global Wind Energy Council; "Global wind energy markets continue to boom – 2006 another record year"; 2 February 2007

Solar power

Solar energy has enormous potential in China, but because the technology is still in its infancy compared to wind or hydro, it is difficult to make realistic estimates about its future contribution to total generation. What seems certain, however, is that its potential is more likely to be realised at a very local level, particularly in rural areas.

China's government has a rural electrification programme aimed at bringing electricity to some 20,000 villages in the west of the country, which are not connected to any power grid, by 2010. Solar generation will play a major role in this, but even so, this programme will only add around 1 gigawatt of generation capacity to China's total — which by 2010 is expected to have reached some 840 gigawatts.⁷

Currently, solar energy is a lot more expensive to generate than coal or wind power. Solar energy installation costs are around USD 5,000-6,000 a kilowatt — four or five times as much as for coal-fired generation.⁸

Cost, however, is not the only obstacle to solar power's development. China lacks any detailed implementing regulations governing how owners of photovoltaic cells can sell power to grid operators. Until such rules are in place, solar energy is likely to remain unviable in anything but small stand-alone operations.

As a result, most solar energy companies in China are primarily focused on the potential of the export market. For example, Suntech Power, China's best-known manufacturer of photovoltaic cells, sells more than two-thirds of its output overseas (see case study, below).



Suntech Power

Suntech Power is one of China's most famous renewable energy companies. Launched in 2002 to manufacture photovoltaic cells, it listed on the New York Stock Exchange in December 2005, when it raised just under USD 400 million by selling 26.38 million American Depositary Receipts (ADRs).

Its founder and CEO, Shi Zhengrong, on paper at least, was the richest man living in China in 2006, with a net worth of USD 2.2 billion, according to *Forbes* magazine's list of the world's richest people.⁹ Shi studied in Australia, gaining a doctorate in electrical engineering at the University of New South Wales, and taking Australian citizenship, before returning to the country of his birth to set up Suntech.

Based in the city of Wuxi in the eastern province of Jiangsu, Suntech had a market capitalisation of around USD 6 billion in early February 2007. Its revenues in 2006 were USD 599 million, with a net income of USD 35.5 million. The company claims to have an 8 percent share of the global market for photovoltaic cells.¹⁰

In 2007, the company plans to produce generating units with a total capacity of 280 megawatts. However by 2010, its production capability is set to rise to 1,000 megawatts. At that point, its capacity will be more than seven times greater than at the time it listed in 2005. Most of that capacity is exported, with approximately 68 percent going to Europe and 5 percent to the United States.¹¹

⁷ National Renewable Energy Laboratory; "Renewable Energy in China", April 2004. "China eyes 840 GW power capacity by 2010: Xinhua", *Reuters News*, 17 February 2007.

⁸ William Wallace, a senior technical advisor at the China project management office for the United Nations Development Program and Global Environmental Facility, reported in "China solar power industry grows, but exports overshadow home market", *AFX News*, 8 February 2007

⁹ <http://www.forbes.com/lists/2006/10/EP46.html>

¹⁰ "Suntech Power eyes 15 pct of global market by 2010," *Xinhua China Economic News Service*, 10 May 2007

¹¹ Jeffries & Company, Inc; "Suntech Power Hldgs", 14 December 2006

Suntech is not the only Chinese solar power company listed in the United States. Solarfun Power Holdings, a photovoltaic cell maker headquartered in Shanghai, listed on Nasdaq in December 2006, and JA Solar Holdings, also a maker of photovoltaic cells based in Hebei province, listed on Nasdaq in February 2007.

BP has a 49 percent stake in a joint venture with China Xinjiang SunOasis, a company based in the far western city of Urumqi, to make and sell photovoltaic products in China. Set up in December 2005, its initial planned output was to produce photovoltaic cells with a total capacity of 25 megawatts annually. However, plans are already in place to increase this.

China's solar power production capacity, megawatts

	Solar panels Megawatts	Solar cells Megawatts
2002	81	24
2003	223	45
2004	524	87
2005	1,495	360
2006	2,832	1,355

Source: ENF.cn

China's leading solar power manufacturers

	Number of Staff	Megawatts (peak) sold in 2005
Suntech Power	1,381	49.8
Kyocera (Tianjin)	300	36
Ningbo Solar	500	20
Shanghai solar	400	20
Chaori Solar	220	15
Yuhui Solar	300	15
Yingli Solar	976	13
Topray Solar	600	11
Tianda Photovoltaic	300	10
Jumao Photovoltaic	300	10

Source: ENF.cn

Biofuels

China has ambitious goals for its biofuels industry — wanting it to meet 15 percent of its transportation energy needs by 2020. Reaching this target, however, will present challenges. In 2005, ethanol production was 920,000 tonnes and biodiesel less than 200,000 tonnes, while its 2020 goal will call for a combined ethanol-biodiesel output of 12 million tonnes.

Production is, however, growing. Under its current biofuel programme, as plants now under construction come on stream, ethanol output is set to rise to 4 million tonnes by 2010, and biodiesel should reach 2 million tonnes. The China National Petroleum Corporation (CNPC) has vowed to step up its production of biological ethanol and diesel and has signed cooperation agreements with biological energy

producers in Yunnan, Sichuan and Shandong provinces. The China National Cereals, Oils and Foodstuffs Corporation (COFCO) has formed an alliance with the State Forestry Administration, to develop biofuel facilities, while Sinopec has established a biological material and fuel research centre in Jiangsu province.¹²

The sector, however, is not without its controversies. To encourage its development, the finance ministry has said that the government will subsidise ethanol and biodiesel producers if oil prices fall below biofuel production costs.¹³ More recently, officials have also begun voicing concern over the stress growing the industry could place on China's already heavily used farm land, and the threat increased demand for corn could put on both the country's food supply and its cost.

At the end of 2006, China's official English-language newspaper, *China Daily*, quoted Zhai Huqu, the president of the Chinese Academy of Agricultural Sciences, as saying: "It would be a disaster for us if we depend on a huge amount of corn and other grains for energy."¹⁴ His comments were echoed by a vice finance minister, Zhu Zhigang, who emphasised that the government would impose strict controls on any biofuel project that used grain as its raw material.¹⁴

Currently, more than three-quarters of China's ethanol output is sourced from corn, with the remainder coming from wheat and sorghum.¹⁵ There are alternatives, among them rape-seed oil, which could be planted in the off-season across much of central China, as well as imports of fuel ethanol from other countries, particularly Brazil, the world's second biggest ethanol producer after the United States.

Chinese companies are also starting to look for biofuel ventures off-shore. In January 2007, China National Offshore Oil Corporation (CNOOC), the country's leading off-shore oil producer, was reported to be planning to invest USD 5.5 billion in an Indonesian project to produce biodiesel from palm.¹⁶

Until recently, the Chinese government had closely regulated all biofuel production, stipulating that it be carried out only in state-owned facilities. This has changed with the approval of the first joint ventures. In early March 2007, Australia's Mission Biofuels announced that it had signed a memorandum of understanding to set up a joint venture producing biodiesel in the eastern coastal province of Zhejiang. The planned plant will have an output of 50,000 tonnes a year, with a deal to sell up to 2,000 tonnes a month of its output to a unit of PetroChina, the listed arm of China's largest oil producer. Its feedstock will come from South and Southeast Asia.¹⁷ In the same month, BP was reported to be in talks with PetroChina's parent, China National Petroleum Corporation, to buy a stake in one of the country's biggest ethanol producers, Guangxi Xintiande Energy Co, which already has the capacity to produce 100,000 tonnes of ethanol annually.¹⁸



¹² State Titans Grab Biological Energy Sources," *SinoCast China Financial Watch*, 20 April 2007

¹³ Reported by China News Digest; "Alternative & Clean Energy: Greater China News Review Nov 1-10, 2006"; published 16 November 2006

¹⁴ Cited in "China officials see 'disaster' if grain diverted to biofuels – report," *AFX Asia*, 12 December 2006

¹⁵ "China officials see 'disaster' if grain diverted to biofuels – report," *AFX Asia*, 12 December 2006

¹⁶ "Biofuel venture initiated," *Bloomberg News*, 10 January 2007

¹⁷ "Australia's Mission Biofuels signs deal to supply biodiesel to China," *AFX Asia*, 5 March 2007

¹⁸ "Energy giants target ethanol unit," *Shanghai Daily*, 15 March 2007

Investment considerations

Many of the world's largest renewables technologies companies have set up operations in China in recent years, including General Electric (US), Vestas (Denmark), Gamesa (Spain) and Vensys (Germany).¹⁹ However, China's domestic capabilities, both to manufacture and commercialise these technologies, have also advanced rapidly. Foreign investors are participating in an increasingly competitive market and a carefully thought-out investment strategy is therefore crucial to success.

Costs of capital

Domestic companies have benefited from extensive access to domestic capital, not only in terms of debt financing from banks, but also equity. In the past two years, a number of Chinese renewable energy companies have completed initial public offerings (IPOs). These include Suntech Power, China Biodiesel, Trina Solar, Solarfun and China-Agri Industries. As of the beginning of May 2007, Goldwind, Yingli Solar, LDK Solar and CEEG Nanjing PV Tech were also reported to be preparing IPOs.

International energy companies may struggle to compete on these financing terms; many apply a higher cost of capital to internal funds and will need to cover a higher perceived risk on internationally-sourced funds. The benefits that come with a clear contract and guaranteed sales for a project may be offset by a perceived shortage of reliable market information and operational risks. In addition, the need to adhere to higher standards and self-imposed regulations from a company's head office may, in purely commercial terms, put the overseas investor at a disadvantage compared to its local peers.

Opportunities for innovation

Nevertheless, foreign companies may be able to develop more innovative financing structures on specific projects. Several international energy companies have established start-up project financing operations to identify and support new energy projects, including many relatively small-scale initiatives.

Foreign companies may also still have much to offer on more technically complex projects and in the development of new technologies. Biofuel production is one area where a number of joint ventures have been established since investment regulations were relaxed.

Foreign investors may be able to take advantage location-specific incentives for foreign investment, for example in the northern and western provinces of Inner Mongolia and Xinjiang. These areas offer some of the greatest potential for the development of wind power resources and are also a key part of the government's "Go West" economic development programme.

The recent move to harmonise enterprise income tax rates between foreign and domestic enterprises could also prove to be welcome news for alternative energy

¹⁹ Information about these investments is available on the respective company Web sites.

Typical investment considerations for a wind power project

Stage	Step
Site assessment	<ul style="list-style-type: none"> • Ownership status: Privately-owned land is preferable • The quality of infrastructure and the receptiveness of the local community should be considered • Land usage rights may include or require specific permits, wind rights and transmission rights • A wind assessment needs to be made incorporating meteorological information to establish output projections
Construction and operations	<ul style="list-style-type: none"> • Procurement process needs to incorporate output projections, capital costs, turn-key construction costs, warranties for equipment and maintenance, and construction financing • Tax exposures, for example on interest payments, need to be assessed and potential tax benefits identified • Issues arising from applying for and transferring Certified Emission Reduction (CER) • Risks or penalties relating to underperformance need to be assessed
Sales agreements	<ul style="list-style-type: none"> • Assessment of power purchase agreement (electronic trading capacity varies by region), facility sales agreement and pricing mechanisms

As the table above demonstrates for wind projects, there can be some unique considerations that need to be taken into account when evaluating investments in alternative energy initiatives.

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The challenges ahead

Many challenges lie ahead for China's alternative energy industry, both in terms of technology and in the development of appropriate policies. The overriding priority will be to develop the generating capacity needed to fuel the country's industrial development, demand for which will continue to rise at around 7 percent a year. The simplest way to do this will be to build more coal-powered generators, because China can do this extremely quickly — taking only two-and-a-half years from approval to completion — and because it has huge and cheap reserves of the necessary fuel.

To encourage the growth of renewable sources, the government may have to offer more support in terms of tariff structures and incentives, especially when it comes to setting the tariffs utilities will have to pay to buy wind-generated electricity, which despite improvements in technologies, remains relatively expensive.

Technological advances should help this — the cost of wind energy, as with all alternative energy sources, is dropping. However, being able to generate cheaper electricity is not the only issue that must be considered, as the higher the cost of energy, the greater the incentive there is to use it efficiently. One of the reasons why China uses energy so inefficiently now is that, historically, it has been priced relatively cheaply. The government has preferred that industry should benefit from the availability of low-cost power.

The government has started to recognise the need to price in the full social and economic costs of energy production. For example, it has recently mandated that power companies will have to source 5 percent of their electricity from renewable sources by 2010, and 10 percent by 2020. Wind and other carbon-free sources will also be boosted by the introduction of carbon trading, which should act as a tax on coal-fired generating businesses and allow wind-powered operations to have higher rates of return.

What may also drive future development is a clear signal from the government of where its priorities lie — with cheap energy, clean energy, or a combination of both. For alternative energies to realise their potential, they have to be able to compete with other sources, particularly coal. While China would clearly like clean energy, a key driver remains maintaining strong economic growth — and producing the energy needed for this as cheaply and as sustainably possible.

Policy priorities will also have an impact on foreign investment. In wind, for example, the government has ruled that all projects with 100 megawatts or more of capacity must be submitted to competitive tender. While foreign companies can bid, they find themselves up against domestic power companies with a low cost of capital, which can often accept lower profits and have a greater tolerance of risk.

Some foreign industry insiders suggest that the government could help by moving away from annually negotiated power purchase agreements towards more longer term contracts. Others also point out that mandating higher purchase prices for electricity generated by wind, or other renewable sources, would help encourage the development of the domestic equipment industry.

Similarly, policy priorities will be significant for domestic power companies. Troels Beltoft, senior strategy manager at Denmark's Vestas, the largest foreign manufacturer of wind equipment in China, suggests that changing attitudes to how electricity should be generated is as much of a challenge as making the grids capable of handling wind-generated electricity.

A balance therefore needs to be struck, taking into account the commercial interests of China's electricity companies. The grid operators have well-established relationships with generating companies that can supply power in large volumes. As such, they may lack the incentives to provide smaller alternative energy providers access to the grid. Until appropriate mechanisms are in place to mitigate this, points out energy consultant James Brock, there will be no way of encouraging a widespread installation of alternative energy sources.

Offsetting these considerations, however, are the opportunities offered by China's attractions as a low-cost manufacturing base. As a result, even if China presents challenges for operators, it will almost certainly be a major manufacturing centre for makers of wind and solar generating equipment. Already, most of the world's leading wind equipment makers have a presence in the country, including GE of the US, Vestas Wind Systems of Denmark, Nordex of Germany and Spain's Gamesa.

Which way will the wind blow?

While China will remain dependent on coal as its primary energy source, alternative sources of energy will proliferate between now and 2020. Indeed, one of the defining characteristics of China's energy supply will be the diversity of its sources — in addition to its current use of coal supplemented by hydropower, nuclear energy and natural gas — new sources will be developed into significant contributors, above all wind, but also solar energy and biofuels.

The fact that China already has extensive hydroelectric facilities will also help support the growth of solar and wind generation. Solar and wind power facilities need to be complemented by back-up facilities on the local grid, to balance their variability of output. Hydropower serves this function well, because it can be switched on and off more readily than fuel-burning plants and with fewer environmental implications.

Nevertheless, development of the industry may depend as much on policy decisions as on the emergence and improvement of new technologies. Keeping energy cheap will encourage continued reliance on coal. Making coal producers and generators responsible for a greater share of their environmental costs — and rewarding carbon-free producers via the use of mechanisms such as carbon trading — could help in allowing alternative energy sources to realise their potential. With regards to transport, the government is already considering matters such as committing funds to develop biofuels for cars, or encouraging greater use of public transport.

When they come, these policy decisions will not be enough to turn China 'green' overnight, but they are sure to make China's alternative energy sector highly significant, not just domestically but worldwide.

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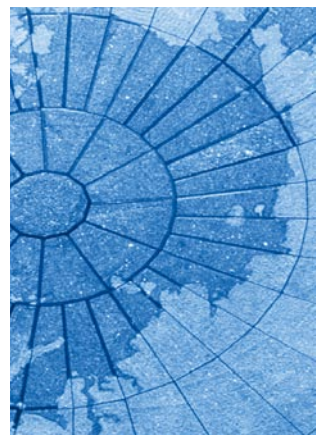
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