



e-Waste Assessment in P.R. China

A case study in Beijing

Final Version



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A report of the Swiss global e-waste programme
«Knowledge Partnerships in e-Waste Recycling»

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Table of Contents

1	Executive Summary	2
2	Introduction	3
2.1	Problem Identification	3
2.2	Objectives of the Assessment	3
2.3	Investigation Team	4
3	E-waste Categories	4
4	Results of E-Waste Assessment Beijing/ China	5
4.1	Structural framework / System Parameters	5
4.1.1	Politics and Legislation	5
4.1.2	Economy	7
4.1.3	Society and Culture	10
4.1.4	Science and Technology	11
4.2	Stakeholders	12
4.2.1	Government bodies	12
4.2.2	Universities / research institutes	12
4.2.3	Relevant industry associations	12
4.2.4	NGO	13
4.2.5	Manufactures	13
4.2.6	Traders	14
4.2.7	Consumers	15
4.2.8	Repair Shops	15
4.2.9	Waste Collectors, Collection points	15
4.2.10	Dismantler	16
4.2.11	Refiner / Conditioner, Final disposal	16
4.3	WEEE System	16
4.3.1	E-waste generation	16
4.3.2	Recycling / Recovery	20
4.3.3	Disposal	21
4.4	Impacts	22
4.4.1	Labour	22
4.4.2	Health	22
4.4.3	Environment	22
4.4.4	Value added	22
5	Conclusions	22
6	Annex	23
6.1	Annex 1: Govt. Regulations	23
6.2	Annex 2: Interviews and Survey Questionnaires	23
6.3	Annex 3: Maps	23
6.4	Annex 4: Assessment of recycling sites	23
6.5	Annex 5: Value Added Analysis	23

1 Executive Summary

Based on abundance of survey data/information, this report has made an analysis and assessment/evaluation on situation of e-waste management, handling, and recycling in Beijing.

, 18.08.2004

Beijing, the capital of China, has a high popularization on civilian TV sets, PCs, Mobile phones and Hi-Fi (including Recorder, Video, DVD, VCD, etc.) with long lifespan. At present in Beijing, electronic product traders collect discarded electronic products with payment.

In Beijing, the e-wastes are from manufactures, household and organization. The discarded electrical and electronic products are mainly collected by individual collectors. 80% of them enter the second-hand goods market for resale and others are disassembled and transport to the south-east of China for recycling.

The data of this report are mainly from Beijing Statistic Bureau, extrapolation and verifying by field survey.

Stakeholders relating to e-waste management of Beijing include government bodies, universities / research institutes, relevant industry associations, Non Government organization, manufactures, traders, consumers, repair shops, waste collectors, dismantlers.

Based on survey and analysis, It's found that: (1) there are about 10,775 tons e-waste every year in Beijing. (2) there are five (5) large-scale distributing trade centers for e-waste assembly and about 10,000 people involved in collecting and disassembling of waste electronic products in Beijing.

2 Introduction

2.1 Problem Identification

As capital of China, Beijing has a high popularization on civilian TV sets, PCs, mobile phones, refrigerators and Hi-Fi (including Recorder, Video, DVD, VCD, etc.). Because there are a large number of electronic products and a lot of them reach their lifespan, the discarded electrical and electric products increase rapidly in Beijing.

At present in Beijing, electronic products collectors collect discarded electronic products with payment. After repaired and cleaned by dealers in secondary market, these discarded electronic products will be sold to secondary market if they are repairable, or be disassembled into parts/elements and transported to other places for recycling if they are unrepairable, or be landfilled as municipal waste. There are no adequate recycling facilities in Beijing. In the future, along with increasing of e-waste, Beijing is facing with problem of collecting and handling of e-waste now.

2.2 Objectives of the Assessment

This report is to make a survey and assessment on the situation of e-waste management, disposal and recycling in Beijing, including:

- To survey the output of e-waste in Beijing;
- To survey the conditions of the establishing, issuing and implementing of government policies, laws and regulations; economic situations concerning increasing of GDP, inhabitants' income distribution, electronic products popularization;
- To survey the stakeholders relating to e-waste management of Beijing including government bodies, universities / research institutes, relevant industry associations, Non Government organization, manufactures, consumers, repair Shops, waste collectors, dismantlers;

- To survey the flow (material flow and financial flow) of e-waste brought by manufactures, traders in second hand products exchange market, consumers and recycling methods;
- To assess the influence of management, disposal and recycle & reuse of electronic products in Beijing on employment, labour safety, economy benefit and environment.

The objective of the assessment focuses on the impacts of e-waste collecting and handling on labour employment, worker's safety, economic benefit and environment.

- Labour employment: How many people are involved in collecting, disassembling e-waste in Beijing? How many employment opportunities can be created?
- Workers' safety: What methods are be adopted for workers to disassemble e-waste? The e-waste being disassembled is harmful to workers' health or not.
- Economic benefit: How much income can the traders gain during collecting, disassembling and selling the waste electronic products? (The salary and cost for raw material, transportation, storage, tools shall be deducted.
- Environment effect: What influence on environment the disassembling methods, landfill and incineration of e-waste shall have?

This investigation/assessment on e-waste of Beijing is consisted with the following four activities:

Activity 1: Collect basic information; define key person(s), categories of e-waste, region of recycle and reuse; define appraisal & acquisition method.

Activity 2: Data acquisition by office work and field survey.

Activity 3: Data analysis and verification; formulation of recommendations; complete draft final report.

Activity 4: Discussion and modification; complete final report.

2.3 Investigation Team

3 E-waste Categories

The e-waste categories surveyed and evaluated by CEIT cover TV sets, PCs (microcomputer), Mobile phones, Hi-Fi products and refrigerators.

TV sets include color TVs and black white TVs; Hi-Fi products include recorders, VCDs/DVDs, videos.

The source of data in the report:

, 18.08.2004

- Investigation/Survey on various level and professional citizens
- Statistical yearbooks of Beijing (1991-2003)
- Websites of government departments such as National Bureau of Environmental Protection, Ministry of Information Industry, etc.
- International Seminars on e-waste recycle and reuse.
- Interviews with collectors, electronic products sellers, dismantler in waste electronic products distributing centers, second hand products exchange markets, dismantling spots.

4 Results of E-Waste Assessment Beijing/ China

4.1 Structural framework / System Parameters

4.1.1 Politics and Legislation

Since 1990s, Chinese government has been strengthening legislation on nature resource protection and solid waste pollution prevention. Chinese Parliament-National People's Congress (NPC), National Development and Reform Committee, State Environmental Protection of China, Ministry of Information Industry etc. have established related laws, regulations and rules. Please refer to Fig. 1.

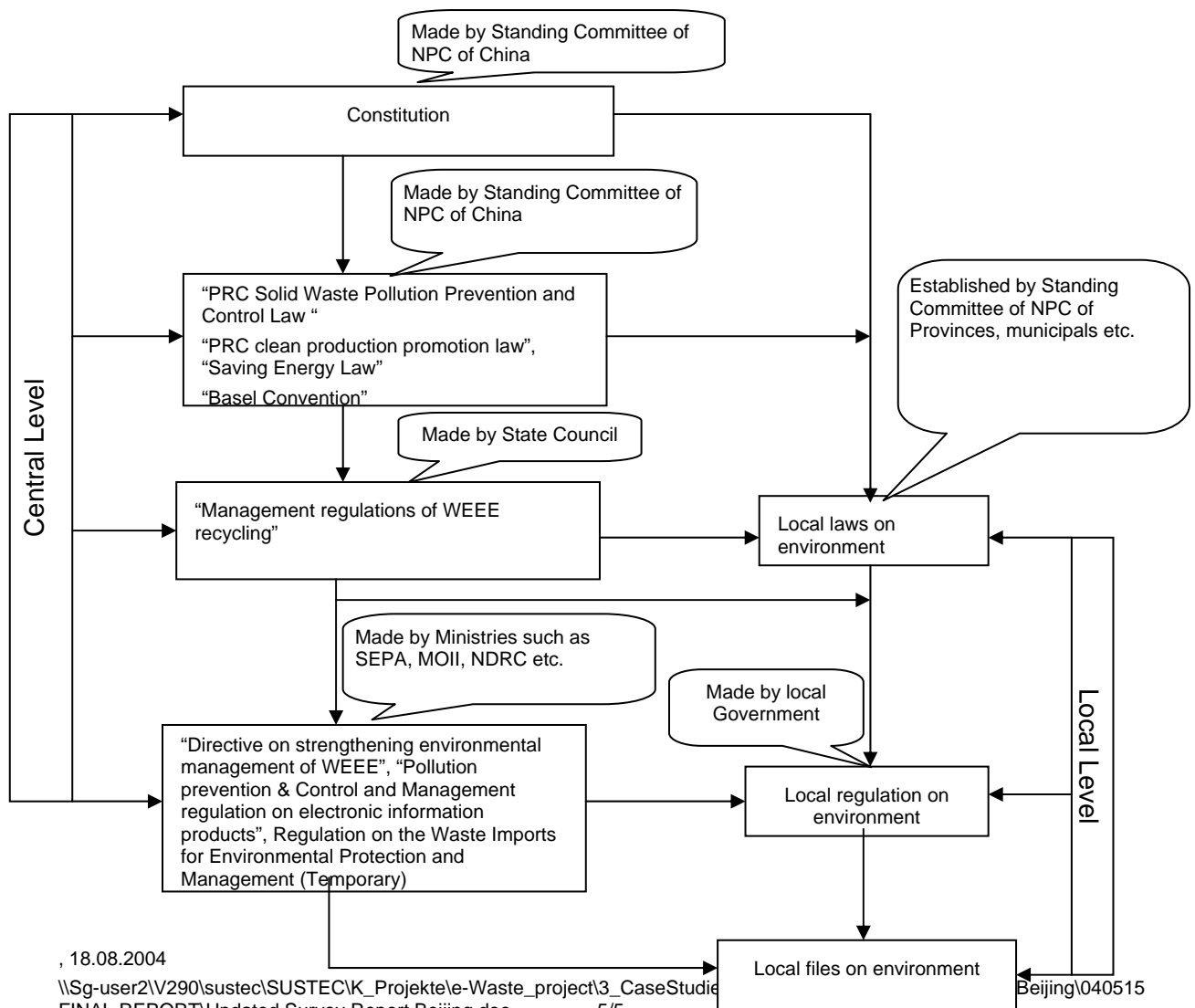


Fig 1. Framework of Chinese Laws

On Mar. 1990, China signed on “Basel Convention” which prevents dangerous waste to be transferred and disposed across the boundary illegally. “PRC Solid Waste Pollution Prevention and Control Law”, was approved by Standing Committee National People’s Congress (NPC) on Oct.30th 1995“and effective from 1st Apr. 1996. In 1st Mar. 1996, State Environmental Protection Administration of China issued “Regulation on the Waste Imports for Environmental Protection and Management (Temporary)” which aim at limiting import of dangerous waste. In 29th June, Standing Committee National People’s Congress (NPC) approved “Law of the PRC on the Promotion of Clean Production” which was effective from 1st Jan, 2003. State Environmental Protection Administration of China issued “Directive on strengthening environmental management of WEEE” on August 26th 2003. Besides these, “Management regulations of WEEE recycling” is been drafting now by National Development and Reform Committee from Oct. 2001. “Pollution prevention & Control and Management regulation on electronic information products” drafted by Ministry of Information Industry PRC is on endorsing now. “Technical Policy on Prevention and Control of Pollution of Waste Electrical and Electronic Products” drafted by State Environmental Protection Administration of China is asking for comments and suggestions. The table 1 is the important laws/regulations concerning WEEE management. For detail, please refer to Annex.

Table 1 Important laws/regulations concerning WEEE management

Name	Date of Issuance	Issued by
Basel Convention	Mar. 1990	Int. Convention
Regulation on the Waste Imports for Environmental Protection and Management (Temporary)	Mar. 1 st , 1996	SEPA
Directive on strengthening environmental management of WEEE	Aug., 2003	SEPA
Management regulations of WEEE recycling	Draft (~2006)	NDRC
Pollution prevention & Control and Management regulation on electronic information products	Draft(-2004)	Moll
Technical policy on pollution prevention and control of WEEP	Draft(-2004)	SEPA

China is enforcing “Basel Convention” and relevant regulations/laws strictly. For oversea e-waste import, it’s controlled and limited according to government procedure strictly. But some high polluted e-waste was imported illegally by some traders. Green Peace and “Basel Convention” Network Organization found that 90% American e-waste is transported to south east countries for handling, 37% is transported to China.

In the Government Work Report 2004, premier Wen mentioned that “We will vigorously implement the strategy of sustainable development and successfully carry out all work related to population, natural resources and the environment in line with the need to balance development of man and nature. We will intensify law enforcement to strengthen ecological and environmental control and monitoring. We will strictly control the discharge of major pollutants and work hard to eliminate environmental pollution that seriously threatens people's health and safety. We will energetically promote the recycling industry and clean production.”

By intruding producer responsibility, Chinese government are perfecting the legislation on e-waste to establish e-waste collecting, handling and disposal system and normalize the action of manufactures, dealers, consumers and recyclers. At present, NDRC has appointed Zhe Jiang Province and Qing Dao city as pilot fields to treat waste electrical and electronic products. On the basis of these pilot plants, Chinese government will explore to establish WEEE collection and disposal modes, to develop suitable WEEE treatment technology and to study relevant standards.

We suggest that Swiss expert team can

(1) Have an interview with Vice Director Mr. Li Jing, Mr. Yang YangFei from Resource Integration Utilization Department of National Development and Reform Committee who are drafting “Management regulations of WEEE recycling”; talk with them for cooperation, and sign cooperation agreement.

(2) Define the cooperation partner; set up project team; establish work plan, work procedure and time schedule; make clear of responsibility of every member.

(3) Raise the fund; start project

(4) Trace, supervise, and manage the progress of project.

4.1.2 Economy

Beijing’s economy is increasing rapidly. From 2000 to 2003, the yearly growth rate of GDP is 10.2-11%, the growth rate of governable income of city citizens and net income of farmers is 10.2-13.5% and 8.6-11.5% in Beijing. Please refer to Table 1 for detail. No body is under poverty line (yearly income: 2500 RMB (302 USD)). At present, the stock in 100 families of TVs, mobile phones, and PCs is 147.92, 210.42 and 97.92 in Beijing. These electronic products have greatly improved living standard of citizens.

Table 2 and table 3 describe the situations of governable income of city inhabitants and net income of farmers respectively

Table 2 Economy Situation of Beijing

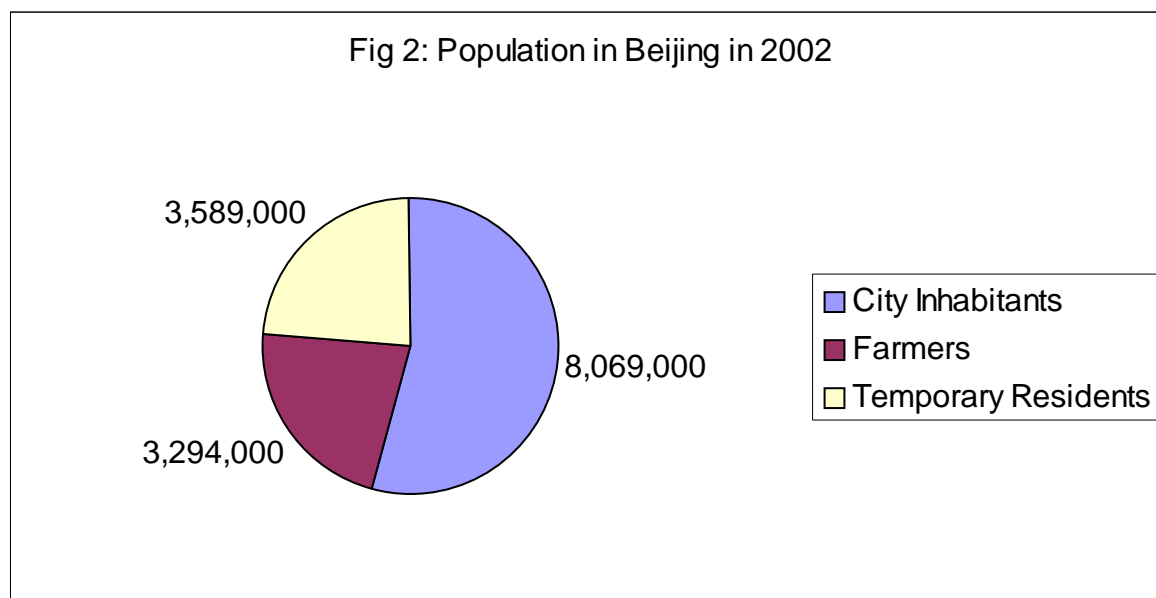
Year	GDP Billion RMB	Growth Rate of GDP	Yearly governable income of city inhabitants* RMB	Yearly net income of farmers** (RMB)
2000	246.05(29.75B\$)	11%	10,349.7(1,251.5\$)	4,687(566.7\$)
2001	281.76(34.07B\$)	11%	11,577.8(1,400.0\$)	5,099(616.5\$)

2002	313.00(37.85B\$)	10.2%	12,463.9(1,507.1\$)	5,880(711.0\$)
2003	361.19(43.68B\$)	10.8%	13,882.6(1,678.7\$)	6,496(785.5\$)

* Governable income of city inhabitants=Total income –Tax –Society Insurance.

** Net income of farmers= Productibility net income + Nonproductibility income.

Source: Beijing Statistics



Source: Beijing Statistics Bureau

Table 3 Yearly governable income of city inhabitants in Beijing

Year Family Group**	Yearly governable income* (RMB)		
	2000	2001	2002
Low Income Family	5,774.6(698.3\$)	6,270.7(758.3\$)	6,057.5(732.5\$)
Lower Income Family	7,916.4(957.2\$)	8,579.2(1,037.4\$)	8,941.2(1,081.2\$)
Middle Income family	9,624(1,163.7\$)	10,631.3(1,285.6\$)	11,315.8(1,368.3\$)
Higher Income Family	11,861.2(1434.2\$)	13,236.5(1,600.5\$)	14,210.7(1,718.4\$)
High Income Family	17,831.2(2,156.1)	20,652.5(2,497.3\$)	23,349.3(2,823.4\$)
Average	10,349.7(1,251.5)	11,577.8(1,400.0\$)	12,463.9(1,507.1\$)
(income of current year/income of last year)	112.7%	111.9%	113.5%

* Governable income of city inhabitants=Total income –Tax –Society Insurance.

, 18.08.2004

**The average population is 3.035 per family

Source: Beijing Statistics

Table 4 Yearly Net Income of Farmers in Beijing

Year Family Group**	Yearly Net Income* (RMB)		
	2000	2001	2002
Low income family <2,000	1,301.34(157.4\$)	1,819.15(220.0\$)	2,083.46(251.9\$)
Lower income family 2,000-3,500	2,751.86(332.8\$)	3,327.32(402.3\$)	3,625.26(438.4\$)
Middle income family 3,500-5,000	4,196.92(507.5\$)	4,504.09(544.6\$)	5,076.41(613.8\$)
Higher income family >5,000	7,833.65(947.2\$)	6,135.05(741.8\$)	6,914.98(836.2\$)
High income family		10,838.82(1,310.0\$)	12,972.47(1,568.6\$)
Average (income of current year/income of last year)	4,687.03(566.8\$) 108.6%	5,098.83(616.5\$) 112.7%	5,880.11(711.0\$) 111.5%

* Net income of farmers= Productibility net income + Nonproductibility income

** The average population is 3.035 per family

Source: Beijing Statistics

Note: There are four family groups in year 2000, and five family groups in year 2001 and 2002 according to average net income.

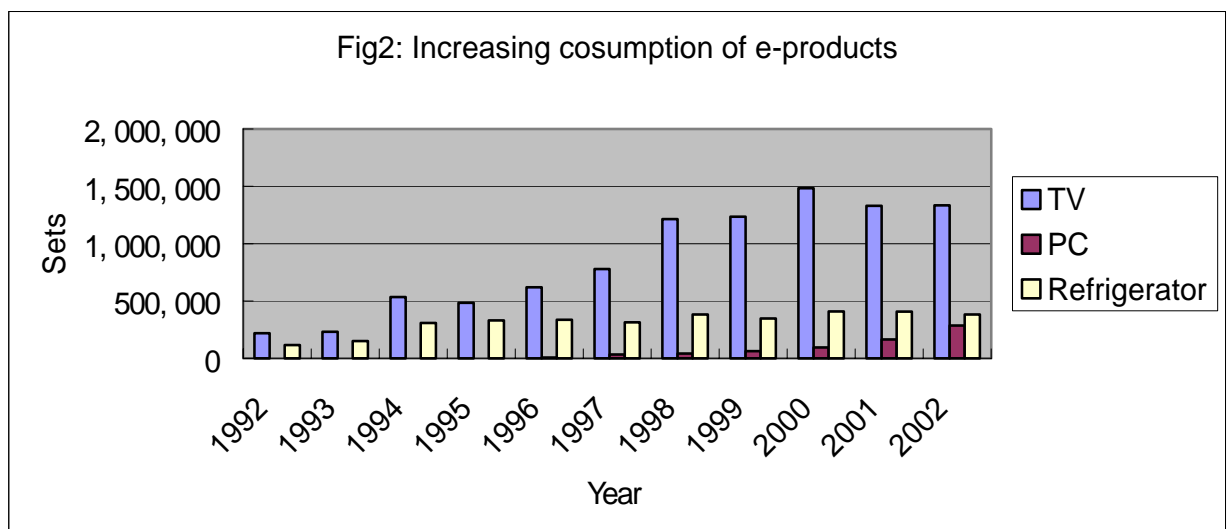
Table 5: Price indices of raw material, fuel purchasing (preceding year=100)

Item	2002	2001
Aggregate index	97.1	100.5
Fuel and motive power	102.3	101.7
Ferrous metal materials	96.4	100.3
Steel products	98.1	100.3
Others	93.6	100.3

Nonferrous metal materials	96.1	97.9
Industrial chemicals	99.3	97.6
Timber and paper pulp	102.5	98.3
Construction materials and nonmetals	97.6	99.5
Other industrial materials and semi-manufactured goods	92.3	98.8
Farming and sideline products	93.6	103.5
Textile materials	97.8	100.6

Source: Beijing Statistic Bureau

Figure 3 shows the rapidly increasing consumption of TVs, PCs and refrigerators in Beijing.



4.1.3 Society and Culture

Most Chinese consumers hold, electronic products are durable goods and are still valuable even they are old, which they are not reluctant to throw away. If they are, they hope to get some compensation from collectors. So the collecting and recycling system, through which the old and waste materials can be collected, repaired for further usage, recycled for raw material etc., exists in Beijing.



Recycling of the waste has close relationship with the resource and environment which are big problems concerning the national economy and the people's livelihood. As a populous country with poor resource, China are encouraging the recycling and reusing the waste material, which can reduce the waste and improve the reusing of resource.

Along with the rapid development of economy, advancement of society and improvement of standard of living, the waste are increasing and more and more e-waste are generating especially. In new century, every country is searching for the sustainable development of community. It's a new task for Beijing to sort, collect and recycle the waste in community to protect environment.

Some non-government organizations (NGO) in Beijing such as "Green Peace Organization " and "Beijing Earth Village Environment Centre "are publicizing environmental consciousness and encouraging public involvement in recycle of the waste.

4.1.4 Science and Technology

Beijing's academic institutions are studying and developing the process technologies for disposal and reuse of waste electronic products, and the know-how & special tools for treating printed circuit boards, CRT, waste wire and for refining noble metal. At present, these technologies and know-how are at pilot stage.

In Beijing, the people who are engaging in disassembling of waste electronic products are individuals and groups with poor knowledge. The tools for disassembly include pliers, hammers, screwdrivers and electric drills.

Table 6: Research and Development Projects

No.	Category of Technology	Description	Name of Academic Institution
1	Technology for removing welded elements from electronic circuit boards	Integrate Circuits and elements of value are removed with special tools and reused after repair	Beijing XunChuang Resource Regeneration Co. Ltd

2	Technology for treating printed circuit boards	Hydraulic or wind power screening is used to separate and recover the copper and the base board on the printed circuit board	Tsing Hua University, Beijing University of Industry and Beijing XunChuang Resource Regeneration Co. Ltd.
3	CRT Cone Separation Technology	Electrical thermal belt are used to heat and separate	China Household Electrical Appliance Research Institute
4	Technology for Treating waste wire	Cables and wires are recovered by screening after pulverizing	Beijing XunChuang Resource Regeneration Co. Ltd
5	Technology for Final Disposal	Incinerating in furnace; The concentration of harmful gas from incineration furnace can meet international standards	Beijing Jing Yu Company (Group)

4.2 Stakeholders

4.2.1 Government bodies

The Chinese governments & authorities related to collection and recycle of e-waste include National Development and Reform Committee, State Environmental Protection Administration of China, Ministry of Information Industry. They are preparing the laws, regulations, policies concerning collection and recycle of discarded electrical appliances and electronic products and making experiences of establishing a system to collect and handle e-waste.

As the pilot places, Zhe Jiang Province and Qing Dao city are establishing the collecting and handling system of waste electrical appliances and electronic products.

4.2.2 Universities / research institutes

Tsing Hua University, Beijing Aviation and Aerospace University, Beijing University of Industry, China Home Electrical Appliance Research Institute, Beijing XunChuang Resource Regeneration Co. Ltd. are developing recycle technologies of printed circuit board, CRT etc.

4.2.3 Relevant industry associations

- China Electrical Appliance Association: a mass organization joined by manufactures, enterprises, institutes in the appliance fields established in Dec. 1988. In 2003, Waste Electrical Appliance and Electronic Product Sub-association was established.
- China Second Goods Association: a mass organization joined by old goods markets, enterprises and individuals dealing with second hand goods. There are about 350 member units. Most large second hand goods markets such as Li Kang Jing Qiao secondary market and Tian Di Ren secondary market in Beijing have joined this association

- China Regenerative Resource Association: a mass organization joined by enterprises, academic institutes and individuals in the field of regenerative resource established in 1992. There are about 167 member units.
- China Resource Integrated Utilization Association: responsible for resource integration utilization in manufactures.

4.2.4 NGO

- Green Peace Organization

Associating with China Environment Science Academy, “Green Peace” sponsored “2004 international conference of electronic waste and extended producer responsibility in China” in April 21-22 2004, which aimed at promoting discussion about the issues of e-waste and extended producers responsibility among government officials, NGOs, corporations, academic institutes and the media. Many governmental officers, experts from academic institutes, famous enterprises of China, medias and volunteers participated in the conference.



- Beijing Earth Village Environment Centre

By launching promulgation on establishing green community in Xuan Wu district, “Earth Village” advocates public to select green life style-5R life style (i.e. Reduce, Re-evaluate, Reuse, Recycle, Rescue). Cooperating with National Bureau of Environment Protection, they compiled “Green Community manual” to raise inhabitants’ environmental consciousness.

- Beijing Earthview Education and Research Center (Earthview)

Earthview aims to increase public awareness about sustainable development by providing scientifically accurate knowledge of environment protection, natural resource evaluation, ecological conservation and sustainable lifestyle promotion to the Chinese people. They deliver this knowledge to the public through TV programmes, an Internet website, newspaper and magazine publications, public lectures, radio broadcast and active communication with governmental agencies.

4.2.5 Manufactures

There are about 26 big enterprises in charge of manufacturing and repairing of electronic products and component in Beijing, including 7 PC manufactures, 10 mobil phone manufactures and 1 TV manufacture. Others are manufactures to produce

elements/parts of electrical and electronic products. Table 7 lists the main manufactures and their outputs.

Table 7 Main manufactures in Beijing and their outputs in 2003

Manufactures	Main product	Output in 2003 (thousand sets)
Legend (Beijing) Company	PC	3,938.6
Bei Da Fang Zheng Company	PC	1,607.0
Qing Hua Tong Fang Company	PC	1,024.0
Beijing Zhao Wei Electronic (Group) Company	PC	2.8
Beijing Acea Communication Company	PC	465.6
Total Capacity of PC		7,038.0
Beijing Peony Electronic Group Company	TV	0.8
Total Capacity of TV		0.8

Source: CEIT Investigation

4.2.6 Traders

The main retailers for appliance in Beijing include Guo Mei Appliance Group, Da Zhong Appliance Group and Su Ning Appliance Group. Up till now, there are about 20 chains of appliance located in each district of Beijing.



There are about 17 second hand appliance markets such as Li Kang Jin Qiao Second Hand Goods Markets, Zhong Shang He Zhong Second Hand Goods Market.

4.2.7 Consumers

Consumers cherish the old electronic products. Many old electronic products, although they are no longer be used, are kept in home instead of discarded. In normal, the discarded electronic products are sold to collector or presented to friends free.

4.2.8 Repair Shops

“Nan Shi Kuai Che” is the biggest electronic products repair company, which generate about 100 tons waste electronic components/parts every year. The waste components/parts from the repair company are directly sold to Beijing Jing Huan Industry Waste Treatment Service Station. Other small size repair shops, such as some repair shops located in communities of Beijing, generate a few waste electronic components/parts, which are discarded with municipal waste.



4.2.9 Waste Collectors, Collection points

The waste electronic products are mainly collected door to door by individuals. There are about 5,000 individual collectors who have no business license and fixed business place, and collect all kinds of discarded electronic products.



Besides, in Beijing there is a regenerative resource recycling system which cover 1800 collection points located in 8 city districts and about 3,600 employees. Because the collecting price for waste electronic products are lower, the quantity of waste electronic products collected through this system are small. There are no disassembling & processing plants in this system, the waste electronic products

collected through this system are sent to individual collectors for treatment instead of being sent to distributing centers.

4.2.10 Dismantler

Up till now, Beijing Jing Huan Industry Waste Treatment Service Station is the only one registered station mainly engaging in disassembly and treatment of waste electrical and electronic products in Beijing. The capacity is 300 tons industry e-waste per year, among which 200 tons are from 7 electronic products manufactures and 100 tons are from repair shops. "Jing Huan", established in 1996 with World Bank's fund, is a state own company controlled by Beijing Economy and Trade Committee. Through simple tools such as screwdrivers, hammers and shears, the waste electronic products shall be dismantled in "Jing Huan".

Besides "Jing Huan", there are four large disassembly centers/distributing centers. Cui Ge Zhuang Suo Jia Chun disassembling center in Chao Yang district and Gong Yi Qiao Old Appliance Centre mainly disassemble waste TV sets; Hou Ba Jia disassembling center in Hai Diang district mainly dismantle PCs; Dong Xiao Zheng in Chang Ping district mainly disassemble waste refrigerators. The dismantlers in these centers are migrants. They use simple tools such as screwdrivers, hammers and shears to dismantle.

In general, most individual collectors are dismantlers also. Through manual disassembly, the collected waste electrical and electronic product are be disassembled by individual collector.



4.2.11 Refiner / Conditioner, Final disposal

All waste electronic products in Beijing are transported to southeast China (such as Guan Dong province and Zhe Jiang province) for refining or final disposal, so there are no refiner/Conditioner and final disposal in Beijing.

4.3 WEEE System

4.3.1 E-waste generation

4.3.1.1 Method

a) Introduction

The main sources of e-waste in Beijing cover manufacturers, households, organisations and large amount of e-waste are from households

b) Waste from manufacturers

According to the investigation to Beijing Jing Huan Industry Waste Treatment Service Station, we get average e-waste amount from each manufacture. The total e-waste amount from manufactures can be get by timeing average e-waste amount per manufactures with total manufactures in Beijing.

The detail is as following:

“Jing Huan treat 200 tons e-waste from 7 manufactures such as HP, IBM, Panasonic, Nokia etc every year. So the average e-waste amount generated by each manufacture is 30 tons per year. There are about 26 similar manufactures in Beijing.

The total e-waste from these manufactures =30×26= 780 tons per year.

c) Stock in households

Based on the data of total population and average population of family abstracted from Beijing Statistic Bureau, we estimate the numbers of Beijing. Please refer to Table 8.

Table 8: Population and Families in Beijing

Year	Population (Thousand)	Families (Thousand)
2000	13,636	4,493
2001	13,833	4,558
2002	14,232	4,689
2003	14,564	4,799
2004	15,280	5,035

Note: The average population for each family is 3.035

Source: Beijing Statistical Bureau

The numbers of stock in 100 families from 2000 to 2003 are from Beijing statistical Bureau. The number of stock in 100 families in 2004 is get by investigation of CEIT. The detail investigation method is as following:

According to statistical report, the yearly average income of Beijing citizens is 13,700 RMB (1,656.6USD) and monthly average income is 1,142 RMB (138.1USD). In order to make survey sample representative and survey data more accurate, common families are selected as survey objects, including 30 low income families (month income is less 1000 RMB (120.9USD)/person), 16 middle income families (family month income: 1000-2000 RMB (120.9-241.8 USD)/person) and 3 high income families (family month income: above 3000 RMB (362.8 USD) /person) (According to China current income situation, CEIT divide family groups). Based on the survey on the said 49 families, the stock of TVs, PCs, refrigerators in 100 families can be calculated.

d) Stock in organisations (government, schools, ...)

The stock of electronic products in organizations is calculate as following equation:

$$Stock\ in\ organizations = Stock\ in\ household \times Coefficient$$

Based on the current situation of China and their experience, CEIT estimate the coefficient of TVs, PCs and refrigerators, which are 5%, 30% and 2% respectively.

e) Technical data

Please refer to Table 9 for average lifespan and average weight of TV, PC and refrigerator.

Table 9 Average life span and average weight

	TV	PC	Refrigerator
Average life span Year	16	6	16
Average weight Kg	25	15	65

On the basis of actual use time got at disassembly spots during field investigation and considering Chinese consumption habits & ideas, CEIT get the average life spans of TV, PC and refrigerators.

On the basis of actual weight got at disassembly spots during field investigation and considering the various size of electronic products, CEIT get the average weight of TV, PC and refrigerators.

f) Estimation of waste quantities

Yearly quantity of e-waste=Yearly quantities of waste TVs, PCs and refrigerators + Yearly quantity of e-waste from manufactures

Yearly actual discarded TVs, PCs and refrigerators= Stock in Society / Average life span

Yearly quantities of waste TVs, PCs and refrigerators =Stock in Society / Average life spanx20%

Stock in Society =Stock in households + Stock in organizations

Landfilled e-waste= Yearly quantity of e-wastex5%

(1) Please refer to table 9 for average life span of TV, PC and refrigerator.

(2) “20%” means 20% discarded appliance can’t be repaired and disassembled directly. It’s estimated by CEIT according to field investigation and their experience.

(3) “5%” means 5% e-waste can’t be recycled and be landfilled, such as PU, Glass in broken CRT.

It’s estimated by CEIT according to field investigation and their experience.

By calculation, we get the weight of waste TVs, PCs and refrigerators, which are 2,444 tons, 3,204.6 tons and 4,347.2 tons separately in 2004. After adding 780 tons waste electronic products from manufactures, the total waste electronic products are 10,775.8 ton. The yearly landfilled e-waste is 529 tons

4.3.1.2 Survey data for TVs, PCs and refrigerators

Table 10 Survey Data for TV sets in Beijing

Year	Stock in 100 families (Sets)	Stock in households (thousand sets)	Stock in Society (Thousand sets)	Actual quantity of the Discarded TVs (Thousand sets)	Actual weight of waste electronic products (ton)
2000	145.5	6,537.3	6,864.0	429.0	2,145
2001	148.9	6,786.9	7,126.2	445.4	2,225
2002	148.4	6,958.5	7,306.4	456.6	2,283
2003	147.0	7,041.3	7,393.4	462.0	2,300
2004	147.9	7,447.8	7,820.2	488.8	2,444

Average lifespan TV: 16 years

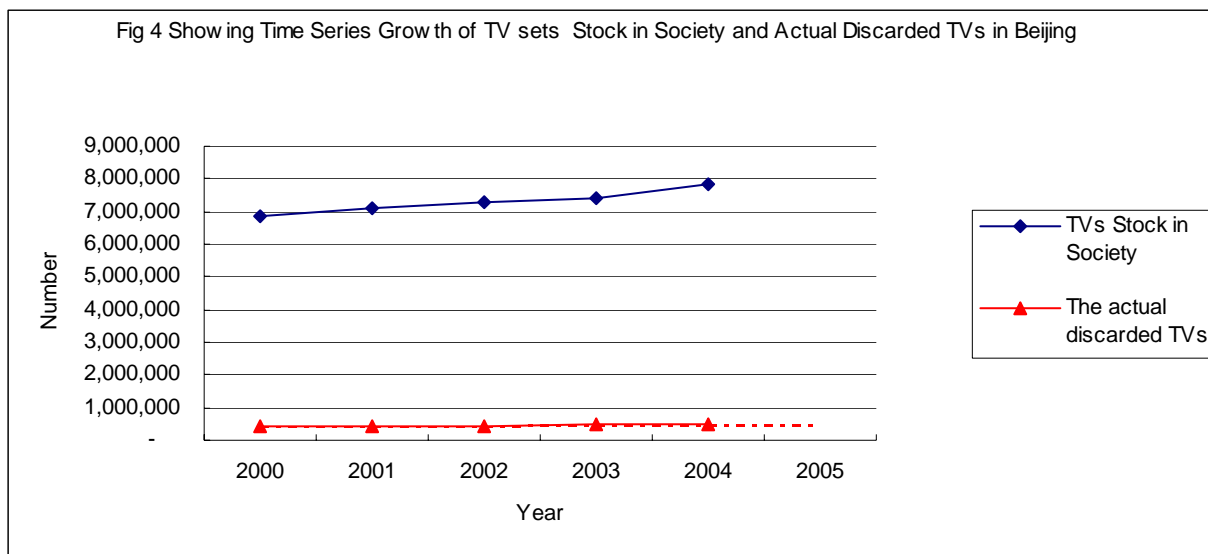


Table 11 Survey Data for PCs in Beijing

Year	Stock in 100 families (Sets)	Stock in households (thousand sets)	Stock in Society (Thousand sets)	Actual quantity of the Discarded PCs (Thousand sets)	Actual weight of waste electronic products (ton)
2000	32.1	1,442.3	1,874.9	312.5	937.35
2001	45.3	2,064.8	2,684.2	447.4	1,342.05
2002	55.5	2,602.4	3,383.1	563.9	1,691.55
2003	68.3	3,277.7	4,261.0	710.2	2,130.0
2004	97.9	4,930.3	6,409.3	1,068.2	3,204.6

Average lifespan PC: 6 years

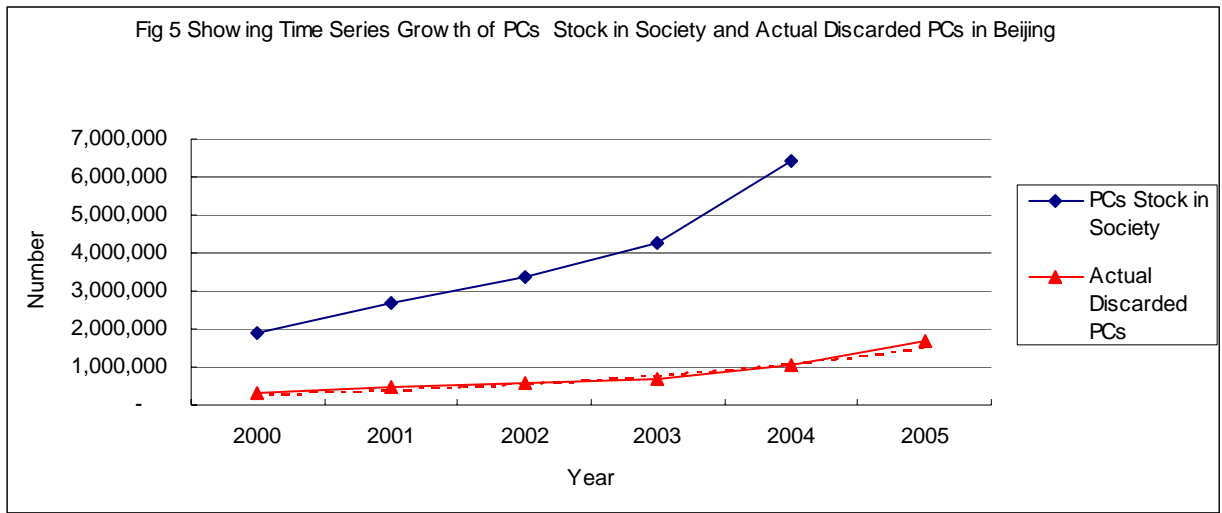
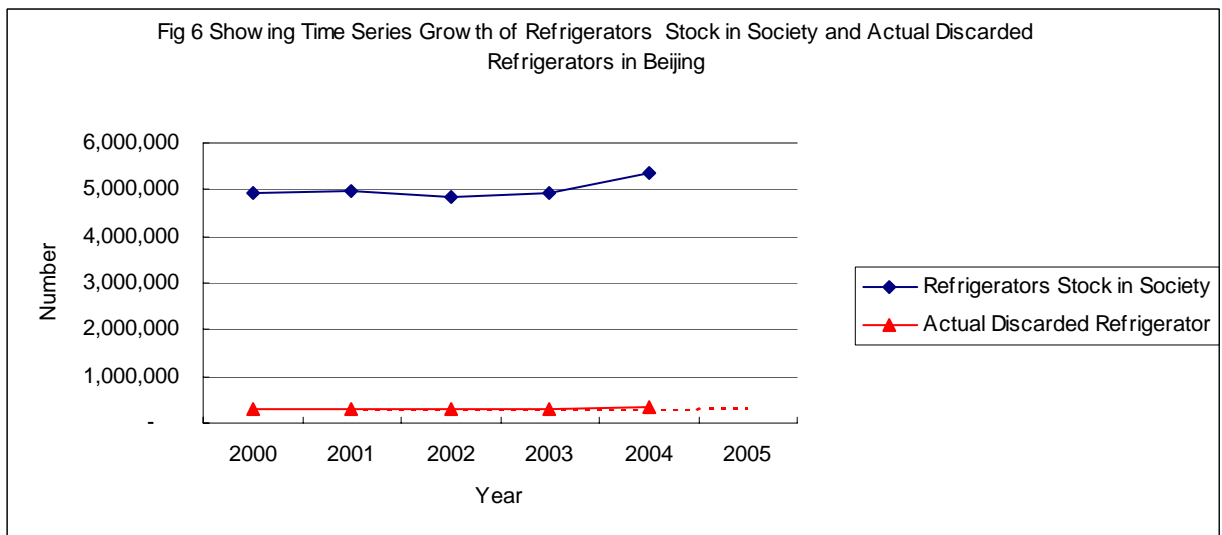


Table 12 Survey Data for Refrigerators in Beijing

Year	Stock in 100 families (Sets)	Stock in households (thousand sets)	Stock in Society (Thousand sets)	Actual quantity of the Discarded Refrigerators (Thousand sets)	Actual weight of waste electronic products (ton)
2000	107.4	4,825.5	4,922.0	307.6	3,999.12
2001	106.6	4,858.8	4,956.0	309.8	4,026.75
2002	101.6	4,764.0	4,859.3	303.7	3,948.18
2003	100.4	4,818.2	4,914.6	307.2	3,993.08
2004	104.2	5,246.5	5,351.4	334.4	4,347.2

Average lifespan refrigerator: 16 years



4.3.2 Recycling / Recovery

Table 13 Recycling /Recovery Material Flow

, 18.08.2004

Parts/Element from Disassembly	Material Flow
Iron, Aluminium, Copper etc.	Sold to metallurgy enterprises
Waste printed circuit board	Recovered and disposed by the vendors from Guang Dong and Zhe Jiang provinces
Wires	Sold to Guang Dong
Shells of waste monitors of PCs	Some are used as raw material to produce pesticide bottle, Most of them are moved to Guang Dong Province for disposal
ABS plastic	Sold to Guang Dong
CRT	In use: Sold to Guang Dong Broken: Disassembly Glass: Discarded with municipal rubbish.
Batteries	Most are transported to Guang Dong for disposal; The batteries collected by "Jing Huan" are stored in storehouse.
Power supply	Sold to Guang Dong
Capacitors	Most are sold to Guang Dong; Only a little amount of capacitors generated by repair shops are discarded with municipal rubbish.
Mercury containing materials	Sold to Guang Dong
Polyurethan	Discarded with municipal rubbish
Compressor	Sold to collector from Guang Dong..

4.3.3 Disposal

Only 5% e-waste (such as glass of waste CRT) shall be landfilled as municipal waste, the quantity is 539 ton/year.

Table 14: Disposal Material flow

Parts/Element from Disassembly	Material Flow
CRT, PU, some waste element from repair shops	landfill
Ink Box collected by “Jing Huan”	Incineration

4.4 Impacts

4.4.1 Labour

There are about 1800 community collection points with 3600 employees (2 employees per collection points) engaging in discarded electrical and electronic products and other waste material collection by the end of 2001. Besides, there are about 5000 moving individual collectors who are immigrants from countryside without fixed collection place and working time. Added the staff of traders in second hand goods markets and collectors & dismantlers in distributing centre such as Hou Ba Jia Chun, the total people who engage in collecting and disassembling of waste electronic products can reach 10,000.

4.4.2 Health

In Beijing, with simple tools the collectors and dismantlers disassemble the waste valueless electronic products manually. The disassembled parts and elements are sorted and transferred to Guang Dong province for sale or collected by collectors from Guang Dong province. It's physic method and no waste gas, liquid and harmful substances are generated. In general, the existing disassembly of electronic products in Beijing has no harm to health of workers.

4.4.3 Environment

It's found that some e-waste such as broken CRT, which nobody is willing to collect, are transferred to landfill field during survey. It's estimated that about 539 ton similar e-waste shall be landfilled with municipal rubbish. Some refrigerant such as CFC12 from the disassembled refrigerators will be discharged, which is harmful to environment. The other existing disassembly and sorting of electronic products in Beijing has no harm to environment.

4.4.4 Value added

In Beijing, except broken CRT and PU, which nobody is willing to collect, other electronic products are collected with payment. On the basis of investigation, we make value added analysis on disassembly of waste TVs, PCs and refrigerator. Please refer to Annex 5 for detail.

5 Conclusions

After investigation/survey on the generating, collecting, disassembling of waste electronic products in Beijing, It's knowable that there is about 10,775 tons e-waste every year. There are 1800 community collection points and five (5) large-scale distributing trade centers for e-waste assembly. Because there is no e-waste recycling plant in Beijing, after simply manually disassembled with simple tools, they are transported to southeast China (such as Guang Dong and Zhe Jiang) for recycling.

On the basis of the above analysis, it's shown that the collection and disassembly of waste electronic products in Beijing have no influence on the health of workers. There are about 539 tons e-waste to be landfilled every year. Some refrigerant such as CFC12 from the disassembled refrigerators are discharged, which have some pollution to environment.

There are about 10,000 people engaging in collecting and disassembling of waste electronic products in Beijing. Most of them are from countryside of China.

Chinese government has been strengthening legislation on nature resource protection and solid waste pollution prevention. "Management regulations of WEEE recycling", "Pollution prevention & Control and Management regulation on electronic information products" and "Technical policy on pollution prevention and control of WEEP" , which are related to e-waste, are being drafted now.

The amount of actual discarded electronic products and e-waste will be increased along with popularization of electronic products, so Beijing is a huge potential market of waste electronic products. As the capital of China, Beijing must suitably collect and disposal the waste electronic products. So foreign advanced, suitable handling technology and equipments with reasonable price can help Beijing to establish a modern e-waste handling plant, which can also benefit to 2008 Olympic game of Beijing.

- 6 Annex
- 6.1 Annex 1: Govt. Regulations
- 6.2 Annex 2: Interviews and Survey Questionnaires
- 6.3 Annex 3: Maps
- 6.4 Annex 4: Assessment of recycling sites
- 6.5 Annex 5: Value Added Analysis

Annex 1: Politics and Legislation

No.	Name	Adoption date/ Effective date	Purpose	Main Content	Issued by
1	Basel Convention	Chinese gov. signed on Mar. 1990. It's effective at same day.	Limit import of dangerous waste	Prevent dangerous waste to be transferred and disposed across the boundary illegally.	International Convention
2	Law of the PRC on the Prevention and Control of Environmental Pollution by Solid Waste	Oct. 30, 1995/ Apr, 1.1996	To prevent solid waste pollution	In law, reducing solid waste, transforming solid waste into resource and making solid waste harmless have been put forward. At present, the law is revised by Chinese Parliament. Producer Responsibility on WEEE is being studied now.	Chinese Parliament-Standing Committee of National People's Congress (NPC)
3	Law of the PRC on the Promotion of Clean Production	Jun. 29, 2002 / Jan. 1, 2003	Expedite clean production; lighten or eliminate harmfulness to human and environment	To decrease source of pollution, (improve utilization efficiency of resource; to reduce or avoid production and emission of pollutant during producing, providing service and using of products; to lighten or eliminate harmfulness to human and environment	Chinese Parliament-Standing Committee of National People's Congress (NPC)
4	Law of the PRC on Conserving Energy	Nov. 1,1997 / Jan. 1, 1998	To promote energy conservation by all sectors of the	Administration of energy conservation; rational use of energy; betterment of energy conservation technology; legal responsibility	Chinese Parliament-Standing

			society, increase the efficiency in the use of energy and its economic results, protect the environment, ensure national economic and social development, and meet the people's needs in everyday life.		Committee of National People's Congress (NPC)
5	Regulation on the Waste Imports for Environmental Protection and Management (Temporary)	Mar.1, 1996 / Apr. 1. 1996	Limit import of dangerous waste	Prohibit imported waste dumped, stacked and disposed.	State Environmental Protection Administration of China
6	Directive on strengthening environmental management of WEEE	Aug., 2003	Enhance the management of e-waste	Pollutant disposal declaring system, dangerous waste classification management system, permits management system, old technical process prohibition system and information issuance system etc.	State Environmental Protection Administration of China
7	Management regulations of WEEE recycling	Being drafted	Resource recycle, protect environment and health	The definition of WEEE, category of management, responsibility of stakeholders, producer responsibility, quality requirement to enterprises which are responsible to disposal of waste, multi-channel recovery, concentration of disposal, payment mechanism, responsibilities of	National Development and Reform Committee

				government on supervision	
8	Pollution prevention & Control and Management regulation on electronic information products	For comments and suggestions	To prevent electronic information products from polluting environment at headstream	Stipulate that enterprises should reduce or not use harmful substances when design, development, producing, sale, services etc. and provide customers green products	Ministry of Information Industry, PRC
9	Technical policy on pollution prevention and control of WEEP	For comments and suggestions	To reduce the output of WEEP, to improve efficiency of recycling and utilizing and to decrease impact on environment during WEEP disposal.	Friendly design on electronic products; Collecting, storage, recycling, reusing, disposal of WEEP; establishing national policies and standards.	State Environmental Protection Administration of China

Annex 2: Interviews and Survey Questionnaires

Beijing E-waste Investigation Questionnaire

E-waste Disassembly Point

Name of Disassembly Point: Beijing JingHuan Industrial Treatment Service Station

Address: Fatou village, Xingyundian town, DaXing District, Beijing

Character of Disassembly Point: Formal sector Contact Person: Mr. QiaoWangLin Number of employee: 8 persons

Working Hour: 8 hour/day Average wages: 40 RMB/day, person Capacity: 300 tun/year

Type of E-waste: Industrial waste Person responsible for Survey: Mr. Zhou QuanChun Date: March 13, 2004

Description:

Name	Description of the Technologies applied(including tool/device, safety measures)	Price and Quantity	Supplier	Consumer	
PWB	Disassemble main parts from PWB. Tool: hardware (screwdriver, hammer, etc.) Safe measures: glove	Collect price:1500RMB/dun. Processed PWB sale price: 3000RMB/dun	IBM, EPSON, NOKIA, Ericsson, HP, Panasonic, sansong, NanShi express(PC repair company)	Collectors from Zhejiang and Guangdong provinces come to door to buy to further recycling.	
Waste plastic component	Separated mental from plastic component by manual work Tool: hardware (screwdriver, hammer, etc.) Safe measures: glove	Sale price:1000RMB/dun			
Waste CRT	Remove electric gun and other parts from CRT by mental work Tool: hardware (screwdriver, hammer, etc.) Safe measures: glove	Sale price:0			Collector use waste CRT glass as raw material to make pesticide bottles.
Waste toner	Accumulate to a certain number to incineration. Tool: hardware (screwdriver, hammer, etc.) Safe measures: glove	Supplier pay for treatment:7000RMB/dun Incineration fee:7000RMB/dun			Beijing Cement Plant

Beijing E-waste Investigation Questionnaire
Waste TV Disassembly Point

Name of Disassembly Point: SuoJia Village Waste TV Disassembly Point

Address: SuoJia Village, CuiGeZhuang country, ChaoYang District

Character of Disassembly Point: informal sector Main e-waste: waste TV

Person responsible for Survey: Mr. Fu HongJun Date: March 26, 2004

Description:

Name	Description of the Technologies applied	Price and Quantity	Supplier	Consumer
Waste TV	<p>Except for a few good ones provided by renewing from restaurant or hotel sell to the second market, most of the waste TV are disassembled. The process is very simply. The tools are screwdriver, hammer and shears.</p> <p>First, remove the TV cover by using screwdriver. Take the CRT out without doing anything, just put it on a special plastic shelf that prevent them broken.</p> <p>Second, separate the cover and others (PWB, loudspeaker, wires etc,) by screwdriver and shears.</p> <p>So, the waste TV is divided into three parts: CRT, cover and PWB with components without producing pollution and waste.</p>	<p>The cost of waste TV differ from 100RMB to 200RMB according to the size, function and used years.</p> <p>There are several decades of disassembly family in this village, which more than ten disassembly families have a large process capability. They can disassemble several decades one day according to the number of collecting. The others have a small scale. The accurate number is difficult to get. (Because it's an informal section, the investigation is very difficult.)</p> <p>It's estimated that the total number of disassembly is more than 10 ton/day.</p>	<p>1 collect by himself 2 from individual collectors 3 from community collection point 4 from units or company 5 from second market</p>	<p>All the CRT, PWB and plastic cover are transport to GuangDong province to recycling.</p>

Notes: There are 138 local families (480 persons) in this village. The migrant are about 1000 person, which 400-500 persons are doing disassembly business.

Beijing E-waste Investigation Questionnaire
 Trader in E-waste Distributing Center

Name of Distributing Center: HouBaJia E-waste Distributing Center

Address: HouBaJia Village, HaiDian District, Beijing Contact Person: Mr. Wang

Character of Trader(informal sector or formal sector): informal sector

Number of Person: 5 person Main trading goods: waste PC and parts

Person responsible for Survey: Mr. Fu HongJun Ms. Tian Hui Date: March 4, 2004

Description:

Name	How to treatment	Price and Quantity	Supplier	Consumer
Waste PC and parts	Simply disassemble and sort by handwork.	Accept all kind of e-waste, the price is differ according to the weight and quality. Average price: PWB (most from PC):18 RMB/kg Plastic cover, plastic parts,etc:4 RMB/kg Power supply box: 7 RMB/per	From individual collector, computer company, collect company,	Collected e-waste transport to the e-waste market of ShanTou or GuiYu of GuangDong province by truck.

Note: This area has about 15-20 e-waste collectors. It's estimated that the average output are about 10 dun/day.

Beijing E-waste Investigation Questionnaire
 Trader in E-waste Distributing Center

Name of Distributing Center: HouBaJia E-waste Distributing Center

Address: HouBaJia Village, HaiDian District, Beijing Contact Person: Mr. Nie Feng

Character of Trader(informal sector or formal sector): informal sector

Number of Person: 4 person Main trading goods: monitor of PC

Person responsible for Survey: Mr. Fu HongJun Ms. Tian Hui

Description 情况:

Name	How to treatment	Price and Quantity	Supplier	Consumer
Monitor of PC	Basically, the monitor with good CRT was transported directly without any processed. For the monitor with weak CRT, simply separate into CRT and cover. Weak CRT discarded, Cover with wire and others sell to the other local e-waste trader.	Accept all kind of monitors, the price is differ according to the size and quality. Average price: Monitor (with good CRT): 150RMB/per Monitor (with weak CRT): 10 RMB/per	From individual collector, computer company, collect company,	Collected monitors are transported to the e-waste market of ShanTou or GuiYu of GuangDong province by truck.

Note: This area has about 15-20 e-waste collectors. It's estimated that the average output are about 10 dun/day.

Beijing E-waste Investigation Questionnaire
 Trader in Second Appliance Market

Name of Second Market: FeiMa Second Appliance Market Address: South-East of FengTaiLuKou

Main Category of second appliances: Mobile phone PC TV Hi-Fi Others

Name of Trader: C-17 Contact Person: Ms. Tian Number of Employee: 2 person

Category of Appliance: TV Main Customers: Migrant Labor ,Low Income Family, Small Company

Source of Appliance: Appliance Store (old for new), new appliance with old style and keep long in the stock and renewing from hotel etc. Person responsible for Survey: Ms. Tian Hui Date: March 12, 2004

Description:

Name	Price and how to treatment	Quantity	Note
TV	<p>According to the use years, brand etc, the cost of TV with good function is 100-400RMB/set. They are as entire appliance reselled in the second market.</p> <p>The cost of TV with defective function is 20-50RMB/set. If it can repair, repair and sell it as entire appliance. If not, take out the CRT from TV with screwdriver and sell it separately. For 20# CRT, the sale price is 120-140RMB/per, and others are 20RMB/set. There are special persons from GuangDong</p>	<p>TV: 300set/mon, which 20% would be disassembled and sell the component separately.</p>	<p>In the market, we can't find any parts of the TV, They are all in the place where the trader live. The trader also disassembles the waste TV at their place. There are special persons from GuangDong province come to door to</p>

	province come to door to collect these parts. If the CRT is broken, it's valueless, and discarded.		collect these parts. There are about 20 TV traders in the market.
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Beijing E-waste Investigation Questionnaire
 Trader in Second Appliance Market

Name of Second Market: GongYi East Bridge Second Appliance and Furniture Market

Address: North-West of GongYi East Bridge, South Fourth Circle Road

Main Category of second appliances:

Mobile phone PC TV Hi-Fi Others refrigerator, washing machine, air conditioner etc.

Name of Trader: unknown Contact Person: unknown Number of Employee: 3 person

Category of Appliance: TV Source of Appliance: Individual Collector, other TV traders of market

Main customers: whole sale to GuangDong Province

Person responsible for Survey: Ms. Tian Hui Date: March 31, 2004

Description:

Name	Price and how to treatment	Quantity	Note
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TV	<p>The cost of CRT with 14# is 120RMB/per, and the sale price is 140RMB/per. The cost of CRT with 20# is 140RMB/per, and the sale price is 160 RMB/per. If the CRT is broken, the glass is unvalued, and discarded. For PWB, the sale price is 3.8RMB/kg or 5RMB/per For plastic cover, the sale price is 3.8RMB/kg. Usually, there are collectors from GuangDong province come to here to buy these parts.</p>	<p>Old CRT:500-600per/mon Others have no statistical number.</p>	<p>We can easily find PWB and other parts from TV in this market. There are about 30 TV traders.</p>
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Beijing E-waste Investigation Questionnaire
Trader in Second Appliance Market

Name of Second Market: North MinYong Second Goods Market

Address: BaBaoShan Railway Station to North 100m, ShiJingShan District, Beijing

Main Category of second appliances: Mobile phone PC TV Hi-Fi Others

Name of Trader: No.20 in the West appliance hall

Contact Person: Ms. Zhang Li Number of Employee: 2 person Category of Appliance: TV

Source of Appliance: Appliance store (old for new), collect to door

Main customers: Migrant Labor ,Students, Low Income Family, Small Company

Person responsible for Survey: Mr. Zhang YouLiang Date: March 12, 2004

Description:

Name	Price and how to treatment	Quantity	Note
TV	<p>The cost of old TV of 20# or 21# without control is 100 RMB/set;The cost of old TV of 29# with control and famous brand is 400-500 RMB/set. They are reselled in the market, and sale price is higher than the cost 5-15%.</p> <p>The cost of waste TV is 30-50 RMB/set. The trader disassembles it himself. Good CRT, for example 18# of CRT, sale price is 100-200 RMB/per; PWB sale price is 2.5 RMB/kg; transformer or others is 10 RMB/per; broken CRT is 1.5 RMB/per.</p>	<p>Old TV 80 set/mon Waste TV 15 set/mon PWB 27kg/mon Broken CRT 3 per/mon</p>	<p>The area of this market is 5000m2, the total number of traders is 150, which of appliance trader (TV,PC and Hi-Fi) is 36.</p>

Beijing E-waste Investigation Questionnaire
Trader in Second Appliance Market

Name of Second Market: FeiXinMa Second Market Address: GongZhuFen south station

Main Category of second appliances: Mobile phone PC TV Hi-Fi Others

Name of Trader: Phillip Monopolization Contact Person: Ms. Zhang YongXia Number of Employee: 15 person

Category of Appliance: Hi-Fi Source of Appliance: new goods from keep long in stock

Main Coustomers: College Student, Low Income Family

Person responsible for Survey: Mr. Zhang YouLiang Date: March 24, 2004

Description:

Name	Price and how to treatment	Quantity	Note
Hi-Fi,VCD,DVD	Hi-Fi, original value:350-600 RMB/pair; sale:250-400 RMB/pair VCD, original value 500-600 RMB/per; sale:300-500 RMB/per DVD, original value 800-1000 RMB/per; sale:600 RMB/per Radio, original value 500-60 RMB/per; sale:30 RMB/per Recorder, original value 160-500 RMB/per; sale: 150-500 RMB/per CD player, original value 600-1000 RMB/per, sale:600 RMB/per	Hi-Fi 3 pairs/mon VCD 2-3 per/mon Radio 2-3 per/mon Recorder 3-5 per/mon	There are no old Hi-Fi to sell, all the Hi-Fi is new from keep long in stock.

Beijing E-waste Investigation Questionnaire
 Trader in Second Appliance Market

Name of Second Market: FeiXinMa Second Market Address: GongZhuFen south station

Main Category of second appliances: Mobile phone PC TV Hi-Fi Others _____

Name of Trader: unknown Contact Person: Ms. Zhang JunFang Number of Employee: 1 person

Category of Appliance: Mobile phone Source of Appliance: Appliance Store (old for new), Individual Collector

Main Customers: Migrant Labor, College Student, Low Income Family, Small Company

Person responsible for Survey: Mr. Zhang YouLiang Date: March 12, 2004

Description:

Name	Price and how to treatment	Quantity	Note
Mobile phone	<p>The cost of old mobile phone with color screen is 400-3000RMB/per; without color screen is 50-400RMB/per.</p> <p>After repaired, sometimes repair is not necessary, they are as second goods to resell in the market. And the sale price is higher than the cost about 10-30%.</p> <p>Waste mobile phone costs 5-20RMB/per. Plastic or metal cover is useless, discarded; PWB, if usable, as a part for other phone's repair, if unusable, sell to the HouBaJia with the price of 20 RMB/kg.</p>	<p>MP with color 15set/mon</p> <p>MP without color 15set/mon</p> <p>Waste MP 3 kg/mon</p>	<p>The area of this second appliance market is 900m², total number of trader is 200, which 130 are MP traders.</p>

Beijing E-waste Investigation Questionnaire
Trader in Second Appliance Market

Name of Second Market: FeiXinMa Second Market Address: GongZhuFen south station

Main Category of second appliances: Mobile phone PC TV Hi-Fi Others _____

Name of Trader: ZhongBei HengTai GongZhuFen sub-company Contact Person: Ms. Huang LanYin

Number of Employee: 3 person Category of Appliance: PC

Source of Appliance: Individual Collector, Collect to door Main Customers: Migrant Labor

Person responsible for Survey: Mr. Zhang YouLiang Date: March 12, 2004

Description:

Name	Price and how to treatment	Quantity	Note
PC	<p>The cost of PC with CPU 586 and good function is 300-400RMB/set, and the usable CD-ROM is 20RMB/per. They are reselled in the second market. The sale prices are always higher than it's cost about 5-20%.</p> <p>Old component from PC are used to repair, if it 's useless, it's selled to the HouBaJia, for example: the sale price of CRT with 14# is 80-100RMB/per, and with 17# is 100RMB/per.</p> <p>Waste CRT glass is valueless, discarded.</p>	<p>Entire appliance:20sets/mon</p> <p>CD-ROM:60per/mon</p> <p>Old CRT: 3-5per/mon</p> <p>Waste CRT: seldom</p>	<p>The area of this second appliance market is 900m²,total number of trader is 200, which 15 are PC traders.</p>

Beijing E-waste Investigation Questionnaire
Community Collect point

Name of Community Collect Point: Enjili Regenerative Resource Collect Point

Address: Enjili community, Haidian district

Contact Person: Mr. Guo KuanLai Person responsible for Survey: Mr. Fu HongJun Date: March 15, 2004

Description:

Name	Price	Quantity	How to treatment	Note
TV	TV with good function: 100-150 RMB/set; Others: 40-50 RMB/set	2-3set/mon	Transport to the second market to sell	(1) This community has 1000 family. (2) There are 460 collect point like this in Haidian district. (3) There are 1800 collect point like this in Beijing. (4) It's difficult to get exact quantity, for example, the collector accepted 2 recorders and 1 TV at Feb. 15.
PC	About 150RMB/set	Seldom		
Hi-Fi	Recorder: 10-40 RMB/per	3-5 set/mon		

Beijing E-waste Investigation Questionnaire
Community Collect point

Name of Community Collect Point: Second Section, FangQun Garden Regenerative Resource Collect Point

Address: No.13 building, Second Section, FangQun Garden, FangZhuang Community, Fengtai district

Contact Person: Mr. Han YingGuo Person responsible for Survey: Mr. Fu HongJun Date: March 21, 2004

Description:

Name	Price	Quantity	How to treatment	Note
TV	TV(with picture):100-200RMB/set TV (No picture): 30-50 RMB/set	Average:1 set/day	Transport to the second market to sell	(1) The caution money of this point is 2000 RMB. The management fee is 200 RMB/mon, so the net profit of the collector is about 600-700 RMB/mon. (2)There are about 280 similar collection station in this District.
Hi-Fi	Average price of recorder is 40 RMB/set	(including TV, PC and Hi-Fi)		

Beijing E-waste Investigation Questionnaire
Community Collect point

Name of Community Collect Point: First Section, FangGu Garden Regenerative Resource Collect Point

Address: No.31 building, First Section, FangGu Garden, FangZhuang Community, Fengtai district

Contact Person: Mr.Shi ZhaoYang Person responsible for Survey: Mr. Fu HongJun Date: March 19, 2004

Description:

Name	Price	Quantity	How to treatment	Note
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TV	TV (with picture):Min 100 RMB/set. TV (No picture): 30 RMB/set	Seldom	Transport to the second market to sell	The quantity of collected appliance is small and can't be estimated and expected.
PC	Have not a common price			
Hi-Fi	Recorder:30 RMB/set			

Beijing E-waste Investigation Questionnaire
Regenerative Resource Distributing Center

Name of Distributing Center: YaoJiaYuan Regenerative Resource Distributing Center

Address: No.1268 YaoJiaYuan, ChaoYang District

Character of Trader(informal sector or formal sector): formal sector Total Number of Trader: 78

Main Regenerative Resource: steel and iron, color metal, paper, plastic

Person responsible for Survey: Mr. Fu HongJun Date: March 12, 2004

Description:

Name	How to treatment	Price and Quantity	Supplier	Consumer
Scrap steel and iron	Basically, the scrap steel and iron were sorted by handwork. For big piece one, it need cut, and small, light one need pack.	Collect price: 1600-2100 RMB/dun Sale Price: 1800-2700 RMB/dun Average quantity: 22 dun/year	Community Collect Point; Company and Institute; Individual Collector	Beijing Steel plant, Tianjing Steel plant, Tangshan Steel plant.
Scrap color metal	Basically, scrap color metal was sorted by handwork. For cable, it need to peel the plastic cover.	Scrap copper: collect price:18000 RMB/dun; sale price:19000 RMB/dun. Scrap Al: collect price:12000RMB/dun; sale price: 13000RMB/dun. Average quantity: 3000-5000 dun/year		Copper plant and Al plant in Beijing, Tianjing and HeBei province.
Scrap paper	Basically, scrap paper was sorted by handwork.	Collect price:800-1200 RMB/dun; sale price:900-1300 RMB/dun Average quantity: 6-8 dun/year		Paper plant in Beijing, Tianjing, ShanDong and HeBei province.

Notes: The price is of February 2004.

Beijing E-waste Investigation Questionnaire
Individual Collector

Name of Collector: Mr. Li Place of Survey: Morning Market, Yue Tan BeiJie

Place of collection: Community in Xi Cheng District Member of Collector: 2

The collected waste appliance: TV sets , Hi-Fi/Recorder/Video , Washing Machine, Refrigerator

From whom to collect: Individual Person responsible for Survey: Ms. Tian Hui Date: March 15, 2004

Description:

Name	Price	Average Quantity	How to treatment
TV sets	14-20# 130-200RMB/set 21# 200-300RMB/set 25# 300-400RMB/Set 29# 400-500RMB/set If CRT is out of work, the price for waste TV set is 10 RMB per set.	About 10-15 Sets per month	The collected TV is sold to the second market, such as Fei Ma Second Appliance Market.
Video	50 RMB/set whatever it's work or not.	About 2-3 sets per month	The collected video is sold to the second market, such as Fei Ma Second Appliance Market.

Beijing E-waste Investigation Questionnaire

Individual Collector

Name of Collector: Mr. Chen Place of Survey: Wu Mei Supermarket, Huixinli, Chaoyang District, Beijing

Place of collection: Community in Xi Cheng District Number of Collector: 2

The collected waste appliance: PC,TV sets, Hi-Fi/Recorder/Video, Washing Machine, Refrigerator

From whom to collect: Individual Person responsible for Survey: Ms. Tian Hui Date: March 14, 2004

Description:

Name	Price	Average Quantity	How to treatment
TV sets	14-20# 130-200RMB/set 21# 200-300RMB/set 25# 300-400RMB/Set 29# 400-500RMB/set If CRT is out of work, the price for waste TV set is 10 RMB per set.	About 10-15 Sets per month	The collected TV is sold to the second Appliance market.
PC	Disused PC:100-150RMB/set	About 10-15 sets per month	The collected PC is sold Hou Ba Jia in Hai Dian District, Beijing.

Beijing E-waste Investigation Questionnaire
Collect Company

Name of Collector: Chuan Tai Hui Hong Trading Company Place of Survey: No.9, Zhong Guan Chong Da Jie, Hai Dian District

Contact Person: Mr. Zhou Lian Bin Place of collection: Whole Beijing City

Number of Collector: 10 The collected waste appliance: PC

From whom to collect: Individual, Company and Institute

Person responsible for survey: Tian hui Date: Mar. 14, 2004

Description:

Name	Price	Average Quantity	How to treatment
PC	100-150 RMB/set for disused PC	About 10-15 Sets per month of disused PC.	The old PCs, which are in good operation, or can work after repaired , are sold as second computers. If it can't repaired, the PC or parts are sold to Hou Ba Jia Chong, Haidian District, Beijing

Note: This information is available by telephone.

Beijing E-waste Investigation Questionnaire
TV set and PC Manufacturer

Person responsible for Survey: Mr. Gao ZhenJie Date: March, 2004

Description:

Name	Main product	Capacity of year 2001(×1000set)	E-Waste	Measures
Legend (Beijing) Company	PC	2833.6	Rejection will be repaired by replace its component; unwanted raw material will sell to the relative plant to recycling.	Meet with the need of clean produce and environmental certification; package material should be harmless and nontoxic.
QingHua TongFang Company	PC	434.3		
QingHua ZiGuang (Group) Company	PC	19.4		
Beijing BeiYou PC System Company	PC	3.8		
Total Capacity of PC		3297.1		
Beijing Peony Electronic Group Company	TV	1.9		
Beijing ZhaoWei Electronic (Group) Company	TV	0.6		
Total Capacity of TV		2.5		

Beijing E-waste Investigation Questionnaire
TV set and PC Manufacturer

Person responsible for Survey: Mr. Gao ZhenJie Date 调查时间: March, 2004

Description:

Name	Main product	Capacity of year 2002(×1000set)	E-Waste	Measures
Legend (Beijing) Company	PC	3307.2	Rejection will be repaired by replace its component; unwanted raw material will sell to the relative plant to recycling.	Meet with the need of clean produce and environmental certification; package material should be harmless and nontoxic.
BeiDaFangZheng Company	PC	1752.6		
QingHua TongFang Company	PC	669.6		
Beijing ZhaoWei Electronic (Group) Company	PC	3.9		

Total Capacity of PC		5733.3		
Beijing Peony Electronic Group Company	TV	3.1		
Total Capacity of TV		3.1		

Beijing E-waste Investigation Questionnaire
TV set and PC Manufacturer

Person responsible for Survey: Mr. Gao ZhenJie Date: March, 2004

Description:

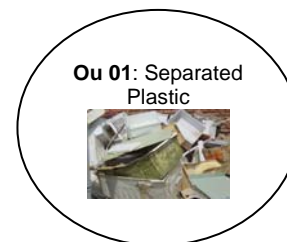
Name	Main product	Capacity of year 2003($\times 1000$ set)	E-Waste	Measures
Legend (Beijing) Company	PC	3938.6	Rejection will be repaired by replace its component; unwanted raw material will sell to the relative plant to recycling.	Meet with the need of clean produce and environmental certification; package material should be harmless and unotoxic.
BeiDaFangZheng Company	PC	1607.0		
QingHua TongFang Company	PC	1024.0		
Beijing ZhaoWei Electronic (Group) Company	PC	2.8		
Beijing HongJi Communication Compay	PC	465.6		

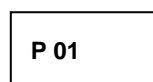
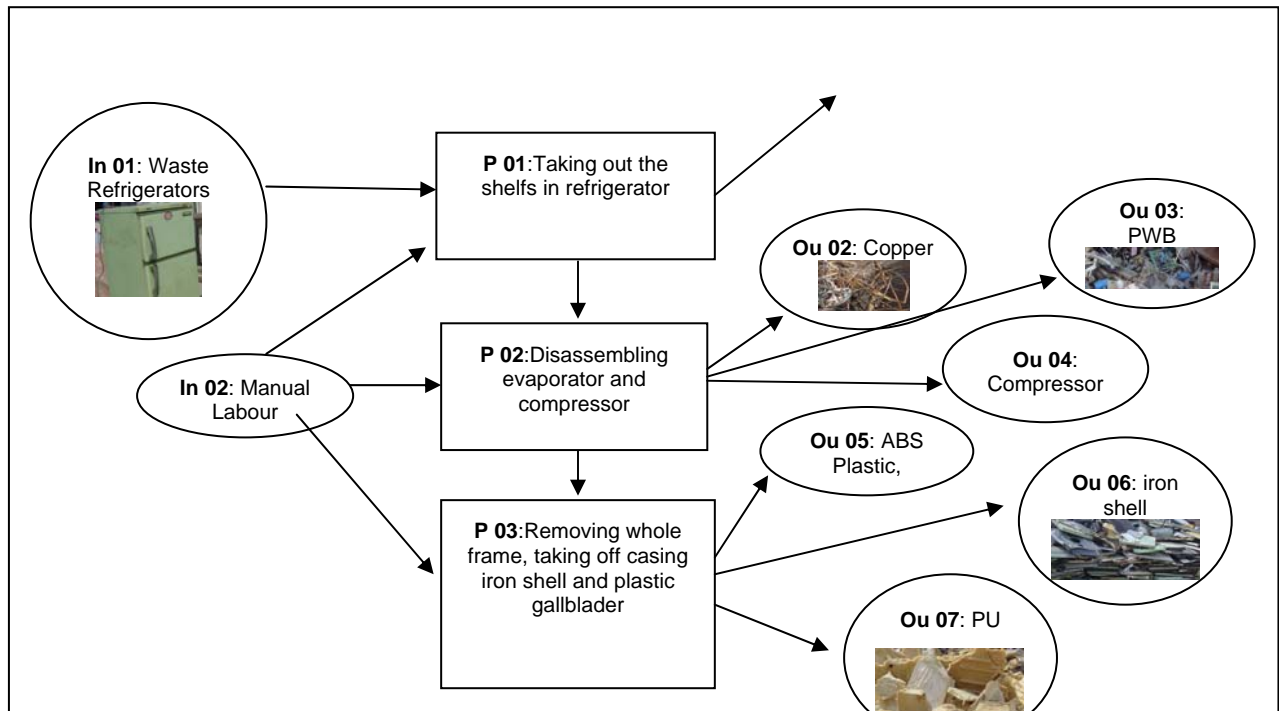
Total Capacity of PC		7038.0		
Beijing Peony Electronic Group Company	TV	0.8		
Total Capacity of TV		0.8		

Annex 4: Assessment of recycling sites

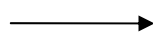
Visited processing site Name; Address, Contact Person	Dong Xiao Kou Second hand goods market Kou Mr. Wang	Beijing Chang Ping Dong Xiao
Date	April 30, 2004	
Person responsible for Survey	Zhou Quan Chun, Tian Hui, CEIT	
Name; Company		
Coordinates (GPS)		
Type of processed material	Waste Refrigerators	
Quantity of processed material	Max. 20 set/day, it's depend on the refrigerators collected.	
Number of employees / Working hour	Two workers, disassembling or repairing in the morning, collecting in the afternoon.	

Processing diagram





P 01 Process (e.g. Transport, Open Burning, Acid bath, Manual separation.)

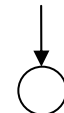


Material flow

Input 01




Input (e.g. e-Waste fractions, Water, Acid, natural gas, electricity...)



Output (e.g. Cu, Plastic, Wastewater, ...)

Output 01

Processes				
Code	Name	GPS	Description	Photo Documentation
			<p>Detailed Description of the Technologies applied: thermal recovery, landfill, environment, open burning, transport (vehicle type, distance)...</p> <p>Health and safety measures</p> <p>Labor intensity (Person * hours / processed material)</p> <p>Ev. wages of employees, taxes paid to public authorities, Cost equipment, etc.</p>	<p>Images "P01 Name.jpg" and further description</p>
P01	Taking out the shelves in refrigerator		Taking out the shelves and storage box in refrigerator manually.	
P02	Disassembling evaporator and compressor		Disassembling evaporator with screwdrivers, discharging refrigerant, and dismantling compressor and PWB.	
P03	Removing whole body, taking off casing iron shell and plastic gallblader		Removing whole body with hammer, taking off casing iron shell and plastic gallbladerwith ripping bar	

Code				
Code	Material/Energy	Price	Description	Photo Documentation
		RMB / Unit	Supplier, Specification	<p>Images "In01 Name.jpg" and further description</p>
In01	Waste refrigerator	50-100 RMB/unit	Collected by themselves or from be transferred from other individual collectors	
In02	Manual labour	3-5RMB/refrigerator		

Output

Code	Material/Energy	Price RMB / Unit	Description Customer, Specification	Photo Documentation Images "Out01 Name.jpg" and further description
Out01	Plastic	3.8RMB/Kg	Sold to collector	
Out02	Copper	18-22RMB/Kg	Sold to collector	
Out03	PWB	4RMB/Kg	Sold to collector	
Out04	Compressor	3.2RMB/Unit (broken) ; 30-40RMB/Unit (Good condition)	Sold to collector	
Out05	ABS Plastic	3.8RMB/Kg	Sold to collector	
Out06	Sheet iron	1.1RMB/Kg	Sold to collector	
Out07	PU	0	Discarded	

Annex 5: Value Added Analysis

Table 1 Value Added Analysis


Company	Beijing Jing Huan Industry Waste Handling Services Station
Place	Beijing Da Xing District Qing Yun Dian Town Dai Tou Village (Silo No. 480)
Capacity	0.82ton/day (300ton/year)
Category	Waste industry electronic products
Input Price	PWB 1.5RMB/Kg; Ink box 7RMB/Kg; CRT 0
Output Price	PWB 3RMB/Kg; Ink box 7RMB/kg; CRT 0; Copper 15RMB/Kg; iron and Plastic: 0.8RMB/Kg
Employees	8
Working Time	8hrs/day
Average Wage	40RMB/person.day
Other Cost	Tools: Screwdrivers, pliers etc. The cost can be neglected. House: The fixed asset, The cost is excluded.
Description	After training, the workers in this station can disassemble and sort the e-waste with simple tools such as screwdrivers, pliers. The other e-waste which can't be handled such as batteries are stored. The disassembled parts include PWB, plastic, wire, battery, metal etc.
Photos	 <p>Disassembly by manual PWB Wire Metal</p>

Table 2 Value Added Analysis

Company	Beijing Hou Ba Jia e-waste distributing Center
Place	Beijing Hai Diang District Hou Ba Jia Village
Capacity	12tons/month, including PWB6tons/month, Plastic components 3tons/month, Power supply Box 3ton/month
Category	PC's Parts (Excluding monitor)such as PWB, keyboard, power supply boxes
Input price	PWB 18RMB/Kg; Plastic components 4RMB/Kg; Power supply box 7RMB/Set (Total:141,000 RMB/month)
Output price	PWB 20RMB/Kg; Plastic components 5RMB/Kg; Power supply box


	8.5RMB/Set (Total:160,500 RMB/month)
Employees	5
Working time	8hrs/day
Average Wage	20 RMB/man.day (Total:3000RMB/month)
Other Cost	Tools: Screwdrivers, pliers etc. The cost can be neglected Packing: White textile bags, The cost can be neglected House rent: 1500RMB/Month (about 20 m ²) Freight: 2400 RMB/month Accommodation : 750RMB/Month
Value added	11850RMB/month
Description	e-waste are sorted, packed and transported to Guang Dong province for sale.
Photos	  
	Power supply box plastic shell wire, cable

Table 3 Value Added Analysis

Company	Beijing Suo Jia Chun TV sets Disassembly Points
Place	Beijing Chao Yan District Cui Ge Zhuan Suo Jia Chun
Capacity	45000Kg (1800sets) /Month
Category	Waste TV sets
Input price	Average :170RMB/set (Total:306,000 RMB/Month)
Output price	CRT 150RMB/set, Others: 3.8RMB/Kg (Total:338,000RMB/month)
Employee	3
Working time	8 hrs/day
Average wage	25 RMB/man.day (Total:2250RMB/month)
Other Cost	Tools : Screwdrivers, pliers etc. The cost can be neglected House rent: 3000RMB/month Freight : 9000 RMB/month
Value added	17750RMB/month


Description	Unscrewing the body; opening the case; removing shell; taking out CRT; putting CRT on a plate; disassembling shell and other parts (PWB, speaker, wire etc.)
Photos	 <p>TVs (Shell has been removed) Disassembled CRT PWB</p>

Table 4 Value Added Analysis

Company	Beijing Chang Ping District Dong Xiao Kou Town Refrigerator Disassembly point
Place	Beijing Chang Ping District Dong Xiao Kou Town
Capacity	5 sets/day (4 sets old refrigerator and 1 waste refrigerator.)
Category	Waste and old refrigerators
Input price	Waste refrigerator:100 RMB/set
Output price	Useful Refrigerator:150RMB/set, material of disassembled refrigerator: plastic: 3.8 RMB/Kg, Iron:1.1 RMB/Kg, Copper:22 RMB/Kg, aluminium: 15 RMB/Kg, glass: 0.2 RMB/Kg, PWB: 4RMB/Kg, Compressor (Can be used): 3.2 RMB/Kg, Compressor (out of use): 30-40 RMB/Kg
Employee	3
Work Hours	To repair and disassemble discarded refrigerators in the morning, while go out to collect in the afternoon
Average wage	10RMB/Day.man (Total: 900RMB/month)
Other Cost	Tools : Screwdrivers, pliers etc. The cost can be neglected Management Cost (including house rent and rubbish disposal): 350 RMB/month
Value added	5200RMB/month
Description	Taking out the shelf; disassembling evaporator, PWB and compressor; removing whole body, dismantling iron shell and plastic gallbladder.

Photos



Shelf



copper



PWB



Shell