

Strategy Analysis for Waste Household Appliance Recycling of Tianjin Community Residents by a Survey

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Abstract. In recent years, China's emphasis on community construction increased significantly, Tianjin is also actively promoting the work about community building like health community services, convenient business services and environmental community services. To improve the recycling efficiency of waste household appliance(WHA) recycling of Tianjin community residents, the paper investigates the condition on WHA recycling of community residents in Tianjin by questionnaire, analyzes the current situation and the main problems and makes suggestions to speed up the establishment of formal community recycling sites.

Introduction

With the improvement of people's living standards, people put new and diverse requirements about household appliances. It promotes the upgrading of appliances and elimination of waste household appliances. Waste appliances often contain a lot of useful metals, such as copper, iron, aluminum, nickel, chromium, etc. It can change waste into treasure to achieve circular economy if done these waste appliances properly. It is not only a waste of resources, but will also cause environmental pollution if handled improperly.

Tianjin is a modern port city and an important transportation hub in northern with rapid economic development. Its household appliances industry is flourishing and home appliance product updates fast but the utilization of resources is not high. In order to improve the processing efficiency of WHA, China has issued the relevant policies and regulations, such as "waste electrical and electronic product recycling regulations" and appliances "trade-in" policy, in which Tianjin became the pilot city. With the end of 2011, the work of appliances "trade-in" fully completed in Tianjin.

According to the statistics, from September 1, 2009 to August 31, 2011, Tianjin have set up trade-in outlets of home appliance 1003; the sale number of new appliances is 1,616,600 units and total sale is 6.091 billion RMB; the recycling number of WHA is 1,692,400 units; financial subsidies are 780,900 units and the amount of 233 million RMB [1]. By the end of 2011, Tianjin proposed a "waste electronic products in Tianjin Development Plan." Early 2013, the Tianjin Municipal Government issued the "Opinions on the establishment of a complete waste of advanced product recycling system," and "opinions" in particular pointed out the need to strengthen supervision of waste electrical and electronic product recycling, handling behavior to combat illegal business [2], reflecting the importance of the Tianjin Municipal Government waste home appliances recycling process. Researches about waste home appliances were mainly in the following aspects: a) Studies on waste sources and hazards of household appliances. LI YJ pointed out the damage of unreasonable WHAR and put waste home appliances recycling proposals combined with experience from foreign countries [3]. ZHU JF introduced the harm emerged in other foreign electronic waste and gave Systematization processing suggestion which was suitable for China [4]. b) Research in the aspects of waste home appliances recycling in operation and management. XU ZY, MA SH proposed you need to reverse supply chain established on benefits driving, corporate responsibility driving and laws driving in order to maximize profits [5]. c) Research on

consumers' behavior in recycling WHA. LAN Y, ZHU QH did empirical research on consumer behavior intention towards participation in regular WHA recycling and analyzed the impact of individual differences in the recovery of consumer behavior [6].

There were many researches about WHA recycling, but studies on WHA specifically for community residents were a little few. With the development of Tianjin, most consumers are living in the community and they are the beginning of the reverse chain, so their behavior and attitude of WHA recycling will directly affect the policy about WHA implementation. The researches on community treatment of WHA seem very important.

Investigation about the condition on WHA recycling of community residents in Tianjin

In order to learn the condition on WHA recycling of community residents in Tianjin, we made the questionnaire named "survey on sustainable development awareness and treatment of WHA in Tianjin community ".In that survey, we distributed 230 questionnaires. There were 214 effective questionnaires recovered. These questionnaires cover six urban cities and four suburbs in Tianjin included 13 resident communities. Among these residents there are 102 men and 112 women; there are 25 people below 30 years old, 97 people 30-50 years old, 93 people over the age of 50; their career include teachers, students, civil servants, etc.; their income also divide into 2,000RMB,2000-4000 RMB, and different intervals.

The awareness about WHA recycling of residents

Community residents learn WHA recycling by different ways. The main ways are advertising from TV, newspapers, network information and shopping malls, propaganda in their communities and small traders to peddle. From the survey data, we know the main way people get information on recycling of WHA is small traders to peddle, followed by advertising from television media and shopping collection sites, more specific data shown in Table 1.

Table 1 ways for learning waste home appliances recycling

Ways of learning	TV	Internet	Newspaper	Community	Market	Trader
Percentage	18.5%	10.7%	6.9%	5.6%	20.0%	38.3%

Nowadays there are factory recycling, community recycling, recovery of small traders and shopping malls recycling pathway in Tianjin. Nearly half of the community residents think the best way to recycle is factory, followed by small traders. The number of people who select community recycling and malls recycling is much little, shown in Fig. 1.

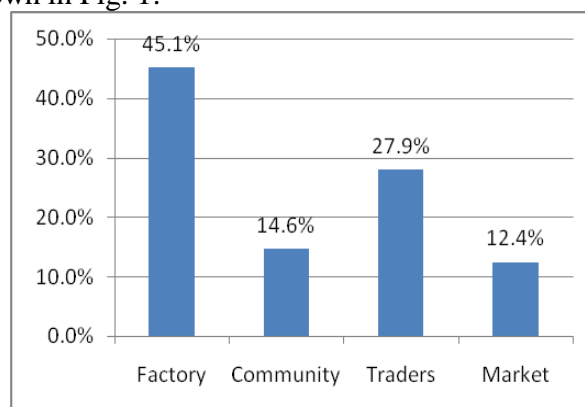


Fig. 1 the best way to recycle

The majority residents thought WHA after recycling are used to product remanufacturing, materials recycling and re-sale as second-hand goods. That is to say, the majority of residents believe that household appliances after recycling become recycling of resources to some extent. But about 13 percent of the residents do not know or do not care about the use on recycling of waste home appliances, and some

residents think the use of WHA is not the same, due to the different recovery purposes and different recycling pathways and how to use them does not matter with themselves, the specific data shown in Table 2.

Table 2 Treatment pathways after recycling

Processing way	Product remanufacturing	materials recycling	re-sale	unknown
Percentage	29.1%	28.9%	28.9%	13.1%

Condition on WHA recycling

As can be seen from Fig. 2, the type of WHA is different. There are large appliances like color TV, refrigerators and washing machines and other small appliances like stereos, fans and kettles. Most of the residents have treated several common household appliances. People who have recycled TV account for about 35% of the total survey population. The number of washing machines is 21.9%, and residents treated refrigerators accounted for about 20%.

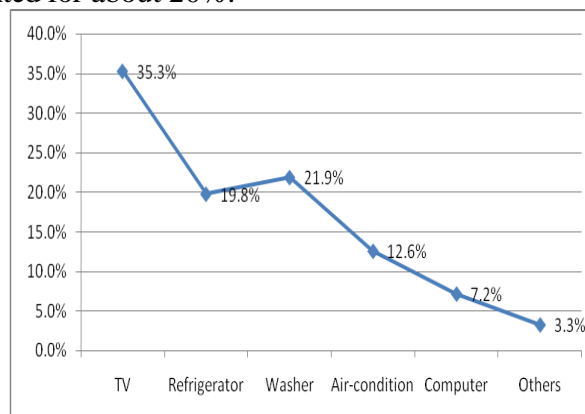


Fig. 2 types of waste home appliances

When community residents recycled discarded appliances, the majority of residents have got directly to small traders. Among residents surveyed, about 28% residents get WHA to recycling sites of the mall to buy new appliances with deficiency payments. Fewer people send WHA to factory and community recycling sites, shown in Fig. 3.

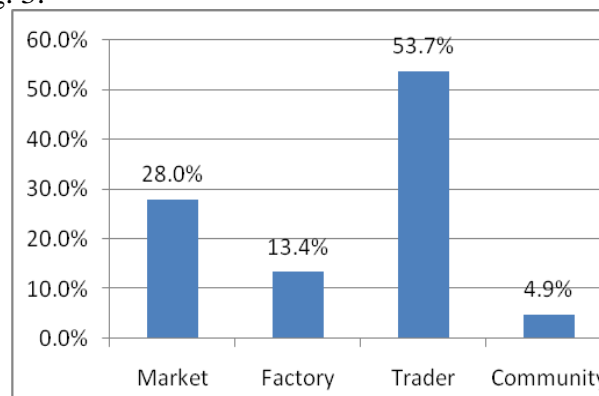


Fig. 3 treatment approaches of WHA

The most concerned problem is various when residents recycle WHA, such as recycling prices, the distance from home to collection sites and whether provide on-site service or not, etc. By investigation we find what residents are most concerned about is whether the on-site service and the distance from home to collection sites, respectively, accounted for 38.2% and 38.4% of the total surveyed residents. Residents

who are more concerned about the price of recycling account for 21.2% of the total number of residents in the survey.

Trade-in on WHA

Waste appliance trade-in policies have implemented for a few years in Tianjin and most residents have heard it. About 54.2% of residents have learn some policies on WHA and 40.6% of the residents are only aware of such policies for WHA, but the detailed contents are less clear.

About "trade-in" policy, 91.1% among surveyed residents believe that the policy will play a catalytic role in the recovery of WHA. Only 1.4% of residents believe that the policy does not work. About 7.5% of the populations think that whether the policy would work or not could be influenced by a lot of factors, so it is not sure whether the policy will eventually have an effect.

Among the surveyed residents, 85% of residents have had the "trade-in" experience. The experience was not very good overall. Residents who were very satisfied with the service are only 10.9%. Satisfied residents accounted for 47.8%. 36.8% of the surveyed residents felt general and there were 4.5% residents who say that they were not very satisfied with "trade-in" experience, shown in Fig. 4.

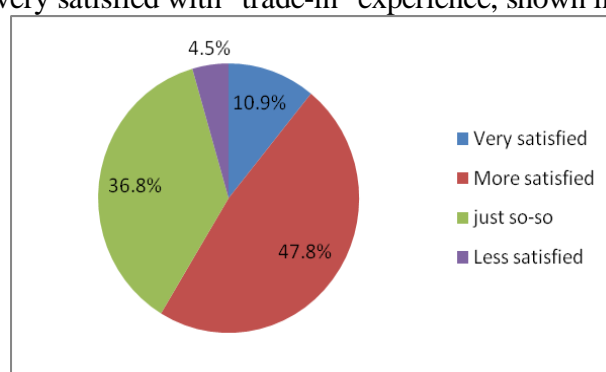


Fig. 4 "trade-in" Satisfaction

Establish community recycling sites

For establishing community recycling sites, the vast majority of community residents have expressed their support. Only a few residents do not support, because they are fear the recycling sites may affect the security and surroundings of the community. In addition, some residents of the community say recycling technology of the community is also skeptical. In the survey we also find that most communities do not have WHA recycling points, and even through there is a community collection points, their information coverage is relatively small and the publicity is not enough. Some people don't even know it. Almost all the communities don't provide "trade-in" service. Most residents express the hope that the community can provide services like on-site, at a reasonable price recovery, providing the latest trade-in information and other services.

Suggestions on improving the efficiency of WHA recycling in Tianjin

With the number of WHA increased, recycling of WHA is receiving more and more concerned. Developed countries like United States, Germany and Japan have established a series of legal regulations for the recycling of WHA. They also formed fixed and effective mode of WHA recycling. Our country is relatively late and Tianjin has implemented the "trade-in" policies for a few years. With the end of the policy, the recycling of WHA is also facing new challenges.

The relevant departments strengthen incentives and regulatory to WHA recycling

Tianjin government has developed a number of policies and regulations related with discarded appliances. "Trade-in" policies which had implemented for several years have got some achievements. WHA recycling industry is a new industry. Many devices need to import and large money need to invest. The appearance of Income should take a long period after the investment and high maintenance costs later, so most companies are reluctant to invest in establishing formal recovery mechanism. Then the relevant

departments must play a necessary incentive effect. They can reduce the corresponding industry access standards, and relative agencies give subsidies to foster these industries on both economic and policies to encourage the establishment and operation of the informal recycling sector. Of course, not only have incentives there are also regulatory sanctions.

Strengthen supervision and increase penalties. Reorganize small traders. Standardize the recovery mechanism of the formation of scale, included in regulatory their recycling rates, quality of service and treatment. It should be severely punished to artificially suppress the recovery of prices, poor service attitude, improper treatment which will pollute the environment. At the same time, the recycling behavior of residents has to do the appropriate provisions. Encourage residents to send discarded appliances to a regular business, and resolutely stop residents throw away discarded appliances.

Step up publicity efforts so that more community residents participate in WHA recycling

At present, notability among the population of regular WHA recycling sties is low in Tianjin. Regular WHA recycling companies cannot effectively recycle used appliances. A very important reason is not enough publicity. As a regular collection points, its advantages are obvious. The residents are willing to send WHA to the formal point of treatment, but many residents do not know the address of the informal collection points. Regular collection points have demand for discarded appliances and community residents have supply, but the middle of the channel is not smooth. So the regular collection points once established, it must make good publicity using a variety of media. At least let people know the existence of collection points.

In the survey, we also find that some districts do have community recycling points, but some community residents don't hear of the recycling points. It makes the district become useless collection points, which indicates the need for propaganda. Community recycling points do publicity with residential property, so that more community residents can take part in the community collection.

Tianjin has been developed and used household appliances recycling-related policies, but the popularity among the population needs to be improved. Publicity is still necessary after the policies are formulated residents. Only when residents understand the policy, can they act in accordance with the policy. It enhances the effect of the implementation of the policy eventually.

Strengthen the education to community residents to improve environmental and recycled awareness

In recent years, Tianjin vigorously promote environment. Environmental awareness of residents has increased. It couldn't stop the work which can help to improve the environmental awareness of the residents. Let more people join the ranks of environmental protection. The protection of the environment is obligation of every resident. It must focus people power as much as possible. At the same time, the awareness recovery also should be strengthened. Many people think recycling has little matter with them and it couldn't get much revenue. It is not worth to participate in the recycling of WHA.

We must strengthen the environmental awareness of the residents as well as the awareness of residents to participate in recycling. Written recycling in the student's textbooks to educate the motherland "future", make them have recovered consciousness and environmental protection awareness; environmental protection departments can take Tianjin streets and educate people to have awareness of environmental protection and WHA recycling using the holidays with related community organization, such as college students. Encourage residents to join the ranks of the efficient recycling of WHA inside; relevant departments can also use the media, microblog, micro-channel, TV and other tools to create a simple-to-understand video to educate community residents.

In addition, the publicity and education materials should be properly joined with content related to the use of WHA after recycling, so that more people understand the recovered WHA can be achieved turning waste into treasure and achieve recycling of resources just after a reasonable treatment.

Accelerate the establishment of standardized community recycling points

From the survey results, we know the majority of communities in Tianjin don't have specific recycling points or trade-in service points. They always can see small traders in the districts. This traditional way has been known to the majority of residents. Small traders do have their advantages, such as low technical

requirements, low operating costs and low degree of difficulty entered the industry. Small traders have liquidity. They can provide home services to consumers. To some extent, they do provide consumers with a convenient. Because of information asymmetry, small traders give recovery pricing randomly. It is difficult to manage the small traders and their approach to treat WHA is simple. It is likely to cause adverse effects on the environment [7].

In fact, the majority of residents support establishing collection points in the community. The points are close to home, more convenient. Discarded appliances can be processed at any time. Compared with the small traders, the points are more formal, worthy of trust. Therefore, the relevant departments should strive to establish standardized community recycling points. In the early work, we can first create some community recycling pilots. With the expansion of the scale, organize regular competitions in administrative units of to encourage enthusiasm of staffs in community recycling points. It also should provide professional training regularly to staffs.

Community recycling points should take the initiative to find regular WHA recycling companies to establish contact with these companies and form long-term partnerships. It facilitates community recycling point processing WHA recycled from the hands of community residents.

Conclusions

This article investigates and analyses the condition that community residents in Tianjin handle of WHA. Learn about the basic situation of WHA treatment of community residents in Tianjin. We propose to strengthen incentives and supervision, increase publicity and strengthen community education proposals mainly from the perspective of the residents. To form an efficient recycling system of WHA, you need to involve the entire reverse supply chain to work together on various departments. With the comprehensive development of Tianjin, we will be able to establish efficient and environmental friendly recycling of WHA chain [8], and promote the development of WHA recycling industry in Tianjin.

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