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**THE DEVELOPMENT OF
CHINA'S ESCO INDUSTRY, 2004-2007**

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China's ESCO¹ industry has grown at an astonishingly fast pace during the last three years, with annual investments in energy performance contracted energy efficiency projects of about US\$ 1 billion in 2007. This note provides a brief summary of the latest survey information available. The note is prepared by the World Bank's project management team for the China Second Energy Conservation Project, drawing on major national surveys completed for 2005 and 2007 by the Energy Conservation Service Committee of the China Energy Conservation Association (commonly referred to as the EMC Association of China, or EMCA) of its members, interim smaller surveys and data collection efforts by EMCA, independent surveys of energy performance contracting by non-EMCA members in 2005 and 2007, data gathered from China's first three pilot ESCOs supported under the World Bank's first China Energy Conservation Project, data and analysis provided by the China National Investment and Guaranty Company (I&G) relating to its execution of the Bank/GEF ESCO Loan Guarantee Program, and analysis of ESCO investment and energy savings completed by the National Development and Reform Commission's Project Management Office (PMO). More detailed information is available from these parties and especially from EMCA's *EMCo Survey Report—2007*.

Background

ESCOs in China are defined as companies which invest in, or facilitate investments in, energy efficiency projects in other, host enterprises, using energy performance contracting. These commercial, profit-seeking companies identify and design energy efficiency projects for a variety of clients. According to their energy performance contracts signed with those clients, the ESCOs then complete procurement, finance or assist in arranging financing for parts or all their projects, oversee construction, and assist in asset maintenance. They receive compensation from their clients based on achievement of the actual energy savings agreed in their contracts.

China's first three ESCOs were created as new companies in 1997, in Beijing Municipality, Shandong Province and Liaoning Provinces. Startup was supported with European Commission and Global Environment Facility (GEF) grant assistance, and a World Bank loan was provided to help finance growth, through the China Energy Conservation Project. These three companies successfully pioneered the business beginning in 1998, adapting the energy performance contracting concept to the Chinese market. A number of other companies began to pick up the successful model. The Second Energy Conservation Project of the World Bank and Chinese Government was

¹ The terms "ESCO" (energy service company), and "EMC" or "EMCo" (energy management company) are used interchangeably in China and mean the same thing---a company which engages in energy performance contracting for energy efficiency investment projects in other entities

launched in November 2003, to help develop a robust Chinese ESCO industry of more companies and expanding scale. The project includes support for the development of EMCA and the operation of a loan guarantee program for ESCO projects. I&G began operation of the loan guarantee program at the end of 2003. EMCA was officially launched in April 2004.

A company in China is considered an ESCO by EMCA if it complies with all of the following criteria: (i) it is an independent legal body implementing energy conservation projects, (ii) it has operated continuously for more than 12 months, (iii) the company's registered capital is not less than RMB² 1 million, and (iv) it has implemented at least one energy performance contracting project, and accumulated investment in energy performance contracting project of no less than RMB 1 million.

There are three basic types of energy performance contracts currently in use in China, and a variety of sub-variations. A common feature among them all is that the ESCO's compensation level is in some way dependent upon the actual achievement of the promised energy savings. The three basic types include:

- *Shared Savings Contracts.* The ESCO provides full project service, including investment financing, while the host enterprise cooperates with the ESCO in project implementation. The value of the energy saved is shared between the parties according to provisions in the contract, during the contract period. Anticipated energy savings cash flows to be shared (as well as the sharing ratio) may often be stipulated by mutual agreement upfront in the contract, based on experience with the given technology, so that payments to the ESCO follow an agreed payment schedule as long as the host enterprise acknowledges that the equipment operates as promised, and any agreed basic initial tests have shown satisfactory results. After contract expiration, the host enterprise retains all assets and future energy savings benefits.
- *Guaranteed Savings Contracts.* Host enterprises are responsible for project financing and coordinating with the ESCO in project implementation. The ESCO provides turn-key design, procurement and construction services, and guarantees the energy saving result. The client pays the ESCO a service fee, but the ESCO is obligated under the contract to compensate for any failures to meet the guaranteed energy savings targets specified in the contract.
- *Outsourcing of Energy System Management.* The host enterprise contracts the ESCO to manage all or part of its energy-use systems (eg. air conditioning, lighting, boiler facilities, on-site power generation, etc.) for a specified fee (or fee formula). The resulting fee is lower than the expected energy cost to the enterprise (including facility upgrading, if relevant) without the ESCO's participation. The ESCO undertakes any agreed investment and renovation, manages the facilities, and covers the payment of energy supply costs. The ESCO

² As of May 2008, US\$1=RMB 6.9.

is compensated through the difference between those costs and its fee, which results from energy efficiency gains.

Recent Development Trends

The size and importance of China's ESCO industry has grown especially strongly during the last several years. Probably about 40-50 core, well-established and knowledgeable ESCOs were operating in China in 2007, while the total number of companies reporting experience with at least one energy performance contract exceeded 400. Investment in energy conservation projects using energy performance contracting in 2007 was four times the 2005 level. Although still new to the energy and financial communities at large, many government and business people involved in energy conservation work have now at least heard of the concept---which was not true only 2-3 years ago.

The Government's great push to meet its aggressive targets to reduce the energy intensity of China's GDP by 20% during the 2006-2010 Five Year Plan has certainly helped foster this rapid growth in ESCO business. Local governments and enterprises across the country are under intense pressure to generate concrete energy savings. But there are other important factors driving the growth as well. The concept that payments to ESCOs are contingent upon delivery of specific energy conservation results is appealing to many customers, especially if they are unable to devote time themselves to assessing the technologies involved. Customers are often keen to pay for the investments using the cash savings achieved, if the ESCO can provide the upfront financing. Project profitability is strong in the market today: small and medium-sized projects typically generate handsome returns for both the ESCO and the client in only 2-3 years, while returns on larger projects generally require only a few years more. While the heavy reliance of this business on compliance with medium-term contracts still increases risk in China today, familiarity with the concept through experience and increasing business sophistication are helping to reduce this problem somewhat.

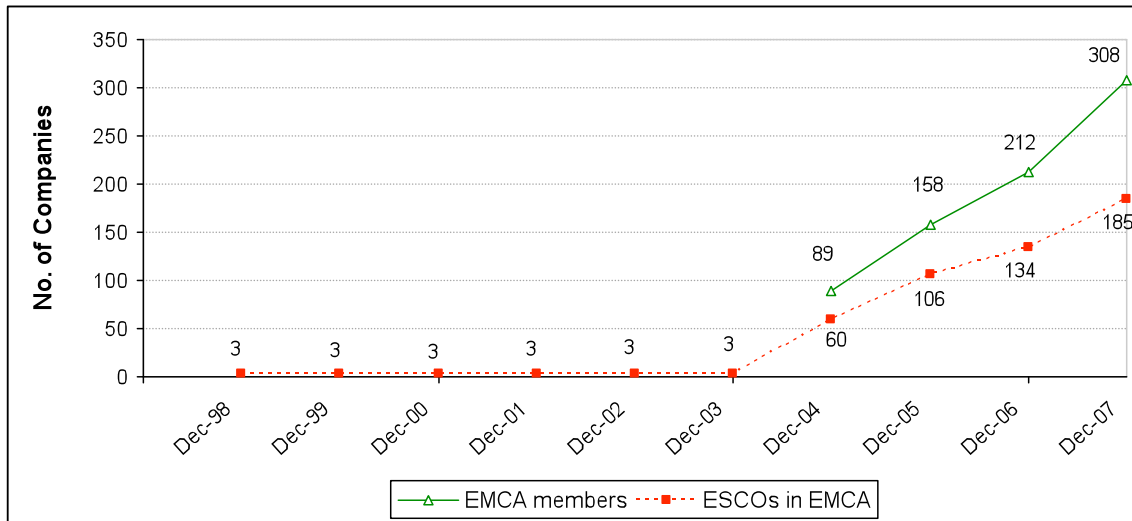
Growth in Numbers of Operating ESCOs.

EMCA was founded in April 2004 with a total of 59 members, of which 40 were ESCOs and the balance interested parties. At the end of 2007, EMCA had 308 members, of which 185 were classified as ESCOs (meeting the previously described criteria). Figure 1 shows the rapid growth of both the Association's membership and the number of operating ESCOs in the membership. In addition, the number of companies outside of EMCA reporting energy performance contracting business has increased from almost 70 companies in 2005 to some 261 companies in 2007. Although these companies independent of EMCA are typically very small companies, and may often be unstable, these raise the total number of ESCOs operating in China to over 400.

One category of the ESCOs includes firms which have relatively strong sources of capital, and are able to integrate a variety of types of energy conservation technology and

products for different markets. The first three pilot ESCOs fall into this category, as they had access to a World Bank line of credit, but there are also several new companies following this pattern.

Figure 1. Growth in EMCA Member ESCOs



The largest category of ESCOs includes companies whose business revolves around certain energy conservation technologies and products, and who see energy performance contracting as a means to expand market share. They seek financing channels, but also may have challenges maintaining technological innovativeness or broadening business scope.

Another group includes companies which have an excellent position to provide services to a specific customer market, and are able to use this position to arrange a variety of energy performance contracting projects if reliable technology providers and sufficient capital can be secured. Market development costs and client credibility risks are comparatively low.

Growth in Energy Performance Contracting Investment

Investment in energy performance contract projects of China's first three pilot ESCOs averaged about \$11 million in total during 1998-2001, and then doubled to about \$22 million per year during 2002-2003. New companies began to enter the market and develop the model. In 2004, the first year of the Second China Energy Conservation Project, total investment reached about \$94 million, of which the three pilot ESCOs accounted for about \$25 million. As shown in Figure 2, then, investment then grew very rapidly, reaching over \$1 billion in 2007. Investment in 2008 is expected to be yet higher.

The total energy savings which will be generated over the lifetime of the assets created (about 10 years, on average) through these investments also has grown sharply each year. Based on the energy savings and carbon emission reduction rates actually

achieved in 226 investments supported through the ESCO Loan Guarantee Program, estimated energy savings from 2007 energy performance contract investments total about 53 million tons of standard coal equivalent (see Figure 3). Associated carbon dioxide emissions reductions from 2007 investments alone total about 38 million tons of carbon, rising from just over 4 million tons of carbon in 2004.

Figure 2. Growth in Energy Performance Contracting Investments in China, 2004-2007

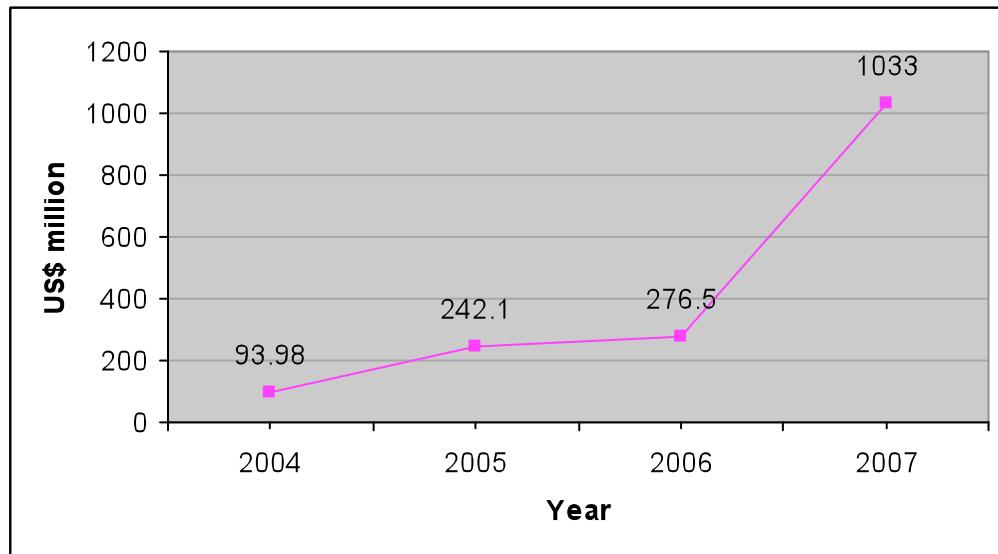
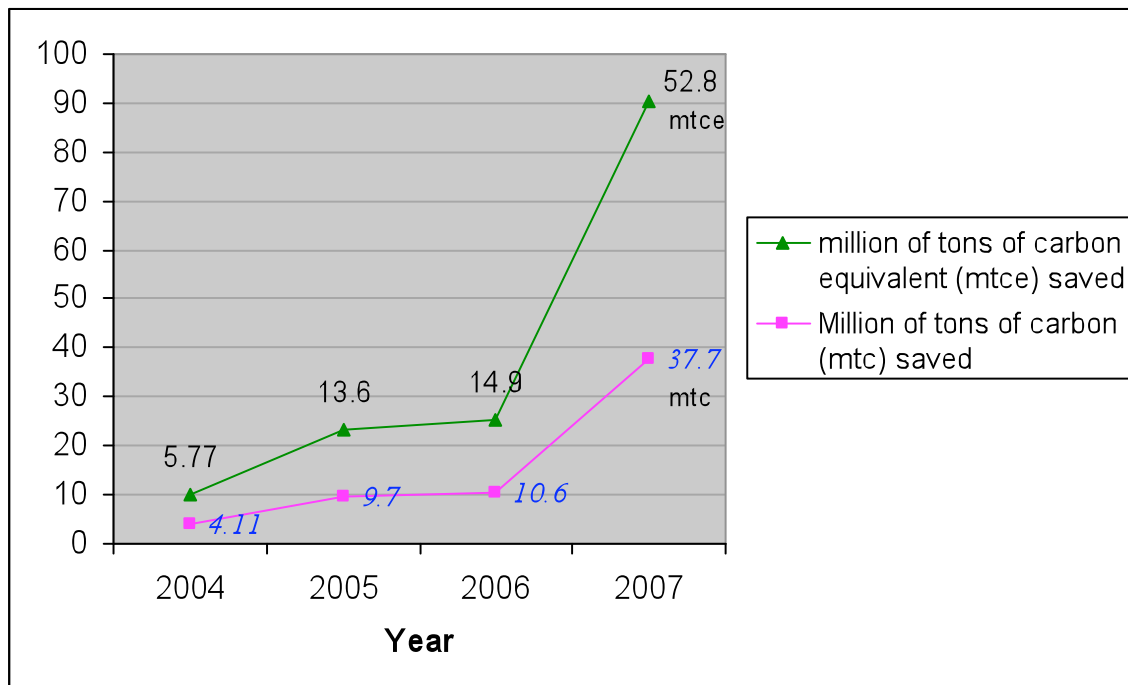


Figure 3. Growth in ESCO Energy and Carbon Emissions Saving in China, 2004-2007

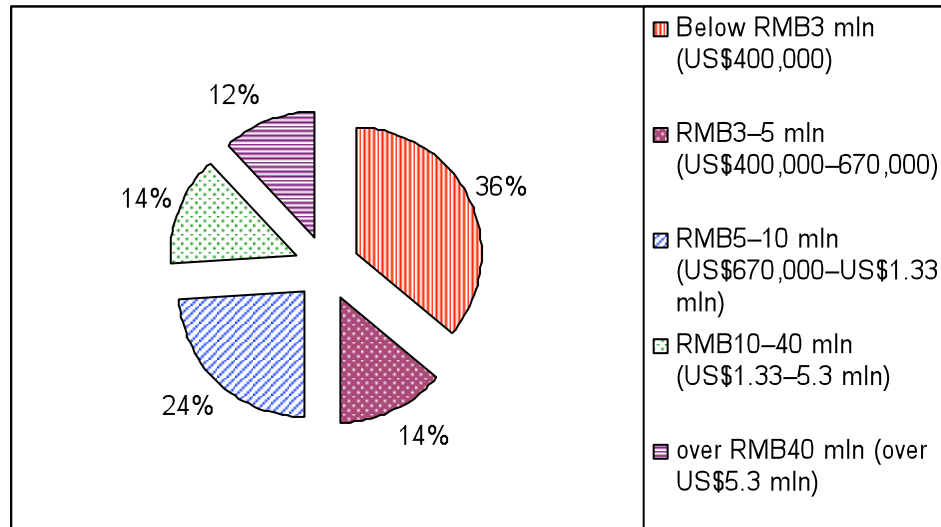


Status of the Industry in 2007

In 2007, the energy performance contracting investments of EMCA's 185 member ESCOs was just over \$900 million. The total energy conservation project investment of these companies was over \$1.5 billion, but not all project were undertaken using energy performance contracts. Non-EMCA members added a little over \$130 million in energy performance contracted investment in 2007.

Most of the ESCOs are small companies, but there are a number of fairly large ones (see Figure 4). Twenty-two companies engaged in energy performance contracting have registered equity capital of more than \$5.3 million each. However, about one-half of EMCA's ESCO membership has registered capital of less than \$670,000.

Figure 4. Size of ESCOs by Registered Capital



China's ESCOs are concentrated primarily in the fast-growing, relatively advanced eastern provinces. Many are registered in Beijing, even if their main markets are outside. However, ESCOs have still developed to some extent in the central and western provinces---EMCA member ESCOs have been registered in a total of 28 provinces.

Types of Projects and Contracts

China's ESCOs serve both industrial and building customers. Among 386 energy performance contract projects from 57 ESCOs reported to EMCA in EMCA's Fall 2007 survey, just over one-half were with building customers. Industrial customers accounted for a little under one-half, but were more dominant in total investment, accounting for about three quarters of contracted investment. While the average investment per project

was about \$1 million, the average size of industrial projects was \$1.7 million, while the average size of building energy efficiency projects was just \$400,000.

As shown in Table 1, shared savings contracts, under which the ESCOs finance the energy conservation investments, account for two-thirds of the total. Guaranteed savings contracts, under which the host enterprise finances the investment and the ESCO provides a financially-backed energy efficiency performance guarantee, account for 38%. Customer demand for shared savings contracts is high, even though ESCOs will take a larger share of the energy savings profits to compensate for the financing service. However, the role of guaranteed savings contracts in the current Chinese ESCO industry increases markedly for larger investment projects, as the ability of ESCOs to provide financing is typically tightly constrained. Thus, guaranteed savings contracts accounted for 71% of total energy performance contract investment, and shared savings accounted for only 25% of total investment. The same phenomenon can be seen from data on the average size of different projects. The average size of shared savings projects was \$400,000, while the average size of guaranteed savings projects was \$1.9 million.

Table 1. Use of Different Types of Energy Performance Contracts, 2007^{a/}

Energy Performance Contract Type	Percentage of Projects	Percentage of Investments
Shared Savings	66%	25%
Guaranteed Savings	38%	71%
Outsourcing	2%	4%

^{a/} Based on 386 projects reported by 57 ESCOs to EMCA in Fall 2007 survey

Outsourced energy management contracts reported in the 386-project sample totaled only 6. However, this business is growing, and contracts are often large. The average size of investments made under this model was \$2.8 million.

Among the projects reported by non-EMCA member companies, most of whom are quite small and fully privately owned (83%), average project investment size was \$682,000. Shared savings and guaranteed savings each accounted for roughly one half of the total number of projects. Shared savings contracts accounted for about two-thirds of total 2007 investment, with an average investment size of about \$950,000 compared to about \$430,000 for guaranteed energy savings. Customer views of the credibility of energy performance guarantees provided by some of these ESCOs may be an issue.

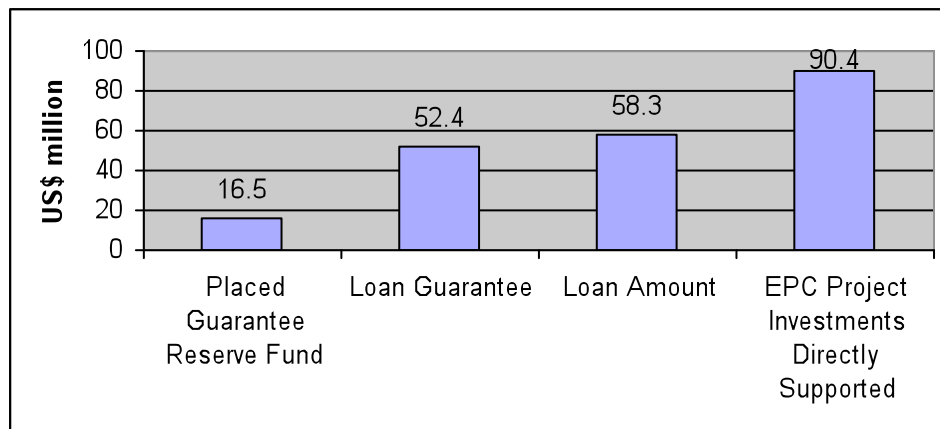
Sources of Financing

Arranging project finance, particularly for shared savings contracts, has been a significant constraint for ESCOs, especially new companies with relatively low registered

capital. Among the typical new entrants to energy performance contracting, whose business focus on a line or two of specific energy conservation technology, the tendency has often been to begin by relying on own sources of finance for financing support from shareholders or other strategic partners. Even for more established companies, formal financing arrangements through financing institutions such as banks may be less than what is common in other countries, and shareholder companies and other strategic partners often continue to play a key role.

The ESCO Loan Guarantee Program, operated by I&G as part of the GEF/World Bank/NDRC Second China Energy Conservation Project, has helped create a bridge for many ESCOs into the world of formal financing. With the backing of \$16.5 million placed in a special guarantee reserve fund held by the Ministry of Finance, I&G had issued loan guarantees totaling about \$52 million from 2004 through April 2008, providing support for specific energy performance contracting project investments totaling about \$90 million (see Figure 5). About 40 Chinese ESCOs have received loan guarantees for one or more of their projects. Twelve banks have participated so far. Efforts are being made to expand the business of the program, especially by continuing to develop new types of guarantee products.

Figure 5. EMC Loan Guarantee Program Support, 2004-April 2008



One of the most important contributions of the loan guarantee program has been to help many small and medium-sized companies just starting energy performance contracting establish their first credit records and develop a borrowing relationship with a bank for the first time. I&G has helped companies understand the requirements of lenders, and helped companies properly assess their financial affairs and improve their financial management. Formal participation in the ESCO Loan Guarantee Program has also helped companies better understand the mechanisms of true energy performance contracting. A substantial number of China's more famous new ESCOs paid for loan guarantees from I&G as a means to obtain initial loans for their business, and subsequently grew to become core companies in the new ESCO industry.

Relatively sophisticated energy performance contract project financing methods have recently begun to develop on both debt and equity sides. A few ESCOs have

developed factoring arrangements with banks, using receivables from executed contracts as security or even a source of cash for financing new projects. Some ESCOs have obtained lines of credit from banks, including with I&G guarantee support. A few ESCOs have taken advantage of opportunities with venture capital funds, and some Chinese ESCOs have been listed as publicly traded companies. A number of companies have restructured their private shareholding structures with injection of new equity from new shareholders.

Sources of Technology

To remain vitality in the market, ESCOs need to continue to develop and improve technological solutions to customers. In addition to continuing technological development internally, some current approaches include cooperation with owners of new technology as strategic partners or new shareholders, international cooperation to introduce technology from overseas into the Chinese market, development of unique corporate brands of energy management practice, and strategic cooperation with research institutes or universities.

Different service models also are developing. One core ESCO has obtained a financial leasing license. New energy management or combined energy supply and management outsourcing models are being explored, including long term “energy advisor”-type relationships with core clients. Some ESCOs seek to work together to provide multi-faceted, integrated solutions for large clients.

Some Challenges for the Future

Although growth in China’s ESCO industry has been impressive, the scale of the industry is still small compared to the needs of the energy conservation market in China. Energy performance contracting is still unfamiliar to many potential clients and the vast majority of financial system professionals. Understanding among even energy conservation technology providers is often poor. A large part of the ESCO industry consists of small companies who have weaknesses both financially and in technological capacity.

Continued, strong promotion of the energy performance contracting concept and propagation of the experience of successful ESCOs so far are obvious musts. Much work remains to be done to forge stronger linkages between ESCOs and domestic financing institutions, and further improve commercial financing mechanisms. Additional and formal policy support is also needed from the Government, particularly to help further anchor the legitimacy of the ESCO industry and to open the Government-owned facility energy conservation market to easier ESCO business.

The needs of China’s ESCOs vary, as industry includes different kinds of companies at different stages of development. The strongest ESCOs need to continue to roll out their company brands, continue technological innovation and market penetration efforts, and, in cases, may have further desires to enter into domestic and international

capital markets. The second tier, which includes companies with stable corporate positions and fairly clear development strategies, typically needs time to strengthen their businesses, through further marketing and further development of financing channels. Another group includes new companies that have strong shareholders or linkage to large-scale enterprises, providing big advantages for start-up, but needs to put the financial, technological and marketing aspects of the business together cleverly to establish solid long-term energy performance contracting businesses. The final, largest group includes the small, new start-ups, which face financial as well as technology and market capacity constraints, and hence have a full range of needs, but may eventually be the source of many of China's strong, core companies in the future.