GREEN BUSINESS OPTIONS

Resource Book

Energy Efficiency
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RESOURCE BOOK

Energy Efficiency
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Preface

The decreasing energy supply cannot be addressed solely through governmental regulation or protests from society. Improving energy efficiency is both a solution to resolving environmental issues and an opportunity for new business developments. Excessive media reporting on such a newly emerging industry usually exaggerates the potential business opportunities, or neglects risks in industrial development. Entrepreneurs who are determined to create businesses to address the shortage of resources in China must accurately understand government policies, the development of the market and must learn from the experiences of pioneers.

Both compulsory policies on low energy consumption and inductive policies on improving energy efficiency have motivated entrepreneurs to invest capital and create technology in the industry of energy conservation. Improvements in energy efficiency will become mainstream in the market and in businesses. This will contribute to sustainable development by relieving the energy crisis, while minimizing harm to the environment.

In light of this, this handbook aims to provide a complete range of resource information and successful cases for people interested in starting business in the energy efficiency industry. Entrepreneurs will gain a thorough understanding of Chinese government policies on energy efficiency improvement, resources available to them and be inspired by the experiences of business pioneers in this industry.
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Chapter 1. Background

The concept of “energy conservation” was first brought up during the 1970’s energy crisis and was aimed at tackling the energy issue by conserving and reducing the consumption of resources. The term “energy consumption” has evolved into the term “energy efficiency” which places an emphasis on enhancing technology in order to maximize the utilization of resources, and protect the environment.

The past 30 years of Chinese reforms and opening-up policies have seen China’s rapid economic development. This development came at the cost of over-consumption of resources, which put enterprises at risk of energy shortages, created a degrading living environment and posed a threat to the health and daily life of Chinese citizens. Excessive and inefficient energy consumption is not in line with the international trend of economic and sustainable development.

- China has surpassed Japan to become the second largest economy in the world. While China’s GDP grew, so did its consumption of energy;
- China’s energy consumption increased by less than 800 million tons of standard coal from 1980 to 2000, and increased by 800 million tons over the four year period from 2001 to 2005;
- The government has set a performance target for energy conservation and emission reduction in its “Eleventh Five-year Plan (2006-2010)” by pledging to reduce energy consumption per unit of GDP by 20%, noting that “conservation and development shall be emphasized while conservation shall be taken as a top priority”. In the “Twelfth Five-Year Plan (2011-2015)” sets the target of reducing the energy intensity per unit of GDP of 16% by 2015;
- Chinese citizens, however, strain energy infrastructure facilities by wanting to increase their standard of living. Rapid urbanization means that about ten to twenty million rural people migrate to cities every year, which sets higher requirements on energy services, and infrastructure;
- Energy consumption requires an urgent adjustment. Coal currently accounts for 70% of China’s total energy consumption, creates heavy pollution and has low energy efficiency, and accounts for 80-90% of total sulfur dioxide emissions;
- International politics have been facing pressure since the adoption of the Kyoto Protocol in December 1997. The global emissions of carbon dioxide from conventional energy use of coal, petroleum, and natural gas remain high. Energy and the reduction of emissions remain hot international issues;
- In 2005, the Chinese government pledged to reduce emissions during the next fifteen years, in the
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hope to eliminate the current production model of high energy consumption. Policy-based industrial restructuring triggered by this pledge will create new opportunities and hot spots in the market.

The central government has taken an aggressive approach to energy conservation and emissions reductions. Its decision to use the lowering of energy consumption per unit of GDP as the number-one indicator for rating the performance of local officials, and by appointing the legal representatives as responsible for energy consumption and emission reductions in enterprises reflect the seriousness with which the Chinese government has approached this issue. These decisions are expected to decrease total energy consumption by 20% per unit of GDP during each Five-year Plan period from the year 2005 onwards and by a total of 50% between 2005 to 2010. This will put direct pressure on the six major energy intensive industries of power, steel, non-ferrous metals, oil, and chemicals to improve energy efficiency. In the first quarter of 2010, 3.2% more resources than last year were consumed per unit of GDP, and by the end of 2010 19.1% of reduction was achieved in the 11th Five-Year Plan. The energy intensity target in the 12th Five-Year Plan is 16%. This indicates that the local governments are trying to decrease energy consumption per unit of GDP by raising the total value of GDP — and will mount more pressure on the enterprises in these industries during the Eleventh Five-year Plan period.

It has been relatively common to force energy intensive enterprises to shut down. According to the status report issued by the National Energy Administration in October 2010, the total capacity of all closed small coalmines exceeded the target set for the whole year. Still, the elimination of backward industries on such a large scale, contributes to only around 30% in overall energy conservation and emission reductions. Energy conservation policies rely mainly on technological advancement to achieve their goals. To date, the central government has invested more than RMB 200 billion to support technological innovation. It is estimated that, in next Five-year Plan period, closure of high energy-consuming enterprises will contribute less to energy conservation and emission reduction, and that a multitude of new policies will favor technological innovation and upgrading. For example, financial institutions will set up green credit policies, taking environmental responsibilities and performance as one of the important conditions for funding; tax authorities have launched favorable taxation policies to boost the energy conservation industry. Punitive measures also promote the development of energy conservation: businesses which fail to reach the standard in energy efficiency will be forced out, while medium- and small-sized businesses providing design and consulting service in energy conservation will have opportunities to develop rapidly.

Top-down administrative adjustment requires a powerful executive force, and improper execution often leads to opposite results than what is desired. Businesses can probe into the slightest demands and changes in market activities. With an increase in Chinese people’s environmental consciousness,
different companies and individuals have different demands for low energy-consuming products, making simplified adjustments difficult to meet the new demand market. Subtle adjustments can only be made by enterprises which are already familiar with the market for maximum energy conservation.
Chapter 2. Analysis of Domestic Policies

For those interested in starting a business in the circular economy, knowing government policies can help to foresee development trends for the industry and potential business opportunities. Currently there are three major types of public policies which are applicable: legal (mandatory) measures, financial or economic measures, and governmental action. Governmental action refers to conducting industrial restructuring and eliminating backward productivities through administrative power.

This policy analysis covers both the national and regional levels because policies in different regions of China can be either similar or different according to regional needs. The analysis on regional policies included is mainly based on experiences for regions of the East coast, like Jiangsu province.

The development of a new market may rely on the regulation of macro policies which are summed up in as follows according to their effect on improving energy efficiency:

2.1 Policy-based Market Opportunities

- Energy conservation is mandatory in public institutions, which opens up a market to be used by the government. Facilities in offices, namely air-conditioners, computers, printers, copy machines, lighting products, and water apparatus are included in the list of compulsory energy saving as stated in the Energy Conservation Law of People’s Republic of China and Comprehensive Scheme for Energy Conservation and Emission Reduction.

- Energy intensive entities are strictly supervised. Increasing this pressure can open up a new market in energy conservation. Currently, energy intensive enterprises which consume over 10,000 tons of standard coal annually and those which consume between 5000 tons and 10,000 tons as designated by the related organs of State Council or of provincial, autonomous regional, and municipal government will be regarded as key energy consumption entities according to the Energy Conservation Law of People’s Republic of China.

- Energy efficient vehicles including automobiles, motorcycles, trains, and cargo ships are favored by supporting policies. Scrapping and updating laws which pertain to old transportation carriers provides systematic support for the development of new pollution-free vehicles and creates a strong market demand for recycling waste products.
Furthermore, developing clean and alternative fuels for vehicles will be a promising market opportunity. (Energy Conservation Law of People’s Republic of China).

- According to the Energy Conservation Ordinances of Jiangsu Province, products that have an energy conservation quality certificate will enjoy preferential promotion. Entities in service industries shall choose the products, services and projects with high energy efficiency and low energy consumption without sacrificing the quality of services.

- The following is a list of light industries which will be eliminated by the end of 2011 as stated by the Comprehensive Scheme for Energy Conservation and Emission Reduction: straw pulp production plants with an annual output of less than 34,000 tons, chemical pulp production lines with an annual output of less than 17,000 tons, papermaking production lines with an annual output of less than 10,000 tons, backward alcohol production technology and alcohol (waste molasses made alcohol excluded) production plants with an annual output of less than 30,000 tons, MSG production plants with an annual output of less than 30,000 tons, citric acid production plants which fail to meet the environmental standard, leather production lines with an annual processed capacity of less than 30,000 pieces. Such adjustments will help industrial leaders to gain a large share of the market and achieve energy conservation goals through technological upgrading. There will be more possibilities in research and development of new techniques and new facilities in this industry.

- Technologies for energy conservation and emission reduction will receive policy-based support. Technologies which have great potential, wide application and which contribute significantly to energy conservation will be promoted in key industries like steel, non-ferrous metals, coal, power, petroleum and petrochemical, chemicals, building materials, textile, paper-making and construction. Agricultural machinery and facilities which reduce power and petroleum usage as well as agricultural technologies for water, fertilizer and pesticide reductions shall become popularized according to the Comprehensive Scheme for Energy Conservation and Emission Reduction.

- Products and facilities in industries like automobile, boiler, motor system, air-conditioning and lighting with wide application, great potential and quick return for energy efficient products and technologies will receive policy-based support as stated in the notice by the State Council on Further Strengthening of Petroleum Efficiency and Power Conservation.

- According to the notice by the State Council on Further Strengthening of Petroleum Efficiency and Power Conservation, budgetary investment and fiscal allocation by the central government shall be more focused on projects of petroleum conservation and substitution.
2.2 Fiscal Subsidies

- The implementation of Ten Major Energy Efficiency Programs in the Eleventh Five-Year Plan suggests that projects which adhere to one of the ten major national energy efficiency programs will receive fiscal subsidies. These include the coal-fired industrial boiler (furnace) reform program, heat and power cogeneration program, the program to reuse residual heat and pressure, program of petroleum conservation and substitution, energy efficiency program for motors, program to optimize the energy system, pollution-free lighting program, program of energy-efficient buildings, and program of energy conservation in government buildings, and the program of energy-efficiency technological services.

- Projects related to the coal-fired industrial boiler (furnace) reform program, reuse program of residual heat and pressure, program of petroleum conservation and substitution, program of motor drive efficiency, and optimization program of energy system are able to get fiscal incentives. Fiscal incentives are mainly directed at the projects of energy-efficient technology transformation in enterprises as stated in the Interim Measures for Administration of Fiscal Incentive Fund for Energy-efficient Technology Transformation.

- The use of high-efficiency lighting products instead of incandescent bulb or other low-efficiency lighting products are eligible for fiscal subsidies, according to the Fiscal Subsidies for Popularization of High-efficient Lighting Products. The subsidies will be granted indirectly to bid-winning enterprises who will sell their products to end-users at a price after deducting fiscal subsidies from the contracted price.

- Passenger vehicles, light commercial vehicles, and hybrid vehicles are eligible to receive subsidies. This subsidy is primarily given to 10-meter-long urban public buses. The local government is required to allocate special fiscal fund to subsidize the expenditures on purchasing, energy-efficient and new-energy vehicles, construction of support facilities and their maintenance as stated by the Pilot Program for Promotion Demonstration on Energy-efficient and New-energy Vehicles.

- Under the Benefiting Projects on Energy-efficient Products stipulation, the central government will grant subsidies to manufacturers of energy-efficient products who will in turn sell their products at a subsidized price. Currently China’s energy-efficient home appliances have a market share of 5-15%, which is expected to increase to around 30%.

- Ten categories of products with the energy efficiency Level 1, 2 and above will be popularized
between 2010 and 2013. This includes air-conditioners, refrigerators, flat-panel TVs, electric motors, etc. High-efficiency lighting products and energy-efficiency/ new-energy vehicles are also included. Split room air-conditioner with a rated capacity equal to or less than 7500W will be popularized after June 1st, 2010.

• Energy-efficient enterprises can acquire market opportunities during the transformation of residential buildings in northern China, according to the Interim Measures for Incentive Fund Management on Heating Measurement and Energy Efficient Transformation for Residential Buildings in Northern Area. Currently fiscal subsidies from the central government include: incentive for fender energy efficiency, incentive for devices which reduce consumption and control the temperature of indoor heating, an incentive for making more efficient heat equilibriums in the heat supply network.

• There are market opportunities in increasing the energy efficiency of government and large-sized public buildings. Currently fiscal subsidies from the central government include: expenditures for the construction of energy-efficient monitoring and supervising system which include expenditures for subsidies to set up a platform for monitoring and examining a building’s energy consumption, conducting statistics on buildings’ energy consumption, energy auditing and posting public notices on a building’s energy efficiency. These subsidies are all included in the Interim Measures for Special Fund Management on Energy Conservation of State Agencies’ Office Building and Large-size Public Buildings.

2.3 Tax Preferences

• Any corporate income from policy-abiding products manufactured by enterprises which utilize resources comprehensively are eligible for a preferential corporate income tax break which took effect on April 1st, 2008 under article 33 of the Enterprise Income Tax Law of People’s Republic of China in the Implementation Regulations of Enterprise Income Tax Law.

• Energy conservation service enterprises under energy performance contracts (EPC) will temporarily be exempt from business taxes on the taxable portion of their business income; assets which are formed based on energy performance contracts and are transferred to energy consuming enterprises for free will be exempt from value-added tax. These guidelines fall under the Suggestions on Speeding up Energy Performance Contracting (EPC) and Promoting Energy Conservation Service Industry.

• Energy conservation service providers under energy performance contracts, in line with
related stipulations in tax laws, will be exempt from corporate income tax for the first three years, and enjoy half reduction for the next three years as stipulated in the Suggestions on Speeding up Energy Performance Contracting (EPC) and Promoting Energy Conservation Service Industry.

• Reasonable expenses that energy consuming enterprises should actually pay to energy conservation service providers can all be deducted when calculating the taxable income amount in the tax year, without necessarily differentiating service charge or asset value in tax handlings. This guideline is in the Suggestions on Speeding up Energy Performance Contracting (EPC) and Promoting Energy Conservation Service Industry.

• Upon expiry of energy performance contracts, energy conservation service providers can transfer the assets which are formed based on projects of energy performance contracts to energy consuming enterprises as depreciated or amortization expired assets in tax handlings. Income from the ownership transfer of assets between energy conservation service providers and energy consuming enterprises are not accounted as the income of service providers.

• When enterprises purchase special equipment which is safe, eco-friendly, energy and water saving and specified in the Directory of Corporate Income Tax Preferences on Special Eco-friendly Equipments, Directory of Corporate Income Tax Preferences on Special Energy and Water Saving Equipments, and Directory of Corporate Income Tax Preferences on Special Safe Equipments, then 10% of the amount invested in this equipment can be deducted against taxes payable in the tax year. Any excess amount not offset due to insufficient taxable income can be carried forward in the five succeeding tax years.
Chapter 3. The Potential of the Energy Conservation Industry

The general guideline of Chinese government’s current energy development strategy is “to emphasize both development and conservation while conservation is taken as a top priority.” In dealing with the relation between energy development and energy conservation, energy efficiency should take first priority as China transforms from an extensive to intensive growth mode.

It is undeniable that the world’s energy resource is in short supply. Experts have indicated that by 2050 even the entire coal reserves on the earth will not satisfy the amount needed for China’s development. Electricity and liquid fuels are the most needed for China’s domestic energy consumption. Some enterprises in Guangdong and Jiangsu have already experienced power rationing of “2 days off and 5 days on.”

Research on General Environmental Strategy in China, led by the Chinese Engineering Academy and State Environmental Protection Administration, has clearly stated that by the end of the Twelfth Five-Year Plan, the output of environmental protection industry will be valued at RMB 2 trillion. Statistics by the International Energy Conservation Environmental Protection Association indicate that in 2010, the output value of China’s energy-conservation and environmental protection industry will exceed RMB one trillion, accounting for 3% of GDP. By 2020, this industry will be a pillar of China’s national economy, increasing at the annual rate of 12%-15%.

Still in its early stages, China’s energy conservation industry has much room for development. Energy-conservation technologies can bring profits to related enterprises and lower carbon emissions. Considering the general global context of energy usage, the Chinese government’s resolution to promote energy conservation as reflected in its policies, and development potential in the energy-conservation market, it is the opportune moment for private enterprises to seize these new market opportunities.

3.1 Market Space

According to a UNEP report issued during the Copenhagen Summit, construction, transportation and heavy industry have become the three major energy-consumers and CO2 producers. Premier Wen Jiabao addressed this in the 2010 Government Work Report, which writes that the government will reinforce its efforts to save energy and curb emissions in construction, transportation and heavy industry rather than
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putting an emphasis on alternative energy resources like it did in past years.

The Chinese government keeps watch and takes strict regulatory measures on the energy efficiency of existing residential buildings, government office buildings and large public buildings in northern China. China has the largest total number of buildings in the world, and it is still increasing by 2 billion square meters per year. Among these, over 95% are high energy-consuming. The energy required to heat one square meter of a building in rural and urban northern China is approximately 2 to 3 times that of the countries sharing the same latitude and climate. Large public buildings, namely high-class office buildings, hotels, large shopping centers, commercial buildings and traffic hubs consume as much as 100 to 300 kWh/m², almost 10 to 15 times the energy used in residential buildings. Increasing the efficiency of air-conditioning units and lighting facilities would reduce the energy consumption by 30%. Despite considerable profit in the energy conservation market, it still remains underutilized. This market capacity in Beijing alone is as high as around 600 billion RMB, with only 3% - 5% of it currently being exploited.

Currently, China’s construction market falls into three major categories, private buildings characterized by residences, commercial buildings exemplified by office buildings and hotels, and public buildings such as government offices. Among these, commercial buildings like hotels and apartments are sensitive to operational costs and suitable for private enterprises.

Enterprises don't manifest a strong will to save energy or cut down emissions, which leaves the market for energy-conservation and environment protection undeveloped. However, the speeding process of upgrading industrial structures and an increasingly strong resolution from the government means that the time has come for entrepreneurs to enter the energy-conservation industry.

The energy conservation and environmental protection industry is mainly based on offering service and counseling on energy-conservation in order to provide high-consuming, high-pollution enterprises with better solutions on energy consumption control.

For instance, under an energy performance contract (EPC), an energy-conservation service company provides a big shopping center with renovation ideas totaling RMB 3 million to conserve energy, from these renovations; the customer can save RMB 2 million worth of energy every year. Energy-conservation service companies sign fixed-term contracts with customers and share the energy-reduction benefits from the final profits of renovations. The payback period for an energy-conservation service enterprise varies from 3 to 4 years to conditions within an enterprise.

The three key players in the energy-conservation industry are the state-owned, private-owned and foreign-invested enterprises. State-owned enterprises have the advantages of more funding and policies and are mostly involved with energy-saving projects of high-consuming enterprises such as in
The potential of the energy conservation industry

electrolytic aluminum, metallurgy and steel-making. Foreign-invested enterprises enjoy technological advantages and have shares in nearly all market segments. Private-owned enterprises mainly sell energy-saving products.

Currently, the energy-conservation and emission-reduction industry is in its inception with companies of around ten employees. It can be hard for enterprises to expand in this market without having their own core technologies. Even with technological intellectual properties, new enterprises can’t promote their techniques to the market quickly enough due to insufficient seed funding. At present, the prevailing approach for new enterprises to open the market quickly is to create star projects with zero profit as models. Therefore, in their beginning stages, professional energy-conservation service companies have to endure lots of market fostering activities and invest heavily before they can convince customers to launch and carry out energy-conservation projects.

There are two tendencies in this industry worth noting for entrepreneurs: enterprises are shifting from simply providing energy-conservation equipment to taking over the whole energy-conservation process; and the government has begun to include emission reduction for small- and medium-sized enterprises (99% of the total Chinese enterprises) as a priority issue. Small and medium sized private energy-conservation service enterprises have a chance to keep away from SOE and foreign capital enterprises’ competition if they pursue these two trends.

3.2 Analysis on Potential Customers

Judging from data from the first quarter of 2010, six high energy-consuming industries (electricity power, steel, non-ferrous metal, building material, petroleum chemical, and chemicals) have seen an increasingly rapid growth. As a result, the average energy consumption per GDP unit has risen by 3.2% which poses great challenges to the reduction of energy consumption. In years to come, the government will continue to strengthen the leading role that policy plays on the market.

Government organs, institutions, various types of enterprises and individual consumers are all potential customers for energy-saving services. Among these, the government and enterprises are the main consumers. To private enterprises, there is no advantage in competing with large state-owned enterprises for government orders of compulsory energy-efficient products.

The new buildings intended for civilian use are the most difficult to make energy efficient. Whether or not the buildings are energy-efficient does not affect sales, thus there is no motivation to increase the budget to develop eco-friendly houses which “save energy, land, water and material”. Therefore government and commercial buildings such as hotels which are sensitive to water and electricity costs
are more likely to pay for energy conservation. For private enterprises, a breakthrough is most likely to be achieved in the scope of commercial buildings.

### 3.3 Commercial Risks

The energy-saving industry earned the reputation of being “the fifth industry” after a knowledge-based economy. In examining the fore-runners in this field, even foreign enterprises with strong technological support face the dilemma of unpredictable future profitability projections and initial over-spending. The main risks for start-up enterprises still come from government policy shifts.

Initiated by policies, the operation of the energy-conserving industry is closely related to the improvement of energy-conserving policies. For instance, in energy-efficient air conditioning, the precondition is to charge different electricity prices for different periods of time; while for business ventures, only when commercial use of electricity is also priced differently can energy-efficient air conditioning be possibly popularized in commercial buildings like shopping centers.

Currently, the commercial use of electricity is priced differently according to high, medium and low demand levels in Shenzhen which enables energy-efficient air conditioning to be widely adopted in commercial buildings. Other cities in the country, with different electricity pricing policies based on time-periods and demand are not yet established, thus curbing the development of energy-efficient air-conditioning enterprises.

Furthermore, compared to large state enterprises, private enterprises have an obvious disadvantage in receiving special subsidies from the government and acquiring bank loans. Despite recent government attention and support to energy-efficient and environment protection industries to make the environment more favorable to private enterprises, a large number of private enterprises still face problems caused by backward technology and a lack of funding.
Chapter 4. Analysis on Available Resources

The Energy Conservation Law of the PRC states that energy efficiency is a fundamental state policy. The government has adopted energy strategies which emphasize both development and conservation, with conservation as a top priority. The energy-saving industry has developed from a conceptual industry to one that is sought-after and brings great opportunities.

4.1 Environmental Opportunities for Energy-Efficient Industries

In 2008, China and the US each accounted for 20% of the world CO2 emissions. In 2009, China became the largest producer of CO2 emissions. It has also adopted the mandate to develop a low-carbon economy, an obligation which China, as a responsible power, should shoulder.

There are three ways in which to achieve low-carbon economy: control the source, the process and the end. The process of control refers to enhancing energy efficiency during the production and consumption stages with a purpose to reduce emissions. Relevant information shows that industrial energy consumption in China is about 30% higher than other developed countries.

The Chinese government’s approach on energy efficiency and emission reduction is clear. In 2007, the State Council issued the Comprehensive Scheme for Energy Efficiency and Emission Reduction drafted by State Development and Reform Commission with collaboration from other commissions, which clearly advances plans to establish and improve a performance index system, monitoring system and evaluation system for energy saving and emission reductions. The index results from the local social development evaluations to establish an accountability system and “veto” policies for energy-conservation related work, and to use these as an important part of the performance evaluations for officials and enterprise leaders.

The government has set rigid emission reduction targets for high energy-consuming and high emission enterprises. Energy conserving products such as air conditioners, electrical water heaters, water closet, etc., from energy-efficient enterprises, covering 10,239 types of products from 292 enterprises, are included in the compulsory governmental procurement list.

On the 3rd of August, 2010, the State Statistics Bureau, National Development and Reform Commission, and State Energy Administration jointly announced that China’s energy consumption per GDP unit in the first half of the year has risen by 0.09% instead of decreasing. A major target in the Eleventh Five-
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Year Plan was for China to reduce energy consumption by 20% of GDP in five years. This means that reductions must be more than 6% in the remaining 6 months — a heavy task considering that only 3.61% were reduced throughout last year.

4.2 The Creation of Environmentally Conscious Consumers

In December 2002, the UN General Assembly announced that it would undertake a ten-year education program on sustainable development from 2005 to 2014, calling on all national governments to include sustainable development in curriculums and education strategies.

This decision has created an opportunity for the emergence of the low-carbon market and economy. China has been enhancing the prominence of environmental protection in curriculums and has citizens which are increasingly aware of environmental protection. In April 2009, a green Channel of Sohu.com, one of China’s leading portal sites, along with China Environmental Protection Association, carried out a questionnaire-based survey about green consumption awareness. The questionnaire included 14 questions, geared towards people’s understanding of green consumption, the realms of greatest concern in green consumption, the purpose behind consuming green products, reasons for not consuming green products, expectations on the quality of eco-friendly products, and ways to raise awareness on green consumption. A total of 6349 people participated in the questionnaire.

![Public Expectation on Environmental Services and Products (%)](image-url)
The results show that consumers use green commodities in order to live a healthy life. Customers expect eco-friendly products to conserve resources as well as to be conducive towards good health. They believe that technological research and development should improve a products’ performance in “pollution reduction”, “reusable or can be utilized repeatedly” and “can be separately recovered and recyclable.” Public knowledge about diverse green qualities of eco-friendly products should be raised while innovations are made and a new market is developed. Green production can be used to guide public consumption.

What is the most effective method to cultivate environmentally aware customers? The survey provides us with an answer. According to the survey, the public thinks that the best way to raise green consumption is to “popularize it through the media”, next is to “strengthen education on green consumption.” If enterprises can combine their interest with those of consumers, society and the environment by using green marketing strategies, nurturing a green entrepreneurial spirit, and setting up green enterprise image, then the public will adopt concepts of green consumption and lean towards choosing green products.

4.3 The Mode of Operation for Energy Conservation Enterprises

The energy conservation industry consists of many branches. Private enterprises in the energy conservation business are mostly small, with around a dozen employees, and aim at a special market segment, to gradually secure a market share.
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There are three obstacles to overcome when creating a new business in the energy conservation industry:

First is how to develop a core technology on energy conservation. To cope with a possible lack of capital, a new business needs to strengthen its tie with academic institutions and use their research findings to develop its markets. Sharing its profit with academic institutions is no doubt a good strategy.

Second is on the promotion of energy conservation technology. When a good energy conservation technology is not gaining market share because of inadequate promotion, the first thing to check is whether it is safe for use. It is natural for new technology to go through an initial stage of improvements and adjustments before being accepted on the market. Saving energy is one thing, while safety is more important to a client. Therefore, we must advocate for products which are safe as well as energy-saving.

Third is how to prepare for the government-promoted Energy Performance Contract (EPC). It is risky for a start-up enterprise to position its main business on EPC projects. As EPC projects’ return on investment (ROI) requires a longer time, the company may face cash flow difficulties. Even if the company doesn’t expect getting the investment within 1 or 2 years, it has to pay for daily expenses with cash, most of which may rely on profits of the products. Therefore, as far as projects are concerned, a new enterprise needs to choose carefully so that it will not mainly rely on EPC projects.

EPC is a revolutionary business model, aimed at solving a certain number of issues arising in energy conservation industry. Generally in traditional business models, customers design, install and maintain the energy-saving product they purchase from enterprises, while the producer only provides an after-sale service. As an enterprise in the energy conservation field, all sections of the industrial chain should be studied carefully before deciding which services to provide.

Lastly is how to ensure the company’s competitive edge in energy conservation. For this purpose, enterprises in China need to keep closely in touch with environmental protection groups, who have been taking an increasingly active role in environmental protection, and whose work represents the latest trend in international environmental protection as well as in what environmental responsibilities customers in the west are asking from their enterprises.

4.4 Powering the Energy Conservation Industry with Talents

The energy conservation industry has been developing for years in the West. With the current expectation for the Chinese Yuan to rise, it will help enterprises to break the technical bottleneck and avoids twists and turns in strategic development if it hires technical experts from the West, who are
equipped with rich experience and knowledge in the energy conservation field.

With respect to the talent pool, the number of China’s four-year university graduates majoring in science and engineering are among the top-ranked in the world. Furthermore, many colleges and universities in China provide instruction in subjects to cultivate talents in the environmental protection field. However, the current educational system still contains a huge gap between what is taught in school and what is needed at work. Lack of experience is common among college graduates. What worries enterprises more is that that colleges graduates do not have a solid foundation in theory either.

Therefore, it is necessary for new enterprises to build talents from scratch by setting up and maintaining a sustainable professional training system. If conditions permit, enterprises should co-train talents with relevant colleges and universities, in order to ensure a stable and sustainable supply of talent.

Currently, a relatively good way of bridging theory and practice is to hold training courses for staff in the energy conservation field in which participants may receive a master’s degree in engineering. For example, postgraduate training courses for masters of engineering in the energy conservation and emission reduction field, jointly launched by the University of Science and Technology of China and the Anhui Council for Promotion of Energy Conservation and Emission Reduction, aims at cultivating talents in four fields: industrial energy conservation, new energy engineering, energy management and environmental protection.

4.5 Building an Effective Partnership and Relationship Network

A complete chain of services in the energy conservation industry ranges from technical research through to the manufacturing of a product and includes the stages of designing, diagnosing, counseling of a project to its implementation, financing, operation managing, launching production, until post-sale service. It’s almost impossible for a new enterprise to cover the entirety of the process. Therefore, apart from positioning itself in the right segment, for a new energy conservation enterprise to be successful, it is necessary to form a community of common interests by uniting and coordinating with not only service providers at all segments of the industrial chain but also with people, companies and institutions from all walks of life.

Organizations that support energy conservation industry like green industry associations, green industry alliances, and NGOs may also contribute to the enterprise’s development. By cooperating with these organizations, an enterprise can familiarize the trends in the energy conservation industry, thus making a timely adjustment on its strategy and target market; as well as establish its green brand and expand its market by participating in certification and appraisal activities in line with development of energy
conservation industry.

As an emerging industry, it is wise for an energy conservation enterprise to shoulder its social responsibility by joining in public welfare organizations’ efforts. Actively participating in public welfare will help shape a good image of the enterprise and industry till it is accepted by customers as a sustainable brand.

In addition, a channel to communicate with the government should be established so that the enterprise can get to know the direction of government policies for energy conservation.
Appendix 1: List of Supporting Institutions

At present, the main driver in supporting circular economic development is the central government, and its rules and regulations play an important part in changing the existing economic developing mode of high energy consumption. Industrial associations have contributed a lot to the development of energy conservation and emission reduction, by actively assisting the government to create favorable policies and standards, and provide enterprises with relative information, technological consultation and training. Various NGOs have undertaken activities such as giving green entrepreneurial training and providing training programs on business developments in order to promote the circular economic development.

<table>
<thead>
<tr>
<th>Government agencies</th>
<th>Name</th>
<th>Mission</th>
<th>Related projects</th>
<th>Website</th>
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<tbody>
<tr>
<td>National Energy Conservation Center</td>
<td>Researching on energy conservation policies, regulations, plans and management principles; When authorized by relevant government departments, analyzing and appraising project energy conservation feasibility of investment on fixed assets, giving assessment advice; Organizing promotion activities for energy conservation technology, product and alternative mechanism; Advocating and publicizing energy conservation concept, providing training and counseling services related to energy conservation; Managing the China Energy Label as authorized by relevant government departments; Organizing international exchanges and cooperation in the field of energy conservation; Other relevant work authorized by National Development and Reform Commission or other government departments</td>
<td>Research and establish middle and long term special planning programs for promotion of energy saving lamp; State-level program for energy conservation institutions’ capacity building of spreading energy conservation information;</td>
<td><a href="http://gjjnzx.ndrc.gov.cn/">http://gjjnzx.ndrc.gov.cn/</a></td>
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<tr>
<td>Center of Energy Efficiency of Buildings, Ministry of Housing and Urban Development</td>
<td>Establishing policies and regulations related to construction and energy conservation as entrusted by Ministry of Housing and Urban Development; Undertaking technological research, development, management and promotion of model projects related with constructional energy conservation; Promoting international cooperation and exchange on constructional energy conservation.</td>
<td>Application of model construction projects with renewable energy led by the Ministry of Housing and Urban Development / Ministry of Finance; Solar energy application projects; Heat pump model projects Model projects on renewable energy integrated in buildings led by Ministry of Housing and Urban Development / Ministry of Science and Technology;</td>
<td><a href="http://www.chinaeeb.gov.cn/root/index.aspx">http://www.chinaeeb.gov.cn/root/index.aspx</a></td>
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</table>
### National Administrative Center for Energy Saving
- Monitor, supervise and put forward executive orders on energy waste activities, in accordance with state (industrial and local) regulations and technological standards related to energy conservation.
- National technical service center for energy conservation measurement test; Entrepreneurial training center
- [http://www.jnjc.org/](http://www.jnjc.org/)

### Industrial associations

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<th>Name</th>
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<th>Related projects</th>
<th>Website</th>
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<tbody>
<tr>
<td>China Energy Conservation Association</td>
<td>First-level association of energy conservation registered within the Ministry of Civil Affairs, with a large number of members in industries of power, coal, petroleum, mechanics, electronics, metallurgy, chemicals, railway, transportation, construction materials, nonferrous metal, environmental protection, etc.</td>
<td>China End-Use Energy Efficiency Project; EU-China Energy and Environment Project</td>
<td><a href="http://www.cecaweb.org.cn/CN/index.html">http://www.cecaweb.org.cn/CN/index.html</a></td>
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<tr>
<td>China Association of Resource Comprehensive Utilization</td>
<td>Aimed at improving energy efficiency, energy conservation, environmental protection, unifying economic, environmental and social benefits, and pushing forward sustainable development of Chinese economy and society. Providing all-round services for government organs and members regarding policy analysis, consultation, technical protection, market development, professional training, conference exhibitions, international exchanges and cooperation.</td>
<td>Standardization planning programs for comprehensive utilization of resources; Strategic alliances of technological alliances in renewable resource industry;</td>
<td><a href="http://www.carcu.org/">http://www.carcu.org/</a></td>
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### Non-governmental organizations (NGOs)

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<tr>
<th>Name</th>
<th>Mission</th>
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<th>Website</th>
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<tr>
<td>International Labour Organization (ILO)</td>
<td>Founded in 1919, The International Labour Organization (ILO) is the tripartite UN agency that brings together governments, employers and workers of its member states in common action to promote decent work throughout the world.</td>
<td>Green Business Options (GBO); START YOUR BUSINESS(SYB) entrepreneurship training program</td>
<td><a href="http://www.ilo.org/beijing/lang-zh/index.htm">http://www.ilo.org/beijing/lang-zh/index.htm</a></td>
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<tr>
<td>Shell Foundation</td>
<td>Assisting poverty-stricken population with necessary energy and infrastructure.</td>
<td>Promotion of technological innovation and spreading of China and international residence-use high-efficient and low emission bio-mass cooking range technology; China Biogas Commercialization Project;</td>
<td><a href="http://www.shell.com.cn/home/content/chn-zh/environment_society/society_environment/shell_foundation/">http://www.shell.com.cn/home/content/chn-zh/environment_society/society_environment/shell_foundation/</a></td>
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<tr>
<td>Supporting Institution</td>
<td>Description</td>
<td>Program/Project</td>
<td>Website</td>
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<td>Alashan Society of Entrepreneurs &amp; Ecology (SEE)</td>
<td>Taking Alashan SEE region as a starting point, solving desertification issue through community-based integrated development solution, while urging Chinese entrepreneurs to assume more social responsibility, environmental responsibility and to promote environmental protection and sustainable development.</td>
<td>Idea Competition of Chinese University Students; on Environment Protection Green Leadership Training Program; SEE Eco-Award;</td>
<td><a href="http://www.see.org.cn/">http://www.see.org.cn/</a></td>
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<tr>
<td>International Finance Corporation (IFC) of World Bank Group</td>
<td>IFC, the private sector arm of the World Bank Group, shares its mission to provide investments and advisory services to build the private sector in developing countries and to help them escape poverty and improve their lives.</td>
<td>Energy fund</td>
<td><a href="http://www.ifc.org/chines">http://www.ifc.org/chines</a></td>
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<tr>
<td>Energy Foundation</td>
<td>Since its inception, the CSEP has invested $60 million, including over 400 grants. It has over 60 policy development and implementation projects underway in 19 provinces. CSEP focuses on China's most energy-consuming sectors, including buildings, industry (iron and steel, cement, petrochemicals), electric utilities, and transportation. We prioritize allocating grants to those projects with the greatest carbon dioxide reduction benefits.</td>
<td>China Sustainable Energy Program</td>
<td><a href="http://www.efchina.org/">http://www.efchina.org/</a></td>
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<tr>
<td>Global Environmental Institute, GEI</td>
<td>Sustainable rural development program: aimed to develop renewable energy and organic agriculture; Energy and climate change program: aimed to increase the efficiency of fossil fuel use through the commercialization of clean energy and energy saving technologies, exploring new commercial and financial models; Environmental governance program: aimed to establish environmental regulations for overseas enterprises, etc.</td>
<td>GEI-The Asia Foundation: Eco-Entrepreneurship Training Project Capacity building on business opportunities for CDM (Clean Development Mechanism) projects in China</td>
<td><a href="http://www.geichina.org">http://www.geichina.org</a></td>
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