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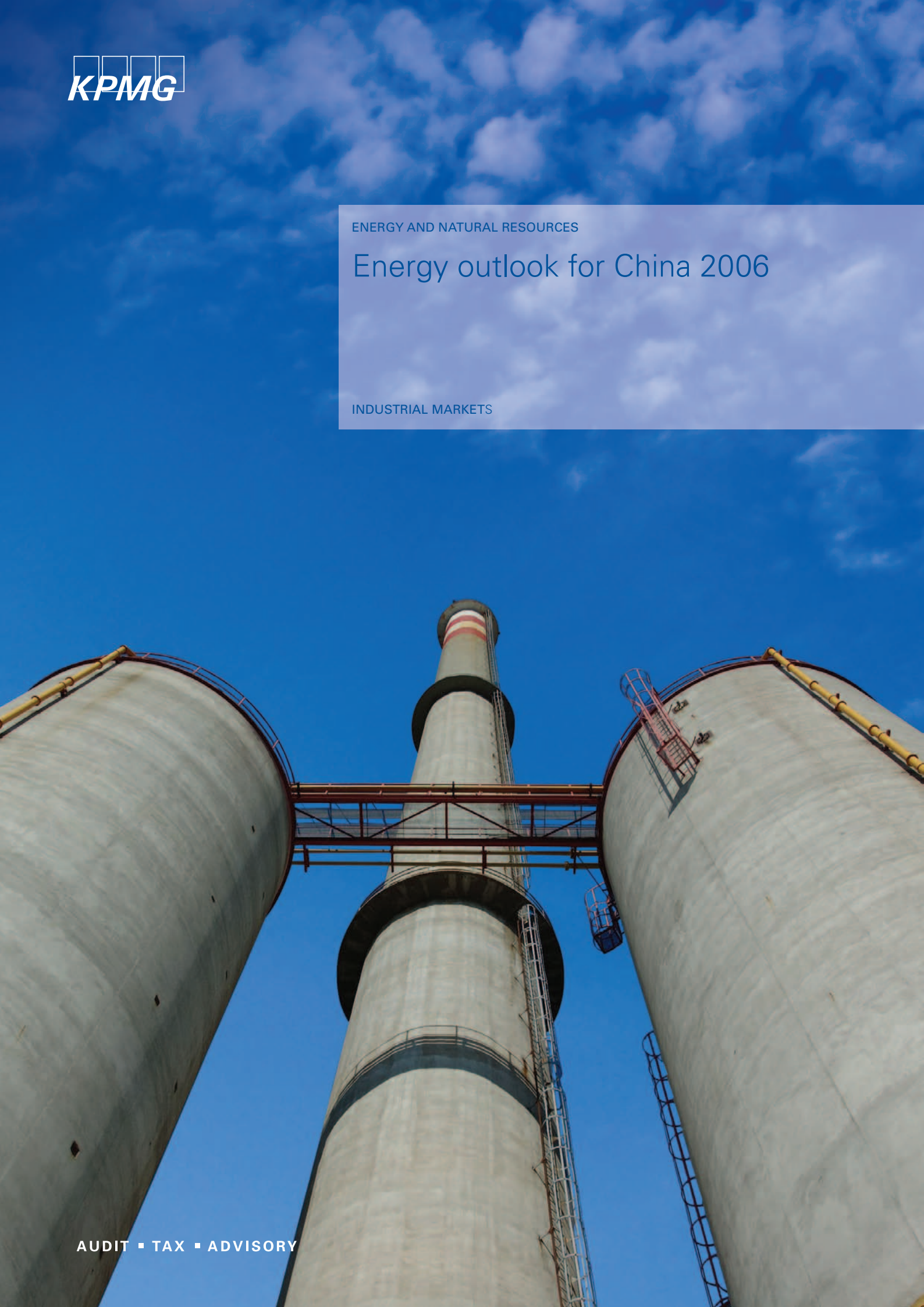
ENERGY AND NATURAL RESOURCES

Energy outlook for China 2006

INDUSTRIAL MARKETS



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1 Introduction

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KPMG released its 'Energy Outlook for China' ahead of the first Energy APAC conference in Beijing in March 2005. One year on, I am pleased to introduce a second paper which revisits the complexities and challenges of meeting the growing energy needs of China.

The Chinese economy continues to expand. That and the resultant lifestyle aspirations of the Chinese increases domestic demand for power, light, heat and transportation fuel.

It has long been clear that China's energy needs must be met by a combination of developing domestic sources to a maximum, including nuclear, and by securing international assets and creating interdependent relationships with energy rich nations. The energy producing countries also need to secure their markets. Not surprisingly, the countries visited by King Abdullah of Saudi Arabia since his accession in August 2005 were first China followed by India.

During 2005 China's oil industry, through China National Offshore Oil Corporation (CNOOC), was caused to fail in its bid for Unocal. China is not alone in feeling the opposition of U.S. vested and protectionist interests around important assets. Protectionism, though, invites retaliatory protection and, in hydrocarbons, results in the inefficient use of the world's resources.

Energy security is a necessity for nations; but a measure of the progress of sophisticated economies must also be the increasingly efficient use of ultimately limited resources. Some steps forward in international cooperation in energy security and efficient usage is one of the stated aims of Russia's chairmanship of the G8, which begins as we go to press with this paper.

There will certainly be continuing opportunities internationally in 2006 for China to invest, acquire assets and form joint ventures as witnessed by Sinopec's exploration with Saudi Aramco for non associated gas in Saudi Arabia. China has a competitive advantage in developing partnerships due to its rapidly growing demand and its ability to negotiate and commit for the long term.

In electricity consumption, we are seeing a plateau in growth rates but with overall growth remaining strong by OECD standards. As this report highlights, the array of statistics is complex and China must make bold decisions in securing feedstock as well as investing in the downstream sector to avoid confidence-sapping power blackouts or fuel shortages.

Energy companies in China have been at the forefront of privatizations and new market listings during 2005. KPMG has assisted two companies in what turned out to be among the largest IPOs in the world last year - China Construction Bank and energy company Shenhua - using our longstanding international and local capability on initial public offerings.

KPMG's aim is to make our contribution to economic development by delivering globally consistent world class services in our areas of competency in each economy of which we are a part. We achieved that aim in China in 2005. During 2006, we will continue to use our worldwide experience and our globally developed capabilities to bring value to companies in China through our offices here.

We wish you a successful 2006.

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The last year has seen China emerge as a major player on the world energy stage. Its leading oil companies have travelled the globe in search of reserves, already spending billions of dollars and certain to spend many tens, if not hundreds, of billions more, on acquiring oil and gas reserves and related energy companies.

Meanwhile at home, massive investment in new generating facilities means that the power blackouts which affected most of the country in 2004 should be a thing of the past. With investment also committed to upgrading and expanding the country's power transmission network, every part of the country should be sure of having access to electricity.

Nonetheless, with the Chinese economy continuing to expand by around 8-9 percent annually, and likely to continue doing so for the next several years, demand for energy can only continue to grow.

To keep pace with this, huge investment will be required – not only of money but also of technology. As well as embarking on a major expansion of its nuclear energy program, 2006 will see China's first liquefied natural gas import project go into operation, while the country is starting to look seriously at renewable and alternative energy sources.

At the same time, it is looking at ways of mitigating the impact of its principal energy source – coal – on the environment, by introducing pollution controls and considering how environmental costs can be incorporated into tariffs.

The emphasis the government is putting on developing a balanced energy strategy can be seen from the establishment in 2005 of a Cabinet-level commission to develop energy policy headed by the prime minister, Wen Jiabao.

All of these developments will call for a greater involvement of foreign companies, whether as investors or partners. KPMG's experience in China has already helped power organizations – both multinational and Chinese – develop their business strategies and operations.

With more than 4,200 professionals on the ground in China at our offices in Beijing, Shanghai, Hangzhou, Guangzhou, Shenzhen, Hong Kong and Macau, we are ready to help such companies expand and further develop their businesses.

2 China's energy needs go international

In the China of today, nothing happens slowly. In 2002, the country's total power generating capacity stood at around 350 gigawatts; by the end of 2006 this figure should be around 570 gigawatts – and to around 700 gigawatts one year after.[1]
The consequence? A country which in 2004 saw power blackouts hit 26 of its 30 provinces could soon be facing an electricity surplus.

But, such is the rate of China's economic growth, that just a matter of years later the country could once again face electricity shortages. A report released in February 2006 argued that the country will face a generating capacity shortfall of 280 gigawatts by 2020 unless the government revises its current generating goals up sharply. Prepared by the China Electricity Council, France's EDF and consultancy firm Capgemini, the study argued that China will have to spend an additional US$180 billion on generating capacity over the next 15 years if demand is to be met.[2]

Of course, it is unlikely that China will find itself facing such a shortfall. It will instead go ahead and build whatever generating capacity is required to meet its needs, even if this requires spending hundreds more billions of dollars than now forecast. But the very fact that energy demand may well rise at a rate far higher than current official predictions only serves to underline the fact that China's huge demand for power, already having a major impact on the world, is little more than a foretaste of what is to come over the next several decades.

Take, for example, its oil consumption. At present, China, with just over one-fifth of the world's population, uses 6.4 million barrels of oil daily. The United States, with 5 percent of the world's population, consumes around 20 million barrels – more than three times as much.[3] This consumption gap is likely to close long before Chinese wealth levels approach those of the U.S. Indeed, at even one-quarter of American per capita wealth levels, China's oil consumption could be expected to equal that of the United States. When will that happen? Almost certainly in the 2020s.[4]

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1 Sources: Ministry of Commerce reported via Xinhua, February 15 2006, that China would have 500 GW of installed capacity at end 2005; Wang Yonggan, Secretary-General of China Electricity Council was reported by Xinhua, August 8, 2005, as saying capacity would increase by 70 GW/year from 2005-07, to reach 650 GW by end 2007; Boqiang Lin, Asian Development Bank energy economist, is reported by Worldwatch Institute (http://www.worldwatch.org/features/chinawatch/stories/20060207-1) as forecasting China will have 720 GW installed by 2007.

2 Financial Times, "China must spend extra $180bn on energy", February 26, 2006 Web version - http://news.ft.com/cms/s/bcb3ccea-a6f0-11da-b12c-0000779e2340.html

3 International Energy Agency, cited by Robert J Samuelson, "A new Era for Oil?", Washington Post, March 30, 2005, available at http://www.washingtonpost.com/wp-dyn/articles/A11311-March 29, 2005 .html

4 Big Brains Ltd, internal forecast, February 2006

Meeting this kind of demand will, above all, require a huge and growing amount of fuel from overseas. Although China currently sources most of its energy needs from within its borders, this will be the case less and less in coming decades. More than 40 percent its oil needs come from imports. Half of its planned natural gas usage will come from foreign sourced supplies. And even a significant amount of coal, the country's principal fuel accounting for around 70-75 percent of all generation,[5] is being brought from abroad: in 2005, imports rose 40 percent year-on-year to pass 26 million tons.[6]

To meet these energy import requirements, the world will have to get used to seeing China's energy companies in every corner of the world. This may not always be easy for other countries to accept, as seen in several major events of 2005. In the U.S., the attempt by China National Offshore Oil Corporation (CNOOC) to spend US$18.5 billion buying Unocal was abandoned in the face of fierce opposition from U.S. politicians. In Russia, China found itself competing with Japan to determine the route of an oil pipeline through eastern Siberia. And at various other points around the world the country's biggest oil concern, China National Petroleum Corporation (CNPC), found itself up against Indian energy interests to buy oil and gas rights – outbidding its Asian rival in August with a US$4.2 billion offer for Canada-listed PetroKazakhstan, and in September a US$1.4 billion offer to buy Ecuador-based oil assets from EnCana Corporation, also a Canadian company.

Can the world get used to having Chinese companies scouring the world in search of oil and other resources to fuel its economic growth? Bluntly – it may not have a choice. Countries on every continent will have to get used to China being a major force in the markets and politics of global energy. Adjustments and rethinking will be required everywhere, including in Beijing itself.

Sharing the planet with a new giant will not be easy. But at the same time, China will need – and offer – a growing role to foreign companies as partners in just about every aspect of its energy industries, from prospecting and exploiting new fuel reserves at home and abroad, to supplying and developing technologies for everything from alternative and nuclear energy sources to reducing pollutants emitted by coal-fired power stations.

[5] National Bureau of Statistics, China Statistical Yearbook 2005

[6] China Customs Statistics, reported January 20, 2006 via Simpson Spence & Young, available at http://www.ssyonline.com/News_and_Events/index.html?view=1645&PHPSESSID=2d6 <http://www.ssyonline.com/News_and_Events/index.html?view=1645&PHPSESSID=2d6>

3 China's energy demands: current and forecast

Where does this leave other countries – and companies – from around the world? How exactly should they try and make sense of what is happening in China and the affect this is having on its energy needs?

Perhaps the first step is to become accustomed to the dramatic switches between power shortage and surplus which are likely to occur over the next couple of decades as China's economy continues its breakneck growth. As recently as 2004, the Development Research Centre of China's State Council, the country's cabinet, was drawing a series of long-term energy development scenarios that envisaged total primary energy demand rising by around 4-5 percent a year up to 2020, perhaps not an entirely unreasonable forecast given that energy demand had been rising by an average of 4.6 percent annually from 1980 to 2000, well below the 9.7 percent average yearly increase in gross domestic product over the same period.[7]

Hardly had the report been published than China reported a sudden jump in energy usage – 14 percent for 2004, followed by 15 percent in 2005. This year demand is likely to slow – to around 11 percent according to the Development Research Centre's latest round of thinking.

The reason for the large increase of the last two years, and this year's probable still sizeable expansion is the shortages which preceded them. The problems of 2003 and the blackouts of 2004 resulted in the speeding up of generating projects already under way, a far greater utilization of previously under-used hydropower capacity and heavy short-term expenditure on diesel generators at factories, especially in China's leading export region, the southern province of Guangdong.

Overnight, all of the country's power generation capacity was pushed to its limits and a host of immediately operable if expensive new oil-burning capacity was installed. Total generating capacity soared. More than 50 gigawatts-worth was added in 2004 and 60 gigawatts in 2005. This year capacity is set to grow by an even larger 70-80 gigawatts, which should leave some capacity to spare, at least for several years.[8]

If this lurch from shortage to over-supply was not surprising enough, further confusion in China's power sector came with a report by the country's National Bureau of Statistics that in 2005 the country saw imports of crude and refined oil drop – by 5.3 percent – despite recording economic

[7] Development Research Centre of China's State Council

[8] 2004 and 2005 statistics: China Economic Quarterly, China Insight, No. 10, January 24, 2006; forecast for 2006: Wang Yonggan, Secretary-General of China Electricity Council reported by Xinhua, August 8, 2005 and The Economist, "Power to the people", February 11, 2006

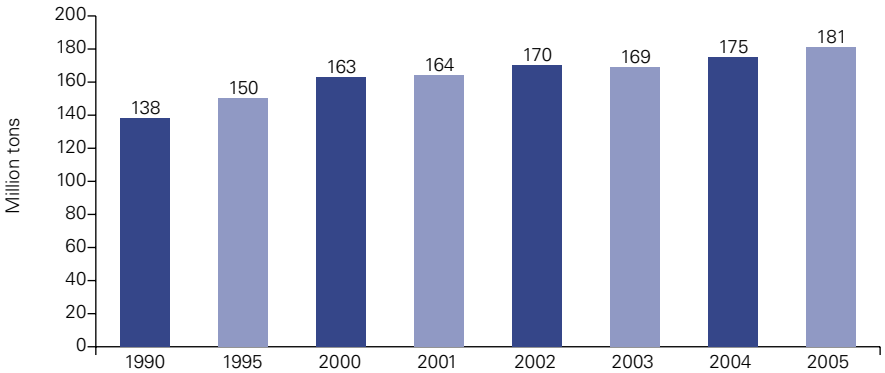
growth of 9.8 percent. This decline took many observers by surprise, even leading some to suggest that the government might have made a different interpretation of its figures in order to be able to argue that China was not responsible for rising global prices.

Such complex arguments are unnecessary. On closer inspection, what appears to have happened is that many of the factories which rushed to install their own oil-burning generators in 2004 found themselves no longer needing them, especially given the far higher price of oil. However, the very fact that the release of China's import figures caught so many people off-guard merely serves to underline the fact that the country's energy sector is liable to remain unpredictable for years to come – a problem which could prove as tricky for the government to handle as much as for other countries and foreign energy companies.

It is worth bearing in mind that only just over a decade ago – in 1993 – China was a net exporter of oil. Last year, despite the drop in imports, more than 40 percent of its oil needs were met from overseas.[9] Lingering hopes that the position could be reversed, or at least maintained, persist, despite the fact that both demand has grown at such a rate that the country is now the world's third biggest importer, behind the United States and Japan, and that domestic oil output has grown slowly – by barely 11 percent since 2000 (see table), and the International Energy Agency in its World Energy Outlook 2005 forecasts that Chinese oil production will actually drop by 2020, from around 3.5 million barrels a day to 3 million (and then continue to decline to around 2.4 million barrels a day by 2030). Given that the State Council's Development Research Centre forecasts that total oil consumption will double by 2020, it is hard to see domestic production meeting demand.

Other probable trends make this even more unlikely – expected growth in automobiles most of all. Car sales rose more than 25 percent to 3.2 million in 2005[10]; this is rapid growth, but output

China's petroleum output



Source: National Bureau of Statistics

[9] National Development and Reform Commission reported in China Daily, February 3, 2006
[10] EIU, Business China, January 30, 2006

is set to rise by up to five times that volume by 2020, by which time China is likely to be both the world's biggest automobile maker and consumer. For sure, some of those cars will be sold overseas, but the majority will remain at home. In time, China's oil consumption patterns are likely to resemble those of the U.S., where vehicles account for around two-thirds of all oil consumption.

Under such a scenario, oil's share of China's imports can only continue to rise – hitting 8 percent last year.[11] In contrast, in developed countries, oil's share of imports has consistently fallen in recent decades: from around 13 percent in the late 1970s to less than 5 percent now.[12] Clearly, while rising oil prices may be undesirable for all countries, they will have a far greater impact in a country where they account for a bigger and rising share of imports than ones where it is small and falling.

For coal – China's primary source of energy – the outlook is more stable, but also offers the prospect of foreign supplies taking up a small but significant and growing share. Imports have been rising sharply. In 2002, China bought some 11 million tons from overseas; last year the total reached 26 million tons.[13] Such figures, however, are dwarfed by total output of 2 billion tons, and the near-certain fact that coal will be responsible for meeting more than 60 percent of all China's energy needs by 2020, albeit down from its current near 70 percent share.[14]

According to forecasts by the State Council's Development Research Centre, this decline will be made up by an increase in natural gas, nuclear energy and hydropower capacity. Gas usage is set to rise from around 3 percent of generating capacity to 7-9 percent. Nuclear power, driven by the construction of some 30 new plants by 2020, should see its share rise from 1 percent of generating capacity to around 4 percent. Hydropower, now responsible for around 16 percent of all electricity generation, is forecast by the State Council's Development Research Centre to see its share rise to around 20 percent, helped by the coming on-stream of the massive Three Gorges Dam project and other schemes, particularly in the south-west of the country and along the upper reaches of the Yellow River in the north-west.[15]

[11] Xinhua reported China's oil imports in 2005 at US$60 billion; "China's oil refining industry posts loss of 30 bln yuan in 2005" February 14, 2006; National Bureau of Statistics reports total imports of US$762 billion
[12] International Energy Agency, "Analysis of the Impact of High Oil Prices on the Global Economy", May 2004
[13] China's Customs Statistics reported via www.ssyonline.com
[14] Coal output figure from Xinhua, "Energy industry imports technology worth $9.34bln" February 14, 2006; coal's share of energy forecast from Development Research Centre of China's State Council
[15] State Council's Development Research Centre

4 China's electricity industry

China's power sector is in a state of transition. Its current form dates to December 2002 when the State Council dismantled the then single biggest power body, the State Power Corporation. From its various parts emerged five power generators (China Huaneng, China Datang, China Huadian, China National Power, and China Power Investment) and two power transmission companies: State Grid Corporation of China, by far the biggest of the two, with a grid covering almost all of the country apart from five southern provinces, Guangdong, Guangxi, Hainan, Yunnan and Guizhou, which were put into China Southern Power Grid Corporation.

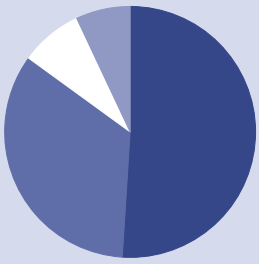
Between them, the "Big Five" generating companies account for around 34 percent of all China's generating capacity. The largest part of China's power generating capacity, however, lies with local state-owned companies, which account for just over half of power generation capacity (see chart).

Ongoing reforms aim at both further separating power plants from power-supply networks in order to allow the introduction of some degree of competition and market pricing into the power sector and eventually some degree of privatization.

In March 2003, the State Council established the State Electricity Regulatory Commission to oversee China's power industry. It is responsible for structural reform of the industry, the drafting of laws and regulations and the development of an electricity market.

Source: China State Power Information Network, Asian Development Bank[16]

Power generation capacity in China: ownership structure share of total generating capacity, percent

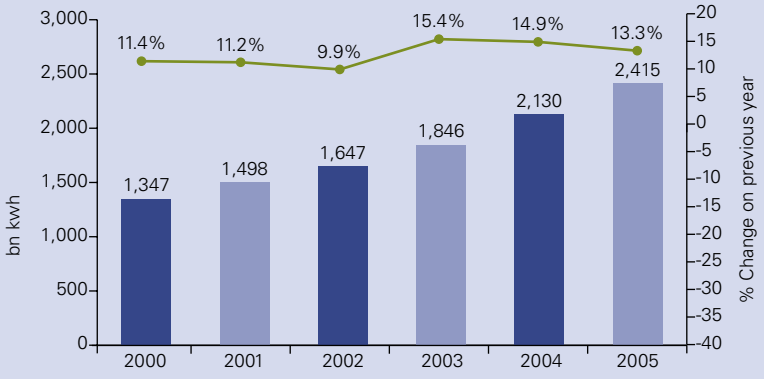


- Large independent hydropower and nuclear generators 7%
- Grid companies 8%
- "Big Five" generating companies*34%
- Local state-owned companies 51%

* China Huaneng, China Datang, China Huadian, China National Power, and China Power Investment

Source: State Electricity Regulatory Commission[17]

China: Electricity consumption



Source: China Electricity Council, China Economic Quarterly 2006

[16] http://www.sp-china.com/powerReform/pgc.html; Asian Development Bank, "Electricity Sectors in CAREC Countries", 2005

[17] Reported in Asian Development Bank, "Electricity Sectors in CAREC Countries", 2005, page 38

5 Policy issues

China's energy consumption trends, however, are only a part of the story. One of the reasons for the abrupt ups and downs of the energy sector over the last few years is the way in which government management and regulation has been handled. Despite the fact that all the industry's major concerns remain state-owned – even those with overseas listings, such as PetroChina (an arm of CNPC), Cnooc Ltd (the listed arm of CNOOC) and Sinopec – China has had no single body overseeing its energy sector since the last Ministry of Energy was abolished in 1993 and the Ministry of Power Industry in 1998.

Since then, responsibility for energy policy has been shared between different bodies, a fact which may go a long way towards explaining how China found itself facing power shortages in the early 2000s. While it appears unlikely that an energy ministry will be established again, there is plenty of evidence pointing to some major changes ahead in the structure of the sector.

This, a little paradoxically, is likely to include both greater regulation and increased liberalization. The latter looks likely to come in the form of an opening of the oil exploration and extraction industries to private investors. A study conducted by the Ministry of Land and Resources' Institute of Oil and Gas argues that this should take place within five to ten years as part of a move to open and restructure the upstream oil market, now shared between Sinopec, PetroChina and CNOOC.

The call for greater regulation comes from a perceived need for greater central control over both strategic planning in the location and acquisition of resources, especially overseas, and some problems which stem from the fact that while China's main energy companies are all state-owned, the state's oversight of their operations is very light. This can create problems, in particular of control and co-ordination.

The headaches this has led to, including the country's recent power shortages, led to Beijing launching a Cabinet-level commission last year headed by Premier Wen Jiabao to coordinate energy policy. According to media reports in January 2006, the government is also drafting an energy law aimed at both regulating the development of the power sector and putting greater emphasis on making power generators more environmentally friendly and consumers more efficient. It is also likely to detail how private investment can play a greater role in all parts of the industry.

And finally, there are market solutions. The Chinese government has long since concluded that allowing market forces a role in its energy sector will encourage a more efficient use

of resources in the long run. As the Asian Development Bank points out in a study of the sector issued in 2005, it is likely doing so would also encourage the development of both alternative energy sources and energy conservation by making comparisons possible with the construction of new thermal generating plants.[18]

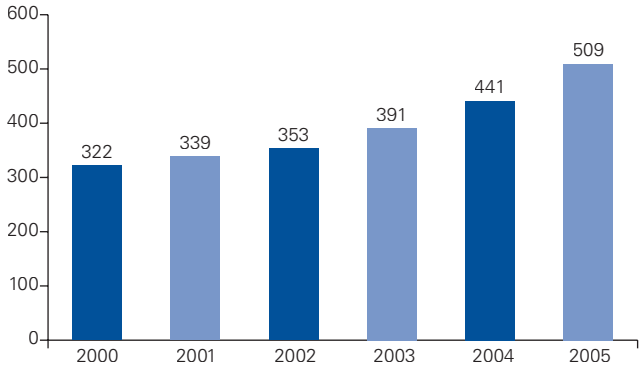
A little more tricky will be including environmental costs into energy costs. It seems likely that China will eventually move in this direction (it is already imposing policies aimed at reducing production pollution), though a prerequisite will be allowing power users choices so that price signals can do their work in encouraging power producers to develop more efficient, environmentally friendly energy sources.

The fact that the government has already separated generation and distribution, and ensured that the country has several major power suppliers, points to its seriousness in moving towards allowing the market a major role.

It still has to tackle the challenge of allowing competition while ensuring power supplies remain guaranteed. Given, however, that even those countries with the most developed electricity markets, including those of the U.S., have yet to resolve this problem, China's progress so far should be regarded as creditable, especially given its enormous growth in demand.

In the meantime, it remains committed to state assistance where necessary. Investment in China's electricity transmission system lags investment in power generation considerably. However, there is talk of large sums of money being committed – State Grid Corporation of China, the biggest of the country's two transmission companies, is reported to be investing about US$105 billion from 2006-10 in its power networks, while the country's other transmission company, China Southern Power Grid Corporation, will invest US$29 billion.[19]

China: Installed generating capacity, GW (gigawatts)



Source: China Electricity Council, China Economic Quarterly 2006

[18] Asian Development Bank, "Electricity Sectors in CAREC Countries", 2005, page 39

[19] Xinhua, "China to input over 1 tln yuan in power grid construction", February 22, 2006. http://news.xinhuanet.com/english/2006-02/22/content_4210934.htm

6 Partnership solutions

When China's energy law appears, foreign companies are likely to get a clearer picture of where China's energy industry is heading. However, this might be a while: similar laws for other sectors, such as the country's telecom law, have been in gestation for years. For now, therefore, a key to understanding and involvement in the sector for overseas investors will be getting in and attempting to grasp both the system as it is and the forces driving its change. Aside from the oil majors and companies overseas selling energy resources to China, other areas of energy development are likely to emerge both as important to China and as ones in which it will welcome foreign involvement. Three stand out:

• **Improving fuel efficiency.** China is incredibly inefficient when it comes to energy use. It uses around 18 percent more coal to develop a kilowatt-hour of energy than power generators in developed countries[20], while according to the International Energy Agency, an energy policy advisor to 26 of the world's most developed economies, its oil intensity – the amount of primary oil consumed per unit of GDP – is well over twice that of developed countries.[21] The country has the goal of reducing the amount of energy per unit of GDP by 20 percent between 2006 and 2010.

Various measures are already being applied. The Asian Development Bank points out that China is experimenting with various innovative energy saving schemes, such as wet and dry season power tariffs in 11 provinces with either high hydropower generation or large energy supply and demand imbalances.[22]

• **Renewable energy sources.** If global climate change is to be tackled seriously, China has to be brought on board. The International Energy Agency forecasts that the country energy-related carbon dioxide emissions, already the world's second largest, will grow from 3.8 billion tons in 2003 to 7.2 billion tons in 2020[23] – roughly the same at the U.S.'s emissions.

In February 2006 the World Bank approved a US$86 million loan to scale up the use of renewable energy. While even the most optimistic of observers cannot see such sources accounting for any more than a couple of percent of generating capacity by 2020, there is a fast-growing awareness within the government of the environmental problems that China's economic development is creating.

[20] China Oil and Gas Monitor, "China To Increase Energy Efficiency", February 8, 2006
[21] International Energy Agency, "Analysis of the Impact of High Oil Prices on the Global Economy", May 2004
[22] Asian Development Bank, "Electricity Sectors in CAREC Countries", 2005, page 38
[23] International Energy Agency, World Energy Outlook 2005, page 93

• **Aiding China's outreach to the world.** CNOOC's attempt to buy Unocal may have failed last year. But energy self-sufficiency is not a viable goal for China, so top of China's energy issues is securing energy resources from a diversified series of locations around the world.

An awareness elsewhere that Chinese companies will be looking for more such deals in the future will make them far more likely to succeed, as is an understanding on the part of Chinese companies that success in negotiating deals in such a sensitive industry as energy requires a lot more than money.

Just how much can be gauged by some of the deals which are going ahead. Take liquefied natural gas (LNG), for example. In April 2006, China's first LNG import project is due to go into operation with the arrival of a shipment of Australian LNG at the newly completed Guangdong Dapeng LNG Terminal in Shenzhen, in which China National Offshore Oil Corporation, with a 33 percent, and BP, with 30 percent, are the two biggest stakeholders.[24]

Total investment in the terminal and related infrastructure, including 334 kilometres of pipeline built to deliver the fuel to five power stations and other destinations in Shenzhen, Dongguan, Guangzhou, Foshan and Hong Kong, is around US$900 million. Several other LNG projects in Beijing, Shanghai, Zhejiang, Jiangsu, Fujian, and Hainan, Hebei and Liaoning are either under construction or waiting central government approval. Under the deal, Australia's North West Shelf Australia LNG PTY Ltd will supply around 3 million tons annually for 25 years.[25]

This project is just the start of China's LNG ambitions. The China Daily reported that the country's total gas consumption was expected to reach around 250 billion cubic metres a year by 2020, about half of which will come from imports.

[24] Dowjones, "Guangdong To Receive 1st LNG Shipment In Apr", February 24, 2006
[25] China Daily, "LNG import to ease energy shortage", February 24, 2006

7 Competition or cooperation?

That China is willing to invest heavily in its future energy needs is undeniable. January of this year alone saw CNOOC sign a US$2.3 billion deal to take a 45 percent stake in Nigeria's Apko offshore oil and gas field and the government reach an energy co-operation agreement with Saudi Arabia, the country's largest source of oil imports. There are also reports of an imminent further purchase involving Kazakh oil interests.

It is also negotiating with Iran to finalise the details of a memorandum of understanding signed in October 2004 under which Sinopec Group (the parent of the overseas listed Sinopec Corporation) would develop an Iranian oil field, Yadavaran, take some 51 percent of the field's output and buy 10 million tons of Iranian liquefied natural gas annually for 25 years – a deal which if it goes ahead could be worth up to US$100 billion.[26]

However, perhaps the deal with most significance was the December 2005 agreement between CNPC and India's Oil & Natural Gas Corporation to buy ownership of a series of Syrian oil fields from Petro-Canada for US$573 million. Sino-Indian competition had pushed up the prices of previous deals in the year; for sure, China had got what it wanted in most cases – but had the cost been worthwhile?

For the two Asian giants – increasingly portrayed as rivals – to come together to work out an arrangement of mutual benefit for both sides was an indication that cooperation might be a better way forward for both countries. But more than this, it also suggests a way in which other companies and countries might find the formation of mutually beneficial partnerships a more fruitful way to get to grips with China and its energy needs in the next 15 years and beyond.

One company which seems to have worked this out already is Australian mining business BHP Billiton. In mid February 2006, it reported first half profits of US$4.36 billion – up from US$2.8 billion one year before – much of it attributable to increased Chinese demand for coal, iron ore and copper.

[26] The Wall Street Journal, "China-Iran energy deal could impair U.S. efforts", February 17, 2006; UPI, "China, Iran close to $100 billion oil deal", February 17, 2006

The results were the biggest half-year profits reported by a company in Australian corporate history and the company is currently investing in the future as it sinks nearly US$12 billion as part of a plan to get one-fifth of its sales from China by the end of the decade.

With such sums to be made in or from China, working out ways to participate in developing its energy sector is almost certain to offer better long-term returns than trying either to resist the overtures of its energy companies, as happened with Unocal, or to out-compete them, as India has discovered.

8 China's oil and gas companies

The main companies leading China's global search for energy resources are the internationally listed arms of its three state-owned oil giants. Between them, this trio account for almost 100 percent of China's oil and gas output. But with domestic production likely at best to remain at its current level, and more likely to start declining, they have been scouring every one of the world's continents in search of new sources of oil and gas.

• PetroChina Co. is the listed arm of China National Petroleum Corporation (CNPC), China's principal oil and gas explorer and producer. Originally established to develop China's land-based oil reserves, it remains by far the biggest producer of the three: in 2005, its combined oil and gas output was 1.034 billion barrels oil equivalent, up 5.5 percent year on year, and almost two-thirds of total national output.[27]

Most of CNPC's assets were spun off into PetroChina ahead of the latter's April 2000 listing in Hong Kong and New York. From its origins in oil and gas production, the company has diversified into downstream petrochemical operations and also operates a chain of around 17,000 service stations.[28]

• Sinopec Corporation, China's biggest oil refiner and petrochemical producer, is the foreign-listed arm of China Petrochemical Corporation (often referred to as Sinopec Group). It was established in early 2000 when its parent company reorganised its assets in preparation for an overseas listing, which duly happened later the same year, when the company sold nearly 20 percent of its stock in Hong Kong, London and New York.

Originally established as a downstream oil refiner and petrochemical producer, it has been expanding its operations both upstream – producing some 316 million barrels of oil and gas in 2005[29] – and into retail operations – it runs China's biggest network of petrol stations, totalling more than 30,000 outlets.[30]

It has proved reserves of 3.3 billion barrels of oil and 2.9 trillion cu. ft. of gas.

Source: http://biz.yahoo.com/ic/102/102508.html

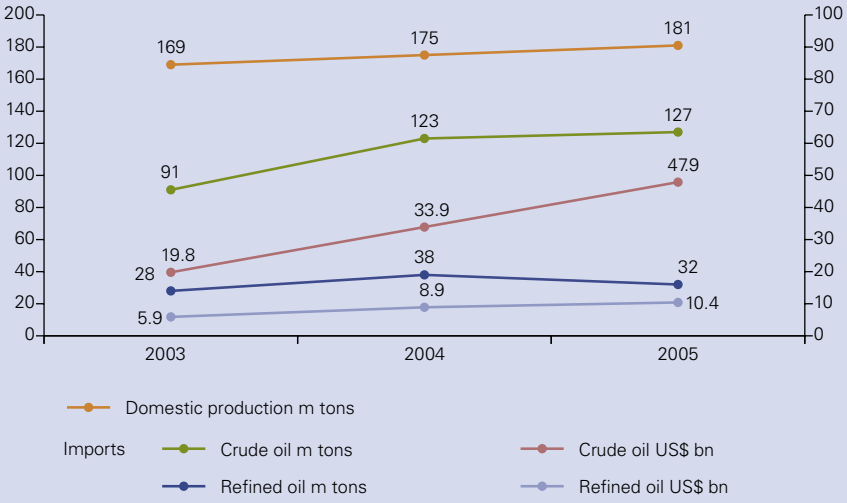
[27] Xinhua, "Data analysis discloses overplayed "Chinese factor" in soaring global oil price", February 11, 2006, http://english.people.com.cn/200602/11/eng20060211_241671.html
[28] PetroChina Profile, http://finance.yahoo.com/q/pr?s=ptr
[29] Xinhua, "Data analysis discloses overplayed "Chinese factor" in soaring global oil price", February 11, 2006, http://english.people.com.cn/200602/11/eng20060211_241671.html
[30] Bloomberg, "Cnooc Parent Buys Majority Stake in Shanghai Fuel Station Chain", February 15, 2006, http://www.bloomberg.com/apps/news?pid=10000080&sid=aP94qfLN_kQw&refer=asia

• CNOOC Ltd. China National Offshore Oil Corporation Ltd, as its name suggests, specialises in offshore oil exploration and production. Its oil and gas output in 2005 was around 155 million barrels of oil equivalent.[31] But like the two bigger companies, it is looking to diversify its business. In December 2005 it began work on its first oil refinery, a US$2.4 billion project at Huizhou in the southern province of Guangdong, and in February 2006 it made its first purchase of petrol stations – albeit acquiring just 20 outlets from a Shanghai chain.[32]

Oil and gas output in 2005	
Million barrels of oil equivalent	
PetroChina	1,034
Sinopec	316
CNOOC	155

Source: Xinhua[33]

China's oil consumption



Source: National Bureau of Statistics, Ministry of Commerce 2006

[31] Xinhua, "Data analysis discloses overplayed "Chinese factor" in soaring global oil price", February 11, 2006, http://english.people.com.cn/200602/11/eng20060211_241671.html

[32] Bloomberg, "Cnooc Parent Buys Majority Stake in Shanghai Fuel Station Chain", February 15, 2006, http://www.bloomberg.com/apps/news?pid=10000080&sid=aP94qfLN_kQw&refer=asia

[33] Xinhua, "Data analysis discloses overplayed "Chinese factor" in soaring global oil price", February 11, 2006, http://english.people.com.cn/200602/11/eng20060211_241671.html

9 A nuclear future?

Nuclear energy supplies a tiny fraction of China's power needs. The combined capacity of its nine nuclear generators now in operation is just 7 gigawatts, between 1-2 percent of its total generating capacity, produced from nine reactors – four in Guangdong province (two at Daya Bay and two at Ling'ao) and five in Zhejiang province (all at Qinshan) – with another two under construction at Tianwan in Jiangsu province.[34]

A sizeable expansion of nuclear capacity is planned for the next decade and a half, with around US$50 billion being invested in another 30 power stations scheduled to be completed by 2020. Even so this will leave nuclear power accounting for only around 4 percent of generating capacity by then.[35]

However, an expansion of nuclear-generated power is all but essential if China is going to realize its goal of reducing coal's share of electricity generation to below 60 percent by 2020.[36]

Moreover, new reactors can be constructed in the regions which most need power – the east coast around Shanghai and the south coast around the Pearl River Delta – both of which are far from China's main sources of energy – the coal of the north-west and the hydropower of the west and south-west.

China only has two companies authorized to build nuclear power plants -- China National Nuclear Corporation, responsible for the Qinshan plants, and China Guangdong Nuclear Power Group, the operator of the Daya Bay and Ling'ao power stations.

Both Guangdong plants use French technology supplied by Framatome. The first three of Qinshan's units use Chinese-developed reactors, with the other two being supplied and installed by Atomic Energy of Canada. The plants under construction at Tianwan are being built with a Russian partner.

French, Russian and U.S. companies are bidding for involvement in the plants at Sanmen in Zhejiang and Yanjiang in Guangdong, with contracts due to be awarded by the end of 2006.

[34] Basic information on China's nuclear power industry: "Nuclear Power in China", UIC Nuclear Issues Briefing Paper # 68, February 2006, available at http://www.uic.com.au/nip68.htm

[35] Xinhua, "China to beef up efforts to develop nuclear power", February 25, 2006

[36] Target for coal's share of electricity generation: Financial Times, "China must spend extra $180bn on energy", February 26, 2006

10 Summary

- China's electricity shortages of the last couple of years should end in 2006 with the bringing on-stream of around 80 gigawatts of new generating capacity. By the end of 2007, national capacity of 700 gigawatts will be double that of 2002.[37]
- With car sales already past 3 million a year, and production capacity set to reach triple that figure in the next 15 years, demand for petrol is expected to rise sharply.
- As domestic oil production is unlikely to keep up with demand, imports will play an ever greater role. China's oil majors are expected to look for opportunities to secure supplies from a diversified range of locations to ensure energy security.
- Nuclear power will slowly start to play a more important role in China's energy mix, with about 30 new nuclear power stations due to come on line by 2020. Its contribution to total electricity supply will rise from its current 1-2 percent share to about 4 percent.
- An energy law now being drafted should strengthen the government's oversight of the sector. It is expected to focus simultaneously on making power generation more environmentally friendly and power consumers more efficient.
- Private investment is likely to play a greater role in all parts of the energy industry over the next several years, with liberalization expected everywhere from the exploration and production of oil and gas to the development of alternative energy sources.
- The government is expected to start experimenting with energy tariffs both to encourage efficiency and to start incorporating external costs such as the price of environmental damage into bills.
- Although CNOOC Ltd failed to buy the U.S.'s Unocal in 2005 despite making a US$18.5 billion bid, similar acquisitions are likely to be successful in the future as the world becomes accustomed to China searching for the energy sources it needs to keep fueling its economic growth.

[37] Sources: Ministry of Commerce reported via Xinhua, February 15 2006, that China would have 500 GW of installed capacity at end 2005; Wang Yonggan, Secretary-General of China Electricity Council was reported by Xinhua, August 8, 2005, as saying capacity would increase by 70 GW/year from 2005-07, to reach 650 GW by end 2007; Boqiang Lin, Asian Development Bank energy economist, is reported by Worldwatch Institute (http://www.worldwatch.org/features/chinawatch/stories/20060207-1) as forecasting China will have 720 GW installed by 2007.

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Publication date: March 2006