

# Electronic Waste in China: Regulation vs. Reality

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## Executive Summary

The Chinese government officially began efforts to ban waste electrical and electronic equipment (WEEE) imports in the 1990s. However, WEEE continues to be imported into mainland China, driven by the demand for cheap second-hand products and lucrative extraction of precious rare metals. Many local communities have maintained electronic waste dismantling practices, despite government regulations. Further, communities that have eradicated the industry still suffer from long-term chemical contamination and face formidable challenges rebuilding the local economy. While national policies set a respectable precedent, unless local actors are mobilized to carry-out the regulatory work of the policies, economic gains of e-waste dismantling will continue to outweigh adverse effects on human health and the environment.

## Definition of Electronic Waste

One piece of electronics contains various organic chemicals and heavy metals. Under normal conditions, people are not exposed to these chemicals. However, the threat arises when these electronics and electrical equipment become waste products. When people handle WEEE using rudimentary methods such as physical dismantling and acid washing, chemicals are released into local soil, water, and air. Therefore, not only are waste-dismantlers themselves exposed, but also community members breathing toxic air, drinking contaminated water, and growing food in poisoned soil. Exposure to dismantled electronic waste can cause numerous and severe health effects such as cancer, cardiovascular disease, and preterm childbirth.

## Electronic Waste Imports

There are three major routes of WEEE import into China. The first route is direct import to Chinese ports. However, due to Chinese government's intense crackdown in the early 2000s, the amount of WEEE imported through this route has decreased dramatically in the last two decades. The second route is through mixed shipments with bulk steel and copper scraps. Large portions of e-waste are disguised as metal scraps in order to pass inspection. On average, about 10% of each shipment container is shredded WEEE. Most of Taizhou's WEEE is imported through this method. The third route of import is a transit through Hong Kong. Due to regulatory differences between mainland China and Hong Kong Special Administrative Region, WEEE can still be imported through Hong Kong ports and transported into mainland China.

Despite known routes of illegal WEEE import, there is no recent data on the volume of WEEE imports nor the scale of the informal WEEE recycling industry in China. According to the Beijing Zhongse Institute of Secondary Metals report, an estimated 1.5 million tonnes of WEEE were imported from overseas in 2001. This estimate provides a brief glimpse at the scale of a potential illegal WEEE market in China.

## Chinese Governmental Structure

There are six levels of Chinese government: national, provincial, prefecture, county, township, and village. The branches of government that are pertinent to this discussion on environmental protection and WEEE are the National People's Congress (NPC) and the State Council. The NPC has the power to make and interpret laws. The State Council is similar to the executive branch in the U.S. and is chaired by the Premier and includes heads of each cabinet-level executive departments. The Ministry of Ecology and the Environment is the cabinet-level ministry responsible for implementing environmental policies and enforcing environmental laws and regulations.

While national cabinets are responsible for macro-level implementations and enforcements, provincial, city, and county level environmental protection departments are the primary agencies to administer environmental protection agendas in their respective localities. Provincial government includes provinces, autonomous regions, municipalities, and special administrative regions (SARs). Provinces, autonomous regions, and municipalities in China do not have much autonomous power. Instead, their power is derived from the national government. SARs, which include Hong Kong and Macao, have more autonomy since they have separate governments, legal systems, and basic constitutional laws. Local governments can establish WEEE-related measures. However, the level of enforcement and implementation is highly varied across regions.

## Policy Background

The Chinese government has taken significant legislative steps to regulate waste electrical and electronic equipment management. The body of law on WEEE management began in the 1990s as broad strategies, and has become increasingly geared towards feasible implementation.

### Basel Convention

China signed the *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal* in 1990. The main goal of the coalition was to agree upon a regulatory system for transboundary movement of hazardous waste in order to minimize environmental impacts of waste management. The Basel Convention did not result in quantifiable reduction in transboundary movement of WEEE (Zhou). However, it did set the foundation for all future Chinese regulation of WEEE. Chinese legislation on WEEE management is built-upon the Basel Convention priorities: minimizing movement of WEEE across borders, disposing of WEEE close to the source of generation, and minimizing generation of waste at source.

### Circular Economy

The 11th National People's Congress signed the *Circular Economy Promotion Law* in August of 2008. This marks the official beginning of China's pursuit of a circular economy. A circular economy does not only regulate waste management, but also seeks to reduce the creation of waste on the front-end of production. A circular economy holds manufacturers responsible for the lifecycle environmental footprint of their products. The 2008 law outlined the main goals of China's circular economy: reducing waste, limiting waste through reusing, and recycling raw materials.

In 2013 these goals were realized in the *Development Strategy and Immediate Action Plan of Circular Economy* (Qi, 39). The State Council issued the action plan with a set of goals for 2015 and 2020. The 2015 benchmarks focused on applying advanced recycling and recovery techniques to about 70% of waste products (Qi, 39). The law aimed for increased systemic change by 2020 through spearheading a competitive market for innovative recycling (Qi, 40).

### Extended Producer Responsibility

Extended producer responsibility (EPR) policy originated in Europe in the 1990s and was adopted in China in 2008 with the *Regulation on the Administration of the Recovery and Disposal of Waste Electrical and Electronic Products*. The law was brought into force in 2011. The law translated the goals of the Circular Economy Action Plan into ten concrete regulations. The hallmark piece of legislation is Article Seven, which established a fund of subsidies for recycling WEEE according to government regulation standards. The fund is to be paid for by the producers and importers of WEEE. These subsidies aim to support the development of a formal recycling sector.

In 2019 Article 11 was added to the EPR Policy. This Article reinforces the expectation of producers of WEEE to take responsibility for recovering WEEE by themselves, or through employing formal "distributors, repair institutions, after-sales service institutions or operators." This is a further attempt to support the formation of a circular economy by holding front-end producers liable for the management of their manufacturing and product-design. (See page 3 for complete list of EPR rules and regulations).

## Wasteless Cities Plan

December 2018, Chinese General Office of the State Council announced the work plan to create “Wasteless Cities.” This initiative aims to promote the formation of green development and lifestyles by reducing solid waste sources and increasing the utilization of resources to minimize landfills. The action plan also emphasizes the importance of public outreach, aiming to enhance guidance and education on how to promote green lifestyle to the general public.

## Reality of E-Waste in China

Unfortunately, these government efforts have failed to produce significant change. The Basel Convention’s regulatory body reports most major countries at the convention - including the EU, Australia, and Canada - still ship roughly 10% of their hazardous WEEE overseas (Puckett 3). The United States, a country which did not ratify the proposal, ships 40% of its waste overseas, 87% of which lands in China each year (Puckett 3). The US alone dumps roughly 2.5 million tons of WEEE into China per annum (Larmer). In total, eight million tons of WEEE is smuggled into China each year (Nuwer).

## The Hong Kong Loophole

Although the Chinese government has publicly taken measures to reduce WEEE imports, China has failed to reject foreign WEEE imports. China and its individual citizens continue to benefit economically from an informal WEEE market. Underground electronic waste processing constitutes a \$3.75 billion industry worldwide. This underground market exploits a loophole via China and Hong Kong’s “One Country, Two Systems” policy. Hong Kong, as a separate governing body, allows for international WEEE imports. Businesses in Hong Kong then smuggle this WEEE into mainland China, which qualifies as a domestic transfer (Wong). In 2010, the Environmental Protection Department of Hong Kong seized 850 tons of WEEE shipments destined for China. This figure likely represents a small fraction of the total waste imported through the Hong Kong loophole (Wong).

## Community-Based Research

Our team conducted a field study in Taizhou, the second largest known e-waste recycling city in China. Due to China’s increased WEEE legislation, Taizhou has experienced closure of many artisanal electronic waste workshops over the past few years. The population who lived in the abandoned sites where informal e-waste recycling workshops resided ranged from young children to old people. A lot of the working-age adults who used to do e-waste had transitioned to new jobs and industry, mainly shoe manufacturing. Even after the e-waste workshops were torn down, its effects on the environment were long-lasting. There was WEEE, such as wires and identifiable parts of computers, lying around in the farmlands or backyards or in proximity to the river (see Figure 3). It is uncertain how long or whether these remnants or effects of them could really go away.

## EPR Policy Articles

1. Purposes: regulate disposal of WEEE, promote circular economy, protect the environment, safeguard human health.
2. Formal definition of WEEE.
3. EPR regulations apply to WEEE products listed in the *Catalogue of Waste Electrical and Electronic Products for Disposal*.
4. The Department of Environmental Protection of the State Council shall administer EPR regulations.
5. Adopt a system of multi-channel recovery & centralized disposal of WEEE products.
6. Adopt a qualification approval system for the disposal of WEEE products administered by restricted city governments.
7. Establish WEEE recovery and disposal subsidies.
8. Support scientific research & technological development w/ regard to the disposal of WEEE products.
9. Prohibited WEEE products shall not be imported.
10. Producers of electrical and electronic products shall conform to relevant state provisions.
11. Encourage the producers of electrical and electronic products to recover WEEE products by themselves.

Our team conducted a community survey at a site identified to have previously housed e-waste workshops. The goal of the survey was to assess community awareness of electronic waste dismantling and the associated adverse health outcomes. About 70% of the respondents reported knowledge of the e-waste industry in local areas. Only 20% of the respondents reported they had never been exposed to e-waste (see Figure 1), and 80% believed exposure to e-waste could adversely affect their health (see Figure 3). Further, 65% of the respondents believed the ban on e-waste import was personally beneficial to them even though the economy might suffer as a result.

Figure 1. Community Exposure Awareness

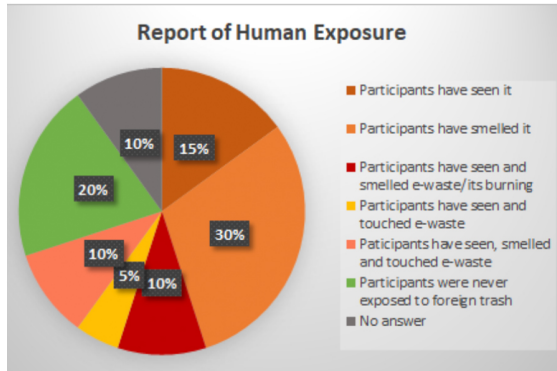
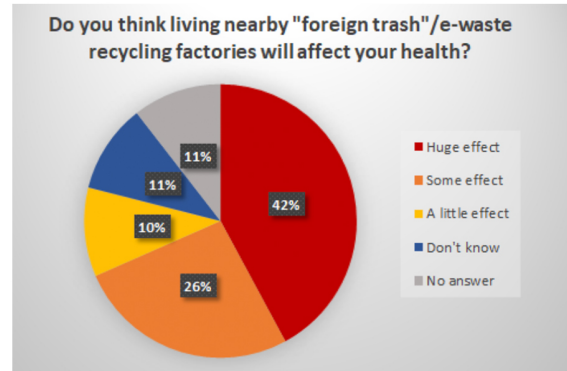


Figure 2. Community Health Awareness



## Local Government Actions

On May 9, 2018, Chinese Ministry of Ecology and Environment launched "Waste Cleanup Action 2018," which lasted from May 9 to the end of June. The plan aimed to resolutely curb the occurrence of illegal dumping cases of solid waste to ensure the health and safety of the ecological environment of the Yangtze River Valley (Ministry of Ecology and Environment). The Act established 150 small groups to investigate the illegal dumping along the river. The specific implementation steps include...



Figure 3. E-waste Remnants Found in Taizhou

1. Conduct a comprehensive investigation and verification of the dumping of solid waste in the Yangtze River Economic Zone
2. Urge local governments to rectify the problems found within a specified period of time
3. Investigate and punish violations
4. Comprehensively disclose the list of issues
5. Rectify and improve the exhibition until all the rectifications are completed

The Act also promoted social supervision by encouraging the public to report illegal transfers and dumping of solid waste to the Ministry's WeChat public account. By the end of September 2018, the action already went through 2 rounds of inspections. This might suggest that actions that targeted toward the local region might be more effective in that they mobilized specific local organizations to take actions.

## Going Forward

While the Chinese government has made significant political efforts with the aim to create a circular economy and regulate electronic waste management, gaps between the idealized policy goals and the current reality for local communities continue to exist. Countries that did not ratify the Basel Convention continue to export electronic waste, and China's failure to reject foreign waste imports for economic reasons places community and environmental health in jeopardy. These policy gaps are evident in community perspectives, as our team found Taizhou residents continue to interact with e-waste in their daily lives. Underground e-waste processing poses dangers as individuals interact with harmful materials in an unregulated manner.

In order to mitigate the potential harms of e-waste processing, national level policies must be translated into local level regulation that is tailored to specific communities. In the creation of "Wasteless Cities", the realities on the ground must be confronted. A balance must be created between removing underground local e-waste processing activities while finding a substitute for this industry's economic niche. Local governments could provide stimulus packages to incentivize the removal of local level processing practices, and assist communities in transitioning to alternative income sources. Furthermore, it is necessary to generate global consciousness about the health and environmental impacts of e-waste in order to inform large scale policy decisions. Moving forwards, responsibility must be given to corporations who continue to export electronic waste to China. An investigation of these stakeholders' roles and proper communication of the downstream effects of their actions may inspire future international policy change. In order to fully understand the impacts of e-waste regulation and processing, this issue must be approached from national, community, and individual levels.

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