



Review

The development of WEEE management and effects of the fund policy for subsidizing WEEE treating in China



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ABSTRACT

The consumption of electrical and electronic equipment is surging, so is the generation of waste electrical and electronic equipment (WEEE). Due to the large quantity, high potential risk and valuable capacity of WEEE, many countries are taking measures to regulate the management of WEEE. The environmental pollution and human health-harming problems caused by irregular treatment of WEEE in China make the government pay more and more attention to its management. This paper reviews the development of WEEE management in China, introduces the new policy which is established for WEEE recycling and especially analyzes the effectiveness of the policy, including huge recovery, formation of new recycling system, strict supervision to related enterprises, and the stimulation to public awareness. Based on the current achievement, some recommendations are given to optimize the WEEE management in China.

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1. Introduction

With the improving of societal need and technological innovation, the increase of various electrical and electronic products has been accelerating constantly in recent years, which contributes to the enormous generation of waste electrical and electronic equipment (WEEE). Globally, the volume of WEEE generated is expected to reach 93.5 million tons in 2016 from 41.5 million tons in 2011 at a Compound Annual Growth Rate (CAGR) of 17.6% from 2011 to 2016 (MarketsandMarkets, 2011). As shown in many studies (Sodhi and Reimer, 2001; Freegard et al., 2005; Hasegawa et al., 2013), the toxic substance contained in WEEE are complex and hazardous, such as polyvinyl chloride plastics, brominated flame retardant, cadmium, chromium, mercury, indium, lead, and so on. These kinds of chemicals can do serious harm to eco-system and human health without proper treatment (Freegard et al., 2005). However, on the other hand, these WEEEs are a potential source of metals, organic components and glass. Studies suggest that large quantity of gold, silver, palladium and other kinds of materials can be recovered from WEEE (Basel Convention Regional Center, 2011). It is estimated that the whole profit of WEEE market will rise to 20.25 billion dollars in 2016 from 9.15 billion dollars in 2011 at a CAGR of 17.22%, which is great economic benefit (MarketsandMarkets, 2011). Concerning the enormous quantity, high toxicity, and considerable resource nature of WEEE, sound management is urgent and many countries have been taking measures for WEEE recycling.

One of the most important laws, (Basel Convention on control over trans-boundary movement of hazardous waste) which was put into effect in 1992 officially forbids the illegal export and import of hazardous waste with WEEE included. Since then, appropriate management of WEEE draws more and more attention in view of legislations and industrial development. European Union enacted the proposed law (the first draft) in July 1997, which almost covered all kinds of WEEE. And the (Directive 2002/96/EC on Waste Electric and Electronic Equipment) got the official approval on October 11, 2002, and then was put into effect on February 13, 2003 (Official Journal of the European Union, 2003). In many EU countries, this policy is implemented by legal acts. In Germany, the Foundation Elektro-Altgeraete-Register (EAR) was established to organize the WEEE pick-up processes and to control collection, recovery and recycling targets. Public waste management authorities are responsible for collection of discarded products while retailers are voluntary (Rotter et al., 2009). And it is reported that there are 500–700 companies that run for WEEE disposing (Rotter et al., 2009). In USA, many states tried to perform their own regulations about the management of WEEE. For example, California established (The Electronic Waste Recycling Act of 2003) which was carried out on January 1, 2005 (RamzyKahhata et al., 2008). What is worthy of being mentioned is that, at the beginning of this century, there had been over 400 enterprises and 7000 people involving in WEEE resourcing in USA. And the profit in 2002 was about 700 million dollars (Jingwei et al., 2003). Currently, the number of such enterprises has been more than 2000. In view of Asian countries, Japan, which runs consumer responsibility for WEEE management, drafted the recycling of Specified Kinds of Home Appliances in June 1998 and put it into force since April 2001. And there were excellent effects resulting from this system (Hirofumi Aizawa et al., 2008). By 2007, 48 appointed recycling plants and 380 collections sites of waste

household appliances are established over Japan (Hirofumi Aizawa et al., 2008). With the increasing amount of WEEE, China government has also more and more attention to its proper management.

Since the 1980s, China has grown to be one of the largest markets in the world, and the consumption of various kinds of electric and electronic equipments keeps surging. Along with that, the volume of WEEE began to increase alarmingly in 1990s. China has been the second biggest entity of domestic WEEE generation (Hunt, 2013). According to government statistics, around 25 million TVs, 5.4 million refrigerators, 10 million washing machines, 1 million air conditioners, 12 million computers, 6 million printers and 40 million mobile phones came to end of their lives in 2009 (Xinhua News Agency, 2010). On the other hand, for the pursuit of economic interest, large amount of WEEE is illegally exported to China since 1990s. It is estimated that about 4 thousand tonnes of WEEE are discarded every hour globally, and 80% of that are exported to Asia while 90% of this share finds its way to China with Guiyu, Guangdong province and Taizhou, Zhejiang province as two major destinations (He et al., 2008). After arriving in China, a large part is sold to individuals and uncertified treatment facilities. The simple and crude processing methods and lack of environmental pollution control measures make great harm to environment and also create massive threats to human health (Jinglei et al., 2009).

Entering new century, large quantity of domestic electric and electronic products came to end of life and problems of environment and human health emerged continuously. And the problems caused by imported WEEE are still in need to be solved. The balance between economy and environment calls for more attention over whole country severely. To handle with deterioration of WEEE management situation, China has taken some measures to regulate WEEE management from the central authorities down to local authorities and rural party branches, including legislations, incentive ways, industrial progress, and so forth.

This manuscript systematically introduces the current status of WEEE management in China, concerning legislations, incentive policies and industrial development, and especially the new policy (Administrative Measures on the Collection and Using of Waste Electrical and Electronic Equipment Treat Fund) is illustrated with content and features in this paper. Additionally, the effectiveness of its implementation is also analyzed. In the end, some options are given for better improvement of WEEE management.

2. The development of WEEE management in China

The (Environment Protection Law of the People's Republic of China), published on 26 December, 1989, is the first law related to the control of various kinds of environmental pollution (NPC, 1989). It stresses pollution control and pollution prevention, also, the polluter-pays was put forward. This law is the guideline and basic principle for environmental management in China. Even though it does not make unique introduction about WEEE, its publication made foreshadows for following specific measures for WEEE management, including legally enforceable legislations and incentive policies.

2.1. Legislations for WEEE management

For promoting the implementation of (Environmental Protection Law of the People's Republic of China), the Ministry of

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