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Preface

Resource recovery has been attracting more and more attention in China in recent years, for it is not only good for the environment by reducing the waste, but will also generate considerable economic benefits. More importantly, the advancement of resource recovery will lay a solid foundation for the establishment of circular economy and sustainable development of China.

At the current stage, the recovery industry in China still faces various issues, such as uneven development within the industry and severe secondary pollution, which has restrained the industry from playing its role in economic development and environmental protection. The industry is in urgent need for greener and more efficient enterprises to enhance the overall level of the whole industry.

The Book was complied to provide useful information, operation skills and market analysis for people interested in starting green business in the resource recovery industry, and help them in their first step of green entrepreneurship. Of course, the information provided by this Book is not enough to guide the entrepreneurial practice, so we also attach the contact information of several government agencies, industrial associations and non-governmental organizations to the Book. We hope that readers will have an extensive and profound understanding of the industry, master the market dynamics of the industry, and make a meaningful attempt to start a green business.
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CHAPTER 1. INTRODUCTION

In recent years, the waste issue has become more and more closely related to our social life. For most of us, the waste means nothing but a crisis. But for entrepreneurs with keen insight, there are opportunities too good to be missed lying behind the issue.

Let’s talk about the crisis first.

Among all the environmental problems caused by modernization and urbanization, the waste issue poses an extremely severe and pressing challenge to the public. In 2002, the per capita waste in Shanghai already exceeded that of developed countries. And in 2009, Beijing had to transport and dispose of 18,400 tons of domestic waste per day, that is, 6.72 million tons per year, 7.5 times of the size of the Olympic Water Cube. What’s more, Beijing has over 500 unofficial refuse dumps, each with the size over 1,000 square meters. They are mostly located between the fifth ring and the sixth ring, besieging the city we live in.

According to the media, the total length of waste transport vehicles needed per day in Beijing is as long as the third ring road; the domestic waste generated per three days in Shanghai can fill in a football field, and that generated per 16 days is of the same size of Jin Mao Tower . Besides Beijing and Shanghai, two thirds of the nearly 700 cities in China have been besieged by waste, with one fourth of the landfills having almost reached their maximum capacity. That’s why in recent years, the expression “City Besieged by Waste” has appeared more and more often in news reports.

In addition to large cities, many medium and small cities and even rural areas have become victims of the waste problem. We must not neglect the environmental problem and sanitation problem caused by waste, or the severe harm to the health of workers and local residents done by the extensive recycling models (i.e. electronic waste is burned down without proper regulation in places such as Guangdong.)

Now let’s look at the business opportunities.

One major reason for the waste crisis is that the solid waste management and recover industry in China is still primitive in terms of development pace and operation level. There are many vacancies and challenges which are worthy of the attention and attempts of entrepreneurs.

To resolve the waste crisis, it is a pressing need of the whole society to reduce the pollution and harm of waste in the origin and subsequent stages through effective waste management, and utilize resources effectively.
From the point of resource recycling, many resources are wasted in the production and domestic use in China. Resource shortages have become more and more common. We are in urgent need of an effective, safe and environmentally friendly resource recycling industry; in particular, the government, enterprises and the public attach great importance to the recycling of waste and used items that are recyclable.

### 1.1 Current Situation of the Renewable Resource Recovery Industry and Its Relations with the Environment and Climate Change

The amount of waste has been growing rapidly, which has imposed huge burden on the living environment of the public, and the urban and rural construction and development. The waste that is piled up outdoors will generate a large number of harmful gases; the percolate of refuse dumps will pollute the soil and the water systems; the various microorganisms contained in the waste can cause many diseases; and the burning of waste will generate poisonous organic pollutants such as dioxin, and will transmit many harmful substances such as heavy metals in the air. Besides those traditional environmental problems, studies show that waste is one of the sources of greenhouse gases in the world. The waste, when piled up or being disposed of, will generate a large quantity of greenhouse gases, such as carbon dioxide and methane, which will accelerate climate change. What’s more, the storage and landfill will occupy a lot of precious land resources.

Waste not only brings negative impact on the environment and the climate, but also becomes a severe problem closely related to economic and social development. Since 2007, several waste-fueled power plants have been launched in many places in China, which led to the opposition and protest of residents and even mass clashes in many cities. These clearly reflect the social problems caused by waste.

It is common international practice to earmark two thirds of the funds for the management of waste such as waste reduction and waste-to-resource transformation, with only the remaining one third for waste disposal. However in China, more than 90% of the funds are being used to collect, transport and dispose of waste. In recent years, as the urban areas and residential areas expanded, it became more and more difficult to choose the site for waste burning plants and landfills. The mixed waste collected makes recycling more difficult. Here is one typical example. Although China has mastered the comparatively advanced techniques for plastic recycling and treatment, because the sanitation departments fail to collect the plastic waste separately and residents mix the plastic waste with other waste when disposing them, the renewable resource enterprises cannot use the plastic waste for recycling for it contains many foreign matters. Therefore, some enterprises have to import classified
and clean plastic waste as their raw materials from other countries.

Since the above issues have increasingly had a severe impact upon the environment and society, the government, the academic circle and public welfare organizations are beginning to pay more attention to the role of the resource recovery industry in China.

1.2 Green Business Opportunities and Employment in the Renewable Resource Recovery Industry

There are many business opportunities behind the current waste problem. It is estimated that the renewable resources that are recyclable are worth of about 300 billion yuan. However, the current recovery rate of waste plastics is only 25%, waste rubber 32%, waste paper 35%, and of waste glass 13%. The recovery rate of organic domestic waste (including catering waste) that accounts for 50% to 60% of the urban domestic waste remains very low. Every year, about five million tons of waste iron, 200,000 tons of waste nonferrous metals, 14 million tons of waste paper and a large quantity of waste plastics, waste glass and waste electronic products are disposed of with other waste, which is a huge waste of resources. Therefore, China has great potential and room for improvement for the recovery and comprehensive utilization of renewable resources.

As far as waste treatment is concerned, China and other countries are making efforts to turn the waste into resources, the premise of which is the classification and collection of waste. The recycling of waste greatly reduces environmental pollution caused by landfill and burning of waste, and furthermore, will greatly enhance the use efficiency of renewable recourses, and reduce the exploitation of original resources. It is estimated that the recycling of per 10,000 tons of waste can save 41,200 tons of natural resources, and 14,000 tons of standard coal of energy, and reduce six to 10 tons of waste to be disposed. Every 10,000 utilized waste iron and steel can produce 8,500 tons of steel, save 20,000 tons of finished iron ore, and 4,000 tons of standard coal, and reduce 12,000 tons of slag. Every 10,000 tons of utilized waste paper can generate 8,000 tons of paper pulp, save 30,000 cubic meters of wood, 10,000 tons of standard coal of energy, and one million tons of water, reduce over 900,000 cubic meters of carbon dioxide, and save six million kilowatts of electricity. Spending more effort on developing the recovery and recycling industry will effectively ease the increasingly severe resource shortage in China. The Chinese government vigorously encourages the development of circular economy and renewable resource industry, with improvements made in the reduction and harmless treatment of urban domestic waste and the waste-to-resource transformation. We will develop better laws and regulations and policies to safeguard the development of the recovery industry.
1.3 Development Trend of the Renewable Resource Recovery Industry

With the economic restructuring and social development, the renewable resource recovery industry has gone through a series of development phases and demonstrated the following development trend:

Non-public enterprises will continue to dominate the renewable resource recovery industry

With the rapid development of the socialist market economy in China, the monopoly of materials departments and supply and marketing cooperatives in the planned economy period has been fundamentally changed. A large number of rural residents have flocked into the industry which requires small investment and low technology. As a result, private enterprises and joint-venture enterprises are rising up in the industry. On the contrary, due to heavy historical burden, insufficient economic benefits and declining business, state-owned recycling enterprises have to alter their business scope. Currently, non-public enterprises such as private enterprises and joint-stock enterprises account for 70% of the recovery industry, and state-owned enterprises account for 30%.

The operation model gradually shifts to in-depth processing and multi-area development

In recent years, renewable resource recovery enterprises have made constant efforts in in-depth processing. They have abandoned the traditional operation model of “collecting + selling out”, but adopted pre-processing steps such as cleaning, oil removal, stain removal, drying, disassembly, cutting, packing, grinding, sorting, and impurities removal, to enhance the utilization efficiency of renewable resources for processing. For example, they clean the waste plastics before grinding and processing them into plastic particles to be used as the raw material; extract the waste nonferrous metals and process them into the raw material; process off-cuts into small-sized products; and disassemble, pack and compact the waste that cannot be directly utilized and supply them to production enterprises.

The demand on specialized personnel is increasing

With the issuance and improvement of decrees, laws and regulations regarding the renewable resource market in China, as well as the raised entry barriers to the market, the enterprises in the industry will be restructured and consolidated. Some enterprises or self-employed individuals will be kicked out due to their smaller size or backward technology, leaving some personnel to be re-employed. In the future, the recovery enterprises with a development vision will adjust to local conditions, make strategies, and
introduce, hire and recruit talents when appropriate. According to incomplete statistics, there are nearly 10 million people engaged in the waste recovery industry. After market integration, a considerable part of personnel will have to look for a new job, including professionals with years of experience. Now many colleges and universities also provide majors related to the recovery and recycling of renewable resource. The education of professionals will play an important role in the future development of the recovery industry.

1.4 Relevant Support and Preferential Policies

Overview of relevant policies and regulations

In the fifth session of the 10th National People’s Congress (NPC), it was decided to include the recovery and recycling of waste into the “Comprehensive Utilization of Resources”, one of the six major aspects of developing circular economy in China.

In the fourth point of the third section “Place More Effort on Industrial Restructuring, Resource Conservation and Environmental Protection” of the Report on the Work of the Government delivered in the fifth session of the 10th NPC, Premiere Wen Jiabao remarked that, “(We) shall vigorously develop the circular economy; build a batch of circular economy demonstration zones in major industries, industrial parks and zones, and urban and rural areas; improve the preferential tax policies regarding the comprehensive utilization of resources and the recovery of renewable resource; and push ahead the comprehensive utilization of waste and the recovery and recycling of waste.”

In the fifth section “Strengthening the Comprehensive Utilization of Resources”, Chapter XXII “Developing the Circular Economy” of the 11th Five-Year Plan passed in the fifth session of the 10th NPC, it is pointed out that, “(we shall) push ahead the recovery and recycling of waste paper, waste metals, waste tires, and waste electronic products; strengthen the transformation of domestic waste and mud into resources.”

In the 12th Five-Year Plan Outline issued in March 2011, it is clearly stated that we shall improve the resource recycling system. This was an important policy signal.

The above policies and decisions made by the Central Government on waste recycling have made it clear that, the waste-to-resource transformation, that is, the development and utilization of renewable resources, is important to protect the ecological environment, and also an important measure to utilize resources in an efficient way, to save energy, reduce environmental pollution and increase economic benefits. In fact, in the past two decades, China has been promoting the issuance of a series of laws,
recycling and policies to encourage and regulate the development of the renewable resource recovery industry.

From the 1990s till now, the Central Government and some local governments have issued some laws, regulations and ordinances in favor of the development of the renewable resource recovery system, including the Catalogue of Resources for Comprehensive Utilization, Law of the People’s Republic of China on the Prevention and Control of Environmental Pollution by Solid Wastes, Renewable Energy Law of the People’s Republic of China, and Circular Economy Promotion Law of the People’s Republic of China, all of which have been put into effect since 2001. These documents have fully demonstrated the great importance attached to the recovery and treatment of waste and the principle of making renewable resources as one of the major resource supply sources. China has also made some preferential policies to support the development of recycling-related industries, subsidizing or reducing the taxes of the renewable resource industry.

On March 1, 2007, six ministries including the Ministry of Industry and Information Technology issued and implemented the Measures for Controlling the Industrial Pollution of the Electronic Information Industry. On March 27, 2007, six ministries including the Ministry of Commerce (MOC) issued the Administrative Measures for the Recovery of Renewable Resources, followed by the Administrative Measures for Departments In Charge of the Recovery of Renewable Resources issued by the Office of the MOC. These regulations have improved the operation procedures of the recovery and the renewable resource industry, enforce, manage and effectively regulate the recovery order of the renewable resource industry. Local governments in Jilin, Hangzhou and Zhengzhou also promulgated local ordinances such as Renewable Resource Administrative Regulations or Renewable Resource Administrative Measures that are in line with local conditions. The recycling and development of the renewable resource industry is being improved, which opens up new opportunities and broad prospects for the development of the renewable resource industry.

Policy orientation of competent departments

For entrepreneurs in the renewable resource recovery industry, the MOC is the most important competent department. The MOC and local commerce bureaus and commerce commissions are the major supervisor and strong supporter of the recovery industry.

In the recent couple of years, the MOC and the Ministry of Finance (MOF) has allocated a total of 1.75 billion yuan to support the construction of 33,075 recovery points, 181 classification centers, and 22 renewable resource markets in 44 cities, and 36 regional large-scale renewable resource markets. This year, they will continue to channel funds to support the construction of the recovery system in 10 pilot
cities and the construction of regional recovery bases in 20 provinces. The recovery network of pilot cities has taken shape with the construction of “three into one” as the core.

The MOC has launched the construction of two batches of pilot renewable resource recovery systems and determined 55 pilot cities and 11 regional recovery bases. The pilot cities have formed the recovery development model consisting of “community recovery points, sorting and classification & processing centers and renewable resource markets”, with the recovery rate of renewable resources climbing up from 40% to about 70%.

As to the specialized policies, five ministries including the MOC and the National Development and Reform Commission (NDRC) have promulgated the *Administrative Measures for the Recovery of Renewable Resources*, and opened the online filing system for recovery operators.
CHAPTER 2. BUSINESS OPPORTUNITIES

2.1 Development Trend of the Renewable Resource Recovery Industry in China

Since the 1980s, the recovery industry in China has witnessed huge development, with its scale tripled in only five to six years. The price of most recycled waste has remained stable in this period, which makes the waste recovery business profitable while minimizing its risks. Moreover, the recovery industry has a very low entry barrier to entry. Inexperienced self-employed individuals can start the business with only a few hundred yuan. It takes tens of thousands of yuan to set up a booth in the waste recovery market, engage in simple recovery business, and conduct recovery and processing with the household as the unit.

In some places, the waste recovery business is still characterized with a low barrier to entry, low technical requirements, and small financial input. But for today’s entrepreneurs, if they want to grow and sustain the business, they must foster strong awareness of environmental protection and resource conservation, gain insight into the development trend of the Chinese market, in addition to a certain amount of financial input, understanding about the policies and regulations on the administration of renewable resource recovery, and mastery of basic know-how.

The general development trend of China’s renewable resource recovery industry is shown as follows:

- In the following decades, there will perhaps be a need for the continuous growth of almost all the renewable resources. The demand on waste bronze, waste iron and waste aluminum will also continue to grow. Among all the waste produced in China, the demand on waste plastics will witness the most rapid growth. In addition, electronic waste and auto waste will also increase rapidly.

- Hazardous home furnishing waste (such as energy-saving fluorescent lamp bulbs, aerosol cans, paint and lubricant) is another rapidly growing sector in China. There are huge business interests behind the local business mode of appropriate treatment of such waste and recovering the recyclable.

- The recovery industry emerges in every field and will become more and more specialized. Therefore, the business plan shall set forth the goal of continuously improving the professional level of classification and processing, and maximizing the quality and purity of waste flow when processed.
Recycling and Waste Management

- As digital products become more and more popular, high-tech electronic waste (such as mobile phones and laptops) has become a major category for recovery that cannot be neglected. Since these electronic products contain high-value materials including gold, silver and rare earth, their recovery has become and will continue to be an important growth area. In this regard, for entrepreneurs that haven’t commanded the high technology, how to explore effective recycling channels remains a question that deserves deliberation.

Opportunities vary from place to place. The urban areas obviously have the largest number of recyclable waste, including the domestic waste and industrial and commercial waste, but each area has its own advantages and disadvantages. For example, at primary and middle schools, universities, and office buildings, the major renewable resources for recovery are waste paper and waste electronic products, while in the service sector such as shopping malls and supermarkets, the focus shall be placed on packing materials.

Notice shall be paid to the following variants in the process of recovery:

- The level and type of urbanization in the local area: the recovery industry is closely related to all kinds of used and abandoned reusable materials, which are closely related to the short-and-mid-term development trend of the local area. For example, some towns and suburban districts are promoting urbanization with extensive demolition and infrastructure construction, which provides golden opportunities for the recovery of ferrous metals and building materials. Though there are fewer waste building materials in the downtown of developed cities (such as Beijing and Shanghai), they are the consumption center with an increasing number of waste plastics, waste paper and waste electronic products. For this variant, we suggest that understanding and evaluation should be developed and conducted through field surveys, reference to the city development report in the local library or on the Internet, or visits to local departments of commerce and renewable resource associations.

- The principal business in different rural areas. For agriculture-based rural areas, the materials used for agricultural production, such as plastic film and plastic cover of sheds, are major renewable resources; in rural areas that are being urbanized, the focus shall be placed on packing materials and domestic waste; and in rural areas with leisure tourism as the pillar economy, the focus shall be placed on the recovery and compost of food waste and the recovery of packing materials.

- The features of a certain area or city can also generate unique resources or market demand. For example, in an area abounding with tourist attractions, there might be a large number of waste plastic bottles and Tetra Pak packages. Such areas will be interested in the clean, quick and eco-
friendly treatment of waste in order to make it more appealing to tourists. But in an area with a lot of industrial plants, there will be different waste and demands including chemical recovery, which are often associated with a particular industry.

2.2 Development Trend of the International Recovery Market

In the past two decades, the international recovery market has developed rapidly, and will continue to grow in the coming years. But there are still many problems. The international renewable resource recovery industry is not stable enough, due to the impact of policy change, economic recession, trade disputes, contractual and logistical problems.

The Organization for Economic Co-operation and Development (OECD), formed by western developed countries, has made the following points regarding the development trend of its recovery industry:

- In developed western countries, the collection of the recyclable usually directly conducted by the waste collection system of the municipal government. By contrast, China’s municipal departments in charge of waste collection have little or no control over the collection and processing of the recyclable, which are dominated by private enterprises. Many Chinese cities are trying to reform the system, so that it can play a bigger role like its counterparts in developed western countries; in the long run, most Chinese municipal governments would like to establish a more unified and standard waste recovery and treatment system. But it is not sure yet whether the conditions of Chinese cities are in favor of such reform. In Europe and the United States of America, the Extended Producer Responsibility (producers of electronic products such as computers, printers or telephones have the following legal responsibility: they must recycle the product as soon as it reaches the end of its service life) has become more and more common, but in most cases, it applies only to electronic products.

- In Japan, Europe and the United States, recovery and processing has become more and more mechanized and utilises newer techniques, on an expanding scale. The crushers are becoming larger, with more and improved functions every year. And machines can automatically classify and separate materials at a higher level to realize a higher level of precision and purity year by year. Such equipment is also more and more common in China. Though in the long run, the trend will definitely impact China’s recovery industry, yet well-trained workers will outperform the machines in waste classification and disassembly.


2.3 How to Address the Environmental Challenges in the Waste Recovery and Management Industry through Business Approach

Though the resource recovery industry is an environmentally friendly industry, all the links of the recovery industry may still cause secondary pollution to the environment. And though all the recycled materials are more environmentally friendly than new materials, all the recovery and processing steps nevertheless pose challenges to environmental protection, such as the exhaust emission in transportation, water pollution caused by cleaning and reproduction of the recycled wastes (such as the re-pulping of waste paper), and the severe air pollution caused by improper recovery of waste electronic products (such as burning cord covers).

In the past two decades, many Chinese recyclers have turned a blind eye to these challenges, for they believed that the expensive costs of resolving the pollution problem would lead them to bankruptcy. For many years, many local environment supervision and management departments lack the funds or capabilities to enforce the anti-pollution laws and regulations. As a result, the local environment, communities and recovery workers have become victims of toxic pollution. Although the polluting small enterprises may prosper for the time being, most of them will be penalized according to law.

An entrepreneur must pay much attention to the potential threat of these problems and find a way to overcome them, to ensure the environmental friendliness of their business and reduce the risks to their own health and business sustainability. For this purpose, special attention must be paid to the following two aspects:

Technical means

Choosing the appropriate technology plays an important role in addressing the secondary pollution in the recovery process. Before starting a recovery plant, entrepreneurs must conduct a survey in the particular field which they are about to engage in, so as to have an accurate understanding of the possible pollution and harm associated with the industry and what kind of technology will prevent and control the damage, and must adopt such technology in the early stage of their business to prevent secondary pollution. There are many expensive technologies and equipment to choose from in this process. But the high-tech means are not always the most economical or environmentally friendly in the recovery industry. Entrepreneurs can find some more reasonable and cost effective technologies. For example, over the years, in the field of thin brass wire recovery, the method of recovering the brass by burning the wire has caused severe air pollution and underground water pollution. To resolve the problem, many financially competitive recovery enterprises have imported millions-of-yuan worth of
high-tech crushers, to extract clean brass from the thin wire. Many medium-and-small-sized enterprises do not have enough money for such equipment, but they have found a cheaper way in South China: first, cut up the brass wire into small pieces; second, place them on a vibrating table and wash them with clean water. This way is comparatively low-tech and low cost, but proves as effective as those expensive crushers. Another example, three wheelers cost much less than trucks in collecting and transporting waste, and will cause much less air pollution. Sometimes, simple means may also meet the desired effect.

**Value the quality of recovery**

The higher the quality of recovered products, the higher the price of collected waste. Such products will cause less pollution to the environment when processed for they can help reduce the pollutants in the cleaning and sorting process. Thus, spending more efforts on material classification and quality improvement will reduce pollution and lower the risks of violating the environment laws.
CHAPTER 3. MARKET POTENTIAL OF GREEN ENTERPRISES

3.1 Market Capacity and Size

In recent years, the renewable resource recovery industry has significantly expanded in China, with a gradually increasing recovered volume and recovery rate, contributing more and more to the national economy. In 2009, the total recovered volume in China reached about 140 million tons, an increase of 42% over that of 2006; the total volume valued about 500 billion yuan, nearly 100% increase over that of 2006; and there were over 100,000 enterprises and about 18 million personnel engaged in the business. The society attaches more and more importance to the renewable resource recovery system, and the public recognition of the industry continuing to rise.

China recovers about 35 million tons of waste iron and steel every year, of which the recovery rate is 29%; about 1.5 million tons of waste nonferrous metals, with the recovery rate of 70%; about 2.5 million tons of waste plastics, with the recovery rate of 25%; about 2.9 million tons of waste paper, with the recovery rate of 29%; about 0.8 million ton of waste rubber, with the recovery rate of 47%; about 2.5 million tons of waste glass, with the recovery rate of 13%; and about 400,000 waste automobiles.

Despite that the recovery scale and volume has continued to grow, the recovery rate of the recyclable remains low due to the low management level of the recovery industry and the substandard techniques used. Compared with that in developed countries, the recovery industry in China started from voluntary participation and chaotic competition and is at the stage featuring low development level and low costs. According to surveys, there are more than 10,000 recovery enterprises of various sizes in Beijing alone. Most of them are of a small size, forming a typical over-competitive market structure. Only a few are of a medium or large size. And fewer are devoted to improving the recovery rate in communities and recover all the recyclable. Most of these enterprises are reluctant to classify the waste at residential communities, but there are still about 30% of the recyclable waste plastics left to be recycled. It is estimated that the waste recovery rate of communities still has much room for improvement. Now waste classification has been promoted in most cities in China, and the residents’ awareness of waste classification is being improved, thanks to which, the waste recovery rate of communities will be enhanced in no time.

The latest waste classification policies adopted by the State Council have brought the recovery of the recyclable to a higher level, in particular for the catering waste that accounts for 50% to 60% of the urban waste. The recycling market for catering waste is still a vacancy, but after it is recycled, the
catering waste can be composted and used as organic fertilizer, which will reduce a large amount of greenhouse gas generated by the landfill and burning of catering waste, and improve the soil crust with the composted organic fertilizer. What’s more important, the NDRC has decided to launch the catering waste recovery pilot projects in some cities, to address the environmental pollution and the problem of swill-cooked dirty oil caused by the catering waste. The recovery of electronic waste remains another area in need of development. Before 2008 when the administration measures on the old-for-new appliance subsidy program were not yet put into effect, the recovery and disassembly of electronic waste were mainly done by self-employed individuals. On the one hand, electronic waste contains many toxic substances and cause huge environmental pollution. On the other, electronic waste also contains many recyclable substances, including precious metals of gold and silver, plastics and heavy metals such as bronze. According to the latest Regulations on the Prevention and Control of Electronic Waste, China has started to support the enterprises with qualifications for recovering and disassembling electronic waste. Except Beijing, Guangzhou and Changsha, there are no certified enterprises for recovering and disassembling electronic waste in Chinese cities.

3.2 Performance and Core Comparative Advantages of Enterprises in the Waste Recovering and Management Industry

The recyclable materials include metals such as bronze, iron and aluminum, plastics, and paper. The recycling process can be divided into the following stages: waste collectors on three wheelers, community recovery points, government-supported waste recovery enterprises, sorting markets, and processing of the recyclables.

Individual waste collectors need only one three-wheeler and one steelyard to conduct their business. Since they don’t pay tax, they don’t need much money to start the business; and since the trade volume remains small, the social risk is fairly low. We can find waste recovery stations in the communities or sub-districts, perhaps a room dedicated to waste collection or a waste collecting truck in front of the community. Such recovery sites normally have direct contact with the local materials recovery companies, which authorize them to collect the waste in the community. This kind of recovery mode is usually stable. They often maintain benign social relations with community residents: the residents will take the initiative to sell the recyclables to them; and they will collect the recyclables door by door, which is a great convenience for the residents. In this sense, their source of recyclables is often stable.

It takes about 100,000 yuan to set up a community collection points. Such recovery points are mostly run by migrant-worker families, who know a lot about waste recovery.
Though the recovery system dominated by supply and marketing cooperatives do not conduct on-site waste collection nowadays, the waste recovery companies, which are transformed from original materials recycling companies, often have financial support from the government. These companies often set up recovery points at communities, and also waste recovery markets.

The district-level materials recovery companies in Beijing all have their own recovery network. For example, Haidian Materials Recycling Company alone has over 400 recovery points. There are two types of operation modes:

- Materials recovery companies set up recovery points in the community, with their staff members in charge of the waste recovery. And after being recovered, all the recyclables are collected, cleaned, transported and processed by the materials recovery companies.

- Materials recovery companies collect some administration fees from community recovery points, and do not participate in the trade of the recovered items of community recovery points. Under the first operation mode, the materials recovery companies have wider business scope and recovery scope, and can better manage the recovered materials, preventing secondary pollution caused by recovery and processing, and better controlling the flow of the recovered materials. The second operation mode is more flexible, but will lose control over the recovered materials which might end up in unofficial markets.

The waste recovery market is an important link of waste classification, and stores the recyclables from the city. There are over 200 waste recovery markets in the suburb of Beijing, which are mostly run by larger renewable resource recovery companies, and store the recovered purchased by companies from community recovery points and the recyclables collected by waste collectors from other channels. These markets are of comparatively large operation size, store all kinds of waste and are also a crucial link to enterprises processing the recyclables. The waste recovered in the city every day will be stored at these markets, then classified and sent to the downstream resource recycling enterprises.

Besides the above waste operation enterprises, there are also enterprises specialized in investing in a certain recyclable, such as enterprises specialized in recovering waste plastics and those specialized in recovering waste paper. Such enterprises often recover only one recyclable, process the recovered and then sell the product to the downstream in-depth processing enterprises. For example, enterprises specialized in recovering waste plastic bottles will compact or grind, clean the waste plastic bottles, change the physical nature of the recovered, and go through basic pre-processing steps, which will greatly increase the value of recovery and make it more convenient for the transportation to downstream recycling enterprises.
Recycling and Waste Management

### 3.3 Potential Market Clients and Customers

Recyclables can be divided into two types: those produced in domestic life and those produced in industrial development. The recyclables of industrial waste will remain stable to a large extent as the current production mode is not likely to change. But as the Chinese economy and the residents’ consuming capacity continue to grow, and in particular, green production and packaging are not yet available in the production chain, a large quantity of recyclables will be generated. So in the future, residents will become the major source of the recyclables, such as food packed in Tetra Paks, plastic packages and packages of other materials. Since there is no corresponding recovery channel, these new recyclables are not recovered in an effective way, with more than 80% of them going directly to landfills or burning plants. The traditional recyclables do not include the above-mentioned new kinds of waste. However with the implementation of waste classification, if these recyclables are recovered, the recovery rate will be greatly increased. Packages will, without doubt, become a major source of the recyclables. Besides packages, kitchen waste is another major source of the recyclables. The recovered kitchen waste can be composted and used to produce organic matters, which is one way of comprehensive utilization of kitchen waste in some developed countries. The kitchen waste accounts for about 60% of the domestic waste in China, and the recovery of such organic matters will reduce the pollution caused by the end processing of waste to a minimum level.

In recent years, a large number of recovery and processing systems targeting at a certain recyclable have been established, such as the enterprises that separate the paper, plastics and aluminum from recovered Tetra Pak packages. Meanwhile, there are also a large number of enterprises specialized in recovering and recycling plastic packages and plastic products. For example, in Guangdong, there are companies which are specialized in recovering and processing PET, and use the processed PET as the raw materials for garments. There are also some enterprises specialized in producing combinations of plastics and other matters. The emergence of such enterprises has created a promising market for the recovering of packages including plastic packages.

### 3.4 Risk Analysis

The risks of recovery vary according to different recovered materials. But the largest risk lies in the change of government policies. Though China has formulated laws and administration regulations on the recovery of renewable resources, most of them are too general to support the enterprises. The terms are not specific and do not clarify the procedure and path for economic bodies including enterprises to seek for government financial support and therefore are of low operability. Though preferential tax policies are made in some tax laws in this field, the profit margins are still not great
enough to appeal to business owners. For example, though the tax rebate policy has been implemented since 2003 for the renewable resource recovery industry, over time, the tax rebate rate declined gradually, and in 2010, there was no rebate subsidy for the recovery industry by any department of the Beijing municipal government. In terms of direction, China will slowly encourage the support of programs promoting circular economy, energy conservation and emission reduction, and renewable resources, but in the distribution and implementation process, the relevant policies and regulations show poor systemization, coherence and consistence.

Heavy metals such as bronze, iron and aluminum account for a major part of the recyclables. The recovery of heavy metals is closely related to economic development and their prices fluctuate sharply. For example, before the Beijing Olympic Games in 2008, the demand on raw materials including metals soared due to the large scale of infrastructure construction, and consequently, the price of metals such as iron, bronze and aluminum doubled. But with the closing of the Beijing Olympic Games and the global financial crisis, the recovery price of heavy metals dropped sharply from August 2008, causing overstock of recovered products and severe loss to many enterprises engaged in metal recovery, many of which entered bankruptcy.

Currently, the recovery and processing of renewable resources in China are mostly done by family-run businesses, which are often located in rural towns. The secondary pollution is inevitable in the recovery and recycling process due to weak supervision. Yet in face of the severe secondary pollution, local governments were not capable of shouldering the responsibility of environmental protection. As a result, many new officials choose to directly shut down such recycling enterprises. However closing down businesses in the recycling chain will lead to fewer buyers, and will in turn directly affect the recovery chain. Examine the case of closing down the market of Wen’an County, the largest plastic recovery and processing base in North China, as an example. Before the shut-down, the market had existed for over three decades, with the cleaning and grinding of waste plastics done by family-run plants. A large quantity of sewage water was generated in the cleaning process. Without any sewage treatment, the sewage water caused severe pollution to the local underground water. On July 15, 2011, the county government of Wen’an issued relevant documents to announce the shut-down of all the plastic cleaning business. As a result, the recovery price of waste plastics in Beijing and Tianjin was cut by half, dealing a fatal blow to plastic recovery enterprises, some of which were forced to shut down.
Chapter 4. Case Study and Lessons Drawn

4.1 Case Study of a Waste Paper Recovery Enterprise — Beijing Zhong Zhi Xin Cheng Renewable Resources Co., Ltd

Background

Waste paper and plastics account for the largest proportion of the recyclables produced by residents in China. Among all the recyclables, the recovered waste paper makes up about 50%. China is a big consumer of paper and has to import a large amount of paper every year due to its severe shortage of paper pulp. Reasonable recovery and effective recycling of waste paper will ease the pressure caused by the shortage of paper pulp and help protect the forest resources in China.

Current Operation Situation of the Company

Beijing Zhong Zhi Xin Cheng Renewable Resources Co., Ltd, founded in September 2007, was one of the first enterprises in Beijing to specialize in the recovery and packaging of waste paper. Its business scope includes the recovery of waste paper, classification of recovered waste paper, compacting of the classified paper and packaging the paper with the packer. Now the company recovers and processes about 10 tons of waste paper every day. Since China is a large consumer of paper, it has huge market demands for recycled paper. What’s more, the recovery of waste paper is not subject to seasonal fluctuations. The amount of recovered waste paper at communities accounts for more than 50% of the recyclables at communities in Beijing. Many community residents have the habit of storing waste paper for sale, which makes the recovery of waste paper more convenient.

With the registered capital of three million yuan, the company now needs the start-up and rolling capital of over two million yuan. It mainly relies on the waste paper collectors in the city to collect waste paper. These regular clients will sell the waste paper they have recovered in the city to the company, in addition to the waste paper delivered by some self-employed individuals specialized in the recovery of waste paper. The company has set up waste recovery stations in some communities in Changping District, and the waste paper recovered at these communities will be transported directly to the company for classification and further processing. Since the company’s plant is located in the Dong Xiao Kou Waste Recovery Market, many booth owners specialized in waste paper recovery will deliver the waste paper they recover to the company for further processing. Now the company’s plant can process about 10 tons of waste paper every day, and has 20 staff members, 10 of whom are responsible for the
classification of the recovered paper and the compacting and packaging of classified paper, with the rest engaged in quality control, management, accounting and driving. However this number does not include those recovering the waste paper in the city.

**Successful Experience and Challenges**

The largest contributor to the successful operation of waste paper recovery is the comparatively huge market demand. Meanwhile, the source of waste paper is quite big and there is huge potential for the recovery of waste paper at communities. The waste paper enjoys a comparatively high recovery rate and requires simple storage conditions. Many residents and enterprises have the habit of storing waste paper for sale. And prior to 2008, the government adopted the tax exemption policy for the resource recycling industry. All these factors have created a favorable environment and opportunities for waste paper recovery enterprises.

However like any other recycling sector, the recovery of waste paper also faces immense challenges. The recovery price of waste paper fluctuated sharply before and after the Beijing Olympic Games, and the unstable recovery price has made it more difficult for the enterprises. For example, for the whole year of 2008, the average recovery price of waste paper was 1.8 yuan per kilogram, but the price dropped to 1 yuan per kilogram after the Beijing Olympic Games. The recovery price of waste paper also fluctuated in the beginning of the financial crisis in 2008. Shandong Province is an important waste paper recycling base of North China and even the whole country. Another challenge threatening the waste paper recovery is that, enterprises engaged in the recovery and recycling of waste paper will depress the recovery price due to the poor capital turnover and postpone the payment, which was made once a month before, but once in every two to three months now. One more challenge lies with the vicious market competition and the tax policy for renewable resources. The whole waste recovery market in China has a low barrier to entry, and individuals and family-run units that haven't registered with the government can move freely from community to community to recover waste paper without paying the value-added tax. The whole market is in vicious competition. For registered enterprises, the tax exemption policy for the renewable resource industry was canceled in 2008, and was substituted by the policy of tax rebate. But the tax rebate rate has declined year by year, from 70% in 2008 to 50% in 2009 to zero in 2011.

**Future Plan**

If the government changes its policies concerning the renewable resource industry in the future, such as adopting the tax exemption policy again or increases the rebate rate, the company will expand its operation scale, increase the number of packers and set up more recovery sites in pilot districts and counties of Beijing.
4.2 Case Study of an Electronic Waste Recovery Enterprise —— Huaxin Environmental Protection Development Co., Ltd

Background
The official recovery and processing of electronic waste in China were not available until 2009, and in particular after the implementation of the old-for-new home appliance subsidy scheme, the government started to set up pilot sites for the treatment of electronic waste in some cities including Beijing. Now the recovery of electronic waste is mainly conducted in two modes: first, through demonstration programs on the recovery and treatment of electronic waste carried out in some cities, including the old-for-new home appliance subsidy program, large home appliance chain stores such as Suning and Gome will sell the replaced home appliances to enterprises with the qualifications for the treatment of electronic waste. Second, waste collectors and recyclers of electronic waste at communities will purchase the electronic waste directly from the residents, and then sell them to second-hand home appliance markets or to waste recovery markets for disassembly.

The electronic waste has strong positive and negative values. For one thing, they are potential threats to the environment. Without proper treatment, poisonous matters such as lead, mercury, cadmium and hexavalent chrome will pollute the environment and harm the human health. For another, electronic waste contains a lot of recyclable resources such as ferrous metals, nonferrous metals, precious metals and plastics. Therefore, the recovery and standard disassembling of electronic waste is of particular significance to our country which suffers from a comparatively small per capita resource amount and shrinking mineral resource.

Recovery and Treatment of Electronic Waste
Huaxin Environmental Protection Development Co., Ltd is a comprehensive environmental protection enterprise, engaged in the development and innovation of environmental protection technologies, development and manufacturing of environmental protection equipment, integrated supply of environmental protection systems, operation of and investment in environmental protection programs, construction of circular logistics systems and the provision of relevant technical support. Huaxin electronic waste recovery and treatment program is a national model program on the recovery, treatment and recycling of waste home appliances recognized by the National Development and Reform Commission, a key program of Beijing, and part of the city infrastructure construction program for the Green Olympic Games campaign in 2008. The phase II base, completed in early 2011, has the treatment capacity of 2.4 million sets per year for electronic waste such as TV sets, washing machines, refrigerators, air conditioners and small home appliances.

Huaxin has explored more renewable resource programs since 2003. In 2008 it started the program of electronic waste recovery and disassembly. When Huaxin was building the disassembly line for
electronic waste, the standard disassembly of electronic waste was still in high demand in the Chinese market. The country’s 12th Five-Year Plan places the resource recycling industry in a key position, including the recovery and recycling of electronic waste. Meanwhile, the No. 551 document of the State Council specifies that the government shall refund the tax collected from the renewable resource industry. Another key reason for Huaxin to set up the electronic waste disassembly program is because the obsolete appliances have increased year by year in both terms of category and quantity, and the recovery of electronic waste has a comparatively large market demand.

Huaxin has established its recovery channels through the cooperation with large appliance dealers such as Gome and Suning, and self-employed individuals engaged in the recovery of waste appliances. The company plans to set up direct recovery channels at communities in the future. It resolves the recyclables and the toxic electronic waste in closed disassembly workshops, and delivers the disassembled recyclable metals and plastics to downstream recovery and recycling enterprises, and the toxic and hazardous matters to enterprises with qualifications for the disposal of dangerous waste, so as to prevent the discharge of poisonous and hazardous matters.

Since Huaxin started to engage in the disassembly of electronic waste in 2009, it has invested about 130 million yuan in disassembly lines. Its business scope mainly includes the recovery and disassembly of refrigerators, TV sets, washing machines, air conditioners and computers, disassembling over 800,000 sets of them in 2009, over 1.8 million sets in 2010, and over 1.8 million from 2011 till now. The recovery of the recyclables is labor intensive, and the recovery of electronic waste is no exception. The community recovery and the old-for-new home appliance subsidy program involve a large number of personnel. Huaxin has about 80 staff members directly engaged in the disassembly of electronic waste, including those responsible for the research and development of disassembly technology. Besides personnel directly disassembling the electronic waste, there are also dedicated staff members for the scientific research on the electronic waste disassembly technology. Huaxin has its own R&D department and therefore needs a large number of talents specialized in automation and high polymer chemistry. Since the disassembly technology plays a key role in the industry, there will be a lot of job opportunities for talents of these majors.

**Successful Experience and Challenges**

A major reason for the success of Huaxin is because it was the first enterprise with standard electronic waste recovery and disassembly when the government started to integrate and regulate the recovery of electronic waste for standard disassembly. Another key factor is that China generates a large quantity of electronic waste every year and the figure continues to grow year by year, so there is a potential market for the recovery of electronic waste. The government plans to scale up the recovery and treatment. But there are also some challenges threatening the development of Huaxin. A large
quantity of electronic waste goes to some unofficial recovery channels due to poor enforcement and inspection in the sector. As with other recovery sectors, the recovery and treatment of electronic waste also faces taxation problems. Regulations on the recovery of renewable resources do not provide these enterprises with reasonable support and guarantee. Though the existing tax policy is to refund the tax collected from these enterprises, no refunding has been made in recent years. In some cases, the self-employed individuals engaged in the recovery do not need to pay the tax, which is not fair for registered and certified enterprises. Another big challenge is the shortage of talents. The enterprises need sound disassembly technology to protect the safety of disassembling workers. But the disassembly of electronic waste is still in its earliest development stages and lacking in technological capacity. The enterprises are in urgent need of improving the disassembly technology as soon as possible. But the industry is in extreme shortage of R&D talents due to the lack of talent education in the past.

For entrepreneurs, the electronic waste recovery industry is highly profitable but also has strict requirements on technology. Therefore for entrepreneurs with certain know-how and technical capabilities, is in a position to consider opportunities in the e-waste sector.

**Future Plan**

Huaxin plans to expand in the following two areas in the future: first, in-depth processing and production of disassembled materials, and making full use of materials such as precious metals and plastics extracted from disassembled electronic waste; second, expanding the market, setting up disassembly bases in places without standard disassembly of electronic waste and copy the practice in Beijing in other places of the country.

**4.3 Case Study of a Community Recovery Enterprise —— Beijing Lian He Ding Sheng Renewable Resource Recovery Co., Ltd**

**Background**

According to incomplete statistics, Beijing generates 18,400 tons of waste every day, and the figure grows by 8% year on year. While the amount of waste continues to increase, the waste treatment capacity is lagged behind. Currently the designed daily capacity of Beijing municipal waste treatment plant is only 10,400 tons, with the actual daily capacity of 17,400 tons. The refuse dumps are much overloaded, and all the existing landfills will be fully filled in within four years.

Despite the fact that departments including environmental sanitation departments are encouraging residents to classify the waste, and set up different trash cans for different types of waste, the residents are not enthusiastic about waste classification due to the mode of waste removal (all the waste is gathered for landfill or burning). As a result, no substantial progress has been made in waste classification and reduction.
The existing waste disposal ways of residents

Since domestic waste contains articles for daily use, such waste is disposed of in a closed system for the sake of environmental protection and sanitation. The process is shown as follows:

In principle, the waste transportation and treatment process indicated in the red dashes is conducted in an enclosed system, excluding personnel engaged in waste collection and classification. Theoretically speaking, the process includes the following steps: residents put the waste in different trash cans according to the category of waste; community cleaning staff gather the waste from the trash cans and move them to the community transfer point or waste storage room; environmental sanitation personnel transport the waste to the waste transfer station and from which the waste is transported to end treatment facilities for further processing.

Statistics show that there are about 170,000 personnel engaged in classifying and collecting waste in Beijing, who are commonly known as waste collectors. Generally they are not staff members of property management companies or materials recovery companies. Most of them are self-employed migrant workers, collecting the recyclables at communities, subdistricts or refuse dumps. The process is shown as follows:
As it is shown in the above chart, waste collectors collect the recyclables with value from trash cans, trash towers, transfer stations and refuse dumps at communities or subdistricts, and sell them to recyclers to gain profits.

Generally, waste collectors do not work in a fixed location, but rather move from place to place to collect waste, such as communities or refuse dumps. They carry plastic bags with them to collect the waste that can be sold. But there are some people who organize some waste collectors to contract all the waste in a community, transport them to the suburb area on a regular basis, sort out the waste that can be sold and sell them to waste recovery stations, and leave the rest on the ground.

Waste collectors are the ones really engaged in waste classification, and thanks to them, a lot of recyclables are efficiently recycled. But such waste classification is conducted in a disorganized way and mainly for personal interests. The dumping of the unrecyclable will cause secondary pollution to the environment.
Operation Model of the Company

In cooperation with government departments such as Beijing Waste Management Department and scientific research institutions, the company has set up a production line for waste liquor package paper with the daily capacity of 15 tons, and engaged in the removal and transportation of some recovered waste. The process is shown as follows:

As it is shown in the above chart, to ensure a clean environment for all the communities, the company is responsible for transporting all the waste in the trash cans to community transfer stations. The process is standardized, with staff workers all in uniforms and all the vehicles for waste transport of the same model and equipment, so as to ensure that no waste is leaked or left out in during the removal and transport process.

The company shall arrange vehicles dedicated to environmental sanitation to transport the waste from community transfer points to classification stations. These vehicles are clearly marked with signs of “Recyclable”, “Unrecyclable” and “Kitchen Waste”, to enhance the residents’ awareness of waste classification. And the company shall ensure the regular removal and transport of the above three categories of waste.

Relevant authorities shall build waste classification stations in appropriate locations as the model for community waste classification. The classification station shall be equipped with sewage pipelines for cleaning some waste and the surface ground, odor reduction facilities and waste classification platforms. The company is responsible for the classification of all sorts of waste and demonstrating the practice and results of waste classification in the station so as to guide the residents in waste classification.

Difficulties and Risks

First, residents’ neglect of waste classification will increase the operation costs of the whole system. Second, for property management companies, the contracting of waste collectors will change the original waste removal and transport mode and might change the original interest pattern; for the company, the recovery price keeps fluctuating and in case of low prices, the profits will be insufficient for normal operation.
4.4 Case Study of a Recovery Station — A College-Student-Turned “Garbage King”

Background
Job hunting poses a huge challenge for fresh graduates for it seems that college graduates have outnumbered the jobs in the market. Confronted with such situation, a small number of college students turned to another alternative — start their own business. The renewable resource recovery industry, though it is equal with traditional waste collection in the eyes of most people, in fact is in urgent need of talents with theoretical and technical know-how.

Stories of Start-ups
In September 2006, eight college graduates in Shenyang, Liaoning, gave up their promising jobs and entered the industry. Many people did not show approval of their decision. But they persisted and tried to build a new image of “garbage king” with new concepts and dedication.

On September 9, 2006, Wu Mingxuan, Lv Mingjiang and Wang Yu, all graduates of the Northeastern University, founded the Zhuo Chuang Waste Materials Recovery Station in Shenyang. They have invested more than 200,000 yuan in the station and Wu Mingxuan even gave up a job in a department of Shenyang municipal government.

On January 12, 2007, Wang Xinyu and Lu Haochen, graduates of Shenyang Jianzhu University, gave up their job with a monthly salary of thousands of yuan, invested in 120,000 yuan and founded a waste purchase station.

It is well known that, to start up business, college graduates have to overcome many obstacles in aspects of funds, equipment and experience. It is even more difficult for them to engage in the waste purchase industry which they had little contact with before.

Besides the pressure associated with the job, they had to do almost everything themselves, including painting the wall, wiring, clearing the chimney and starting a fire in the stove. Until now, Lv Mingjiang and Wang Yu still sleep on an adobe kang and burn coal to warm themselves. They dress like nearby residents and you can hardly identify them as college graduates except for their eloquence.

There are a total of eight waste purchase stations scattered in Zaohua Village and nearby areas in Yuhong District. To increase their market share, the three college students introduced a membership system. Now they have a total of 64 members working as purchasers moving from one place to another. They will be rewarded with certain incentives when the waste they have purchased reaches a
certain amount. They can take a rest in the station when they wander about the streets, or have their three wheelers fixed for free at the station. On festivals and holidays, these college graduates will give them some free food.

For the sake of fairness and integrity, an electronic scale was used at these recovery stations, to be as precise as possible in purchasing the waste and protect the interests of those who deliver the waste.

**Future Plan**

According to these entrepreneurs, in the last four months since their opening, their purchase stations have shown little difference from traditional waste purchase stations. But they are about to conduct rough processing of some renewable resources, and have contacted a metal company in Shenyang and a college professor, and hoped, with their help, to try the in-depth processing of these resources. This is where their future development will go.

A plate has been put on the door of the station recently, reading “Shenzyang Training Base for Floating Purchasers of Renewable Resources.” The purchase station has reached an agreement with the Renewable Resource Management Office of Shenyang, on the provision of training to floating purchasers on a regular basis.

**Experience Sum-up**

These college graduates have encountered unknown difficulties in starting their own business. But it is a comfort to see that the business is growing much faster than we expected. In many large and medium-sized cities, hundreds of tons of waste are generated every day; and the renewable resources wasted per year are worth hundreds of millions of yuan. In this sense, this industry is of huge potential and as it has little competition, small investment and low risks, it is a good career choice for college graduates.
Chapter 5. Suggestions on Developing the Green Business Models

5.1 Practical Business Models and Tips for Starting Your Own Business

Unlike the original materials whose exploitation and usage are concentrated, the recovery of the recyclables requires the gathering of scattered renewable resources before recycling. The waste recovery has a history of more than 50 years in China and has formed a recovery mode that is familiar to the public. But as the society evolves, the traditional recovery mode displays more and more shortcomings, such as the low recovery and recycling rate and severe environmental pollution. Some materials recovery companies have begun to explore new recovery modes at communities.

Under the new recovery system, some companies combine the community-based recovery and transient recovery at enterprises and institutions. They set up recovery points at communities, and provide one-stop services including the pre-post training to employees, door-to-door recovery, registration of the recovered, removal on a daily basis, professional sorting, and recycling. In this information era, these community recover points also operate online recovery and recovery via phone call. Materials recovery companies use enclosed vans to transport the recovered waste from communities to the classification center for classification, selection and sorting on a daily basis. On the other hand, they place specialized waste paper recovery bags and office supply recovery bags at enterprises and institutions according to the characteristics of the recyclables in the office. Through communication with these units via phone call or on the Internet, they arrange personnel and vehicles according to the quantity and categories of the recyclables to provide on-site services and transport them to the classification center.

The new recovery system places more emphasis on door-to-door recovery, and large-scale collection and sorting.

5.2 Create a Favorable Business Environment — Understand Client Groups with Strong Environmental Protection Awareness and Their Needs

Entrepreneurs engaged in the waste recovery at communities have to deal with different stakeholders, including major clients and support clients.
As to residents who produce the recyclables, community property management departments, community neighborhoods and neighborhood committees: many Chinese cities have launched the pilot program of waste classification in communities. Entrepreneurs can make such communities as their priority targets, for residents, property management departments and neighborhood committees at such communities have comparatively strong awareness of resource recovery and will translate such awareness into action. Following the latest trend of waste classification, materials recovery departments shall cooperate with neighborhood committees in publicizing the idea of waste classification so that every resident will understand the categories of the recovered and classification of waste. By publicizing waste classification in cooperation with communities, and rooting the concepts and knowledge about recovery into the mind of every one, they will motivate the residents to the largest extent to know more about recovery and improve the recovery rate.

In cooperation with enterprises and institutions in waste recovery, the materials recovery units may look for those enterprises or units which value their public image. Through such cooperation, these enterprises or units can enhance their image of environmental protection on the one hand, and recovery sources can be secured on the other.

5.3 Meet the Market Demand with Environmentally Friendly Business Models

A strong business model plays a crucial role in starting the resource recovery business. At the current stage, there are the following business models:

- **Resource recovery stations/points**: among all the domestic waste, metals, plastics, paper, glass, electronic waste and packages form the majority of the recyclables. Setting up resource recovery stations/points with proper qualifications near communities, subdistricts and office buildings is a business model with comparatively low costs. The business scope of such stations/points includes the recovery of the recyclables from waste throwers (such as residents and employees), in the forms of door-to-door recovery and recovery at a designated place. Then they will sell these renewable resources to relevant enterprises for further treatment.

- **Resource primary processing enterprises**: some recovered resources require certain primary processing, including disassembly, classification and pelleting. Such enterprises shall attach importance to smooth purchase channels, stable and comparatively pure sources, and environmental protection during the primary processing process to prevent secondary pollution.

- **Resource in-depth processing enterprises**: e.g. recycled paper mills; this business model requires
Suggestions on Developing the Green Business Models

more financial and technical investment and has strict requirements on pollution control. It is not suitable for start-ups in most cases.

- **Business models of information and publicity**: in large and medium-sized cities, the numerous enterprises engaged in resource recovery, logistics and treatment are connected to each other in one way or another, but comparatively comprehensive and effective information platforms are rarely seen. So business in this field may grow into a new business mode. Meanwhile, with the growing input of the government in waste classification and resource recovery and the community’s publicity on waste classification and recovery, it is worthy of attempt for entrepreneurs to receive financial reimbursement from providing services to the government.

### 5.4 Marketing Strategies

The waste recovery mainly target at communities, enterprises and institutions and in the future we shall further tap into the recovery potential of these units. According to the different natures of communities, enterprises and institutions, the waste recovery at these places shall adopt different marketing strategies.

To further explore community recovery, waste recovery enterprises must foster good relationships with community property management offices and subdistrict offices, communicate with them and establish the regional recovery alliance step by step. Regional commerce commissions are the competent authority in direct charge of waste recovery. Therefore, waste recovery enterprises must cooperate with commerce departments to set up designated rooms at communities for renewable resource recovery, and community recovery points, and build a fixed network of recovery with government support and community cooperation.

Enterprises and institutions are a major source of the recyclables. In particular, offices or large supermarkets are the major source of waste paper for recovery. Now some joint ventures and large private firms have established their own department of corporate social responsibilities. Through communication with such departments, a recovery system that suits large enterprises may be established, such as setting up paper recovery boxes at offices and the regular on-site recovery system, to explore recovery modes that suit the recovery bodies.

### 5.5 Risk Management

The risks facing entrepreneurs engaged in resource recovery include the change of market supply and demand, secondary pollution and the change of state policies. To control and resolve these risks, they
have to not only follow the latest regulations and policies in the field of renewable resource recovery, the prices of raw materials and the latest development of the industry, but also pay more attention to and increase investment in environmental protection. Next, explanations are made for the following specific programs:

- To deal with the risk caused by the change of market supply and demand, waste recovery enterprises shall keep informed of the latest market information, diversify the categories of resources for recovery/treatment, and establish close ties with competent departments and industry associations; in terms of management, they shall invite and hire marketing professionals, establish a complete market management system and an effective market monitoring mechanism, and strengthen the construction, monitoring and management of the business network so as to minimize the risk.

- To prevent secondary pollution, attention shall be paid to the following aspects: choosing environmentally friendly equipment and technology in all links of the business, such as storage, transportation and processing, to control the pollution of sewage water, waste air, waste residue and noise within the prescribed standards; meanwhile, valuing the introduction and fostering of technical professionals, and establishing and improving the team training system, so as to improve the professional competency of employees and prevent and control pollution.

- To address the policy risks, waste recovery enterprises shall pay more visits to local management and support organizations such as commerce bureaus (commissions), supply and marketing cooperatives, and industry associations, and invite local stakeholders, including community committees, subdistrict offices, property management companies and representatives of residents, to meetings to develop mutual understanding and trust as soon as possible. In addition, they shall follow closely the orientation of policies to minimize the impact of the change of policies.

5.6 Human Resources

The recovery industry is labor intensive. In the past decades, the recovery industry in China has set up a recovery network covering all the communities in the country. There are more than two million waste collectors in the country, excluding management personnel in the waste recovery industry. Besides the front-line waste collecting force, the old waste recovery system has also produced a large number of management talents.

The waste collectors have thorough understanding about waste recovery and classification and should
Suggestions on Developing the Green Business Models

play a core role in forming a new recovery system, giving play to their key role in front-line recovery, sorting and classification. Recovery enterprises shall reorganize and employ waste collectors, and provide them with basic social security and social status, breaking the loosely-organized work pattern.

On the other hand, professionals experienced in waste recovery management are familiar with the current situation of the industry and has rich experience in management. Most of them used to run waste recovery businesses. Therefore, they will help plan and direct the future development of the recovery enterprise.

In recent years, more and more scholars have started to study on recovery and the recycling of renewable resources. They are familiar with the development situation of the recovery industry at home and abroad and relevant laws, regulations and policies of the state. Therefore, recovery enterprises shall make full use of them, hire them as consultants and allow them to fully participate in the planning of corporate development.

5.7 Foster Effective Partnership

Effective partnerships and networks are very important to entrepreneurs, because a big feature of the recovery industry is that it involves various stakeholders from the source to sale of products. If the recovery enterprise can form partnership with all the stakeholders, it will greatly reduce the overall operation costs and improve the efficiency.

First, government relations are crucial for entrepreneurs. They must establish good relationships with competent departments and subdistrict departments, in particular the latter, which have control over recovery stations and all the community resources, and therefore deserves much attention and active communication.

Second, the resource recovery channel system, represented by local supply and marketing cooperatives and resource recovery companies, also constitutes a major partnership. The supply and marketing cooperatives in the country has basically formed a huge industrial system with functions of recovery, processing, research and development, including over 2,800 above-county-level recovery enterprises, 120,000 renewable resource recovery points, 1,500 renewable resource processing enterprises, and more than 600,000 personnel. In some large and medium-sized cities, the resource recovery companies have developed comparatively standard businesses ranging from the recovery to treatment for recycling. Entrepreneurs shall consider their own features and business scopes and collaborate to varying degrees with these companies.

Third, recovery enterprises shall develop partnership with local circular economy/resource recovery
and treatment industrial parks. In recent years, circular economy/resource recovery and treatment industrial parks have emerged in various areas, and have become the hub of enterprises and technology of the resource recovery industry. Therefore, recovery enterprises, whether they are engaged in the upstream, midstream or downstream business, shall establish close relationships with local industrial parks, to win their support in supply and marketing business, preferential policies and information.

What’s more, industry associations, industrial alliances, research institutions and non-governmental organizations that support the development of the renewable resource industry will also promote the development of start-ups of the industry. By cooperating with these units and organizations, recovery enterprises can, on the one hand, understand the development direction of the resource recovery industry, and timely adjust their own strategic goals to the changing market; and on the other, build the brand by participating in relevant certification and appraisal programs, and explore the market. Now, many environmental protection organizations and community-level public welfare organizations have launched waste classification and resource recovery programs in many communities. By actively participating in the public-welfare programs organized by these organizations, enterprises can enhance their corporate image and explore business channels. In addition, the government plays a decisive role in the development of the circular economy industry. Networking with government departments will help the circular economy enterprise win government support and understand the policy direction as soon as possible.
Appendix 1: Supporting Organizations

Organizations supporting the resource recovery industry mainly consist of government departments, industry associations and public welfare organizations, which are listed in the following table.

List of Supporting Organizations

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<th>Business scope</th>
<th>Relevant programs</th>
<th>Official website</th>
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<tr>
<td>Renewable Resource</td>
<td>Developing a comparatively unified data platform, and producing statistical reports automatically by collecting the information of local recovery enterprise in the country</td>
<td>Electronic filing</td>
<td><a href="http://xxhs.mofcom.gov.cn/">http://xxhs.mofcom.gov.cn/</a></td>
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<td>Electronic Filing</td>
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<td>System of the</td>
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<tr>
<td>Ministry of Commerce</td>
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<tr>
<td>Solid Waste Division, Pollution Control Office, Ministry of Environmental Protection</td>
<td>Responsible for the supervision and management of prevention and control of environmental pollution, and analysis and research on the environmental situation; organizing and instructing townships in overall environmental improvement; responsible for organizing and implementing the quantitative evaluation system for the overall environmental improvement of Chinese cities; verifying the business license for hazardous waste, import license for solid waste that can be used as raw materials, and the export of hazardous waste; registering the import and export of poisonous chemicals; environmental management registration, approval, supervision and management of new chemical substances.</td>
<td>Policies and regulations; overall management; import and export of waste; electronic waste; hazardous waste</td>
<td><a href="http://wfs.mep.gov.cn/gtfw/">http://wfs.mep.gov.cn/gtfw/</a></td>
</tr>
<tr>
<td>All China Federation of Supply and Marketing Cooperatives</td>
<td>Participating in the construction of the renewable resource industry</td>
<td>Sharing policies and regulations; express delivery of information</td>
<td><a href="http://www.chinacoop.gov.cn/Category_38/index_1.aspx">http://www.chinacoop.gov.cn/Category_38/index_1.aspx</a></td>
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<tr>
<td>Industry associations</td>
<td>Responsibilities</td>
<td>Website</td>
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<tr>
<td>China Resource Recycling Association</td>
<td>Responsible for the coordination and management of the renewable resource industry; assisting in and undertaking of the promotion of the latest technology and process of the renewable resource industry; organizing trainings for personnel in the renewable resource industry; providing consultation services; organizing economic and technical cooperation and exchanges, etc.</td>
<td><a href="http://www.crra.org.cn/">http://www.crra.org.cn/</a></td>
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<tr>
<td>Solid Waste Recycling Branch, China Association of</td>
<td>Serving the government and enterprises with technical consultancy, technical services, technical appraisal, international technical exchanges, technical promotion and market survey; actively promoting the technical advance of the solid waste treatment and utilization industry; spotting and fostering backbone enterprises; assisting the Association in regulating the market of environmental protection industry.</td>
<td><a href="http://www.caeipi.org.cn/association-introduction/2875.shtml">http://www.caeipi.org.cn/association-introduction/2875.shtml</a></td>
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<tr>
<td>Environmental Protection Industry</td>
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<tr>
<td>China National Resources Recycling Association</td>
<td>Providing information on policies, economy, technology, products and the market; exchanging information on the trade, economy, technology, and environmental protection related to waste recycling; organizing trainings and exchange programs.</td>
<td><a href="http://www.crra.com.cn/crra/index.asp">http://www.crra.com.cn/crra/index.asp</a></td>
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<tr>
<td>Recycling Metal Branch, China Nonferrous Metals Industry</td>
<td>Planning, coordinating and serving the development of the recycling metal industry.</td>
<td><a href="http://www.chinacmra.org/">http://www.chinacmra.org/</a></td>
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<tr>
<td>Association</td>
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<td>China Association of Metal Scrap Utilization</td>
<td>Serving enterprises engaged in the recovery, processing, marketing and application of metal scraps; enterprises engaged in the development and utilization of metallurgical slag; and enterprises engaged in the manufacturing and marketing of metal scrap processing equipment and metallurgical slag treatment and processing equipment.</td>
<td><a href="http://www.chinascrap.org.cn/">http://www.chinascrap.org.cn/</a></td>
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### Supporting Organizations

**China Tyre Retreading, Repairing & Recycling Association**

| Engaged in tire retreading, repairing and recycling; serving member units; safeguarding fair competition; protecting the legitimate rights and interests of its member units. | Grading the credit level of enterprises specialized in tire retreading; grading the credit level of reclaimed rubber and/or rubber powder enterprises; compiling the National Vocational Qualification Training Course --- Tire Retreading and Repairing; providing trainings on the quality control of tire retreading and repairing. | http://www.ctra.org.cn/ |

**Plastics Recycling Committee of China Plastics Processing Industry Association**

| Undertaking the management of standardization of the national plastics recycling industry; information and statistics of the industry; organizing result appraisal, talent exchange, business training, management consultancy, and corporate appraisal; reasoning and supervision of major investment projects, technical reform projects and development projects; organizing technical cooperation and exchanges, etc. | Holding China Plastics Recycling Conference; providing training courses on the recovery technology and the modification technology for waste plastics. | http://www.env.tsinghua.edu.cn/lab/indexlab.asp?mnid=22377&type=7312# |

### Non-governmental public welfare organizations

**Global Environmental Institute**

| Rural sustainable development: promoting renewable energy and organic agriculture; energy and climate change: improving the energy utilization efficiency by the commercialization of clean energy and energy-saving technology and developing new business and financing modes; environmental protection: formulating environment policies concerning overseas investment. | GEI – Asia Foundation Cooperative Project – Environment Entrepreneurship Training Program China Clean Development Mechanism Fund (CDM) Business Opportunities & Capacity Building Program | http://www.geichina.org/ |

**Institute for Environment and Development**

<p>| Training leaders with the vision of sustainable development and the practice to implement such development strategy; Providing the public with more access to environment information and knowledge through information and communications technology. | New Ventures China: providing services to enterprises; improving corporate management; providing full support to entrepreneurs in financing and project demonstration; and providing network services to sustainable development enterprises, etc. | <a href="http://www.ied.org.cn/">http://www.ied.org.cn/</a> |</p>
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<tr>
<th>Organisation</th>
<th>Focus Areas</th>
<th>Activities</th>
<th>Website</th>
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<tr>
<td>South-North Institute for Sustainable Development</td>
<td>Commercialization of renewable energy; media publicity of and public education on renewable energy; rural energy and sustainable development; sustainable transportation; policy research and consultancy in the field of environment and development.</td>
<td>China Renewable Energy Business Development Training Program Training entrepreneurs on the leading renewable energy technology; improving their abilities in business development, operation and management; fostering their specialties in market development, finance and project evaluation.</td>
<td><a href="http://www.snisd.org.cn/">http://www.snisd.org.cn/</a></td>
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<tr>
<td>Circular Economy and Technology Institute for the Yangtze Delta (Zhejiang)</td>
<td>Organizing academic activities in the field of circular economy; building a bridge connecting the researchers and practitioners at home and abroad.</td>
<td>Including the Circular Economy Institute, Circular Economy and Regional Economy Institute and Resource Recycling Technology Institute.</td>
<td><a href="http://ce.zjxu.edu.cn/list.asp?cid=A_A&amp;sel=1">http://ce.zjxu.edu.cn/list.asp?cid=A_A&amp;sel=1</a></td>
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### Investment and consultancy agencies

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<th>Agency</th>
<th>Description</th>
<th>Focus Areas</th>
<th>Website</th>
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<tr>
<td>Tsing Capital</td>
<td>A venture capital specialized in the clean technology field.</td>
<td>Investing in areas of renewable energy, energy efficiency, environmental protection, new materials, sustainable transportation, intelligent power grid, sustainable agriculture and clean production.</td>
<td><a href="http://www.cefund.com">http://www.cefund.com</a></td>
</tr>
<tr>
<td>Avantage Ventures (Hong Kong)</td>
<td>Providing consultancy to social ventures; promoting the investment in social ventures which are run according to principles of social benefits, environmental benefits and sustainable accounting.</td>
<td>Investing in social ventures that effect positive social and environmental changes.</td>
<td><a href="http://www.avantageventures.com/">http://www.avantageventures.com/</a></td>
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