

# Securitizing e-Waste: Framing Environmental Issue as a Threat to Human Security

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## Abstrak

Isu limbah elektronik (e-waste), sebagai akibat pesatnya perkembangan teknologi elektronik dan sering melihat produk-produk elektronik dari sisi komersial yang terlepas dari siklus akhirnya, mendorong revolusi keberadaan limbah ini sebagai masalah global karena praktik pembuangan dan penggunaan ulang yang diterapkan seringkali tidak mengindahkan bahaya yang mungkin terjadi. Hal ini terutama menjadi perhatian di dunia bagian selatan karena adanya perspektif umum bahwa polusi dan limbah dipandang sebagai "harga" dari proses pembangunan, serta terkait juga dengan pandangan bahwa pengelolaan limbah elektronik adalah praktik yang mahal, sulit, dan tidak praktis serta asumsi bahwa lingkungan dan masyarakat dapat dipertahankan di masa depan, yang dengan demikian menunda upaya-upaya preventif. Kurangnya kesadaran akan permasalahan e-waste dari perhatian publik menimbulkan ancaman pada dimensi keamanan manusia. Artikel ini berargumen bahwa mencegah limbah elektronik menjadi isu keamanan utama dapat memberikan keuntungan dengan melakukan sekuritisasi masalah ini sebagai ancaman terhadap keamanan manusia. Tulisan ini akan dimulai dengan mengidentifikasi isu global tentang limbah elektronik dan bagaimana hal itu dapat membahayakan kesehatan dan keamanan manusia pada umumnya. Kerangka sekuritisasi kemudian akan diimplementasikan dengan menggunakan konsep komprehensif keamanan manusia dalam menjelaskan fenomena e-waste, karena dapat mengeksplorasi ranah normatif politik dan di sisi lain juga melakukan pendekatan dari berbagai sudut pandang, yang memungkinkan pemahaman dan solusi multidimensional.

**Kata Kunci:** e-waste, sekuritisasi, keamanan manusia, lingkungan, pendekatan konstruktivis.

## Abstract

The issue of electronic waste (e-waste), as an effect of the rapid development of electronic technology and often view products from the commercial side regardless of its end-cycle, evolved its existence as a global problem because of the implemented disposal and reuse practices are often not heeding the dangers that may be resulted. This is especially a concern in the global south due to general perspective that pollution and waste is seen as the price of development, which also linked to the view that the management of electronic waste is a costly, difficult, and impractical practice as well as assumption that the environment and society can be maintained in the future. The omission of e-waste issue from public concern raises an impending threat to human security dimension. This paper argues that preventing e-waste from becoming a major security issue may benefit from securitizing the issue as a threat to human security. This paper will start by identifying the global issue of e-waste and how it can harm human's health and security in general. Securitization framework will then be implemented using the comprehensive concept of human security in explaining the e-waste phenomenon since it explores the normative realm of politics while also a multi-faceted approach, enabling multidimensional understanding and solutions.

**Keywords:** e-waste, securitization, human security, environment, constructivist approach.

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## INTRODUCTION

The rapid growth of global industrialization and mass-consumption of electric and electronic items change the way it is perceived; from a luxury that can only be accessed by some to be a lifestyle and daily

needs. From a communication device to a mobile hub which connects us to banking, transportation, or healthcare services. What we tend to forget is what happen to all of these waste electrical and electronic

equipments (WEEEs) after they're deemed to be unusable, or when new technology arrives. The result is millions of tons of electronic waste which confuse countries in managing it both locally and globally, and demand human intervention since it is not naturally decomposed.

The chemicals found in e-waste materials are also harmful to the body, such as nickel that can cause skin damage, asthma, impaired lung health and cancer if inhaled, Poly Vinyl Chloride (PVC) that is harmful to the kidneys of humans and animals and can be consolidated in nature, especially in water and food chains, cadmium that harmful to the kidneys and can cause cancer and death and are often absorbed by plants, lead which can lead to anorexia, muscle pain and headaches, brain damage and death and can disrupt the reproductive system and mercury that can damage the lungs, brain, skin, eyes, kidneys and digestive system (Pinto, 2008, pp. 67-68).

From an economic perspective, e-waste poses both risks and opportunities. The cost of establishing an e-waste recycling center, which needs state-of-the-art technology, is high and often surpasses other means in managing e-waste, such as exporting it to developing countries (Pinto, 2008). A research shows that despite laws are being implemented worldwide to prevent the illegal trade practices, e-waste is still arriving in e-waste scrapping centers in various countries, such as in Guiyu, Guangdong Province, China (Schwarzer, *et. al.*, 2005). Greenpeace also found growing e-waste trade problem in India where 25,000 workers are employed in e-waste hoarding center in Delhi alone, where 10-20,000 tonnes of e-waste is handled each year (Greenpeace, 2011).

This trade also presents opportunities for companies and individuals. In developing countries, while e-waste recycling center needs companies with big venture, it is also practiced by individuals and families which establish themselves around e-waste dumping areas such as in Guiyu, China and Agbogbloshie, Ghana. They are all after the same

thing: precious metals contained in e-waste components.

The e-waste issue thus poses a challenge for human security dimension since it relates both environmentally and economically. While it is common to approach the issue from these perspectives, it raises a question whether approaching e-waste from human security perspective as an alternative can offer a more comprehensive solution towards the problem. This paper will be based from such question. While the research indeed utilizes the "securitization" concept proposed by Copenhagen School, it aims not to identify the components of securitization, instead it will argue that the e-waste issue will benefit from undergoing the process of securitization. Thus, the scope of research will be limited to the process itself and will not consider whether it is accepted or not by the "audience" of securitization. Based on this framework, the research found that framing e-waste issue as a threat for human security adds another dimension in the discussion which open new viable solutions for the problem.

This paper is structured into four parts. Part one will lay out the background issue of this research. Part two will explain the methodology in conducting this research, from securitization proposed by Copenhagen School of International Relations as theoretical framework and human security as the dimension to the concept of waste and e-waste. Part three is the result and analysis, which describes the risks and opportunities of e-waste both as a global issue and seen from the environmental and human dimension, and also arguments in securitizing e-waste as a threat to human security may benefit the ongoing efforts in preventing it from becoming a major threat while also assisting current agenda. Part four is the conclusion of the paper.

## **THEORETICAL FRAMEWORK**

This paper will be conducted using constructivist approach of International Relations to better explain human security as a "norm", that is, a

social construct which is shared among people who perceive particular issue. Wendt (1992, pp. 396-397) explained that:

*“A fundamental principle of constructivist social theory is that people act toward objects, including other actors, on the basis of the meanings that the objects have for them.”*

This socially constructed meanings and practices are not reification as Marxist theory suggests, but rather a relatively stable but impermanent, since ideas and practices might change due to social dynamics (Kratochwil, 1989). This will be the foundation of the research in understanding the human security and how can it be applied on e-waste issue.

The research will be mostly based on documentary research, such as official documents, white papers, and reports by national authorities and international organizations. It will be supplemented by secondary scholarly sources to explore new ideas in linking the both concept of human security and e-waste. While official documents provide the bigger framework for this study, secondary scholarly sources are commonly found in this study since they provide a more comprehensive exploration on this particular issue.

## SECURITIZATION

Securitization can be defined as (Buzan, *et. al.*, 1998, p. 32):

*“Who securitizes, on what issues (threats), for whom (referent objects), why, with what results, and, not least, under what conditions (i.e., what explains when securitization is successful).”*

Securitization as an analytical framework of contemporary security and international relations studies in general provides ‘one of the most innovative, productive, and yet controversial avenues’ (Williams, 2003). It was an effort in ‘widening’ the security issue in “narrow vs wide” debates which grew out of intense narrowing of security agenda while on the other hand witnessed the rise of economic and environmental agendas in international relations (Buzan, *et. al.*, 1998,

pp. 2-5). Echoing the arguments by Acharya (2014), utilizing the securitization as a framework helps in globalizing an issue, since securitization concept explain International Relations phenomenon which is not restricted by geographical limitations.

Securitization involves several components (Buzan, *et. al.*, 1998, pp. 21-22, 26, 36): 1) referent objects: things that are seen to be existentially threatened and that have a legitimate claim to survival; 2) securitizing actors: actors who securitize issues by declaring something—a referent object—existentially threatened; 3) Functional actors: actors who affect the dynamics of a sector; 4) existential threat: an object (or ideal) that has been identified as potentially harmful; and 5) audience: the target of the securitization act that needs to be persuaded and accept the issue as a security threat.

## HUMAN SECURITY

The end of Cold War has shed light to the importance of human security issues, be they underdevelopment, poverty, legal and illegal migration, natural disasters or the spread of mass diseases, notably for emerging regionalism (Gerstl, 2010). But whether it can be utilized as a new approach of state’s security policy still in debates to perceive and cope with the new emerging threats on the post-Cold War international community (Akiyama, 2004), since these threats originate from different levels: global (e.g. climate change, Weapon of Mass Destructions (WMDs)); transnational (e.g. transnational organized crime, human trafficking); regional (e.g. corruption, state repression); national level (e.g. poverty, environmental degradation, natural disaster); and local level (e.g. abuse, ethnic conflict, violent cultural practices).

The concept of human security was first introduced by the 1994 Human Development Report (HDR) which characterized human security as (1) a universal concern, (2) the components of human security are interdependent, (3) Human security is easier to ensure through early prevention than later

intervention, and (4) Human security is people-centered (UNDP, 1994). The report stated that:

*“Human security can be said to have two main aspects. It means, first, safety from such chronic threats as hunger, disease and repression. And second, it means protection from sudden and hurtful disruptions in the patterns of daily life – whether in homes, in jobs or in communities. Such threats can exist at all levels of national income and development”*

It was further developed and established as a new concept by Commission on Human Security (CHS) report in 2003, widely known as the Ogata-Sen report, which emphasize that the objective of human security is to safeguard the “*vital core of all human lives in ways that enhance human freedoms and human fulfilment*” (Commission on Human Security, 2003).

While the concept of human security can be interpreted in various ways and encompasses a broad range of interpretations, there are mainly two distinguished approaches on human security, which are *freedom from fear* and *freedom from want*.

The proponents of the former view, initially articulated by Lloyd Axworthy, focuses on reducing the human costs of violent conflicts through measures such as bans, formation of International Court of Justice, and promulgating human rights and international humanitarian law, and formulate an

instrumental policy which is currently known humanitarian intervention or *Right to Protect* (Acharya, 2014). The latter, which is spearheaded by Japanese government, echoed what CHS proposed earlier. It stresses the ability of individuals and societies to be free from a broad range of non-military threats such as environmental degradation (Ministry of Foreign Affairs of Japan, 2000). By these two approaches, this research will address the e-waste issue using Japan’s *freedom from want* approach since it allows the research to address non-military threat, that is, e-waste problem and explore the comprehensive dimensions behind the issue.

There are seven dimensions of human security commonly accepted, based on 1994 HDR Report. The dimensions are economic security, food security, health security, environmental security, personal security, community security, and political security (UNDP, 1994). The comprehensive approach of Japan’s human security is then based on five principles. Human security aims to address complex situations of insecurity through collaborative, responsive and sustainable measures that are (1) people-centered, (2) multisectoral, (3) comprehensive, (4) context-specific, and (5) prevention-oriented.

Table 1. Human security principles and approaches

Principle	Approach
People-centered	<ul style="list-style-type: none"> <li>• Inclusive and participatory.</li> <li>• Considers individuals and communities in defining their needs/vulnerabilities and in acting as active agents of change.</li> <li>• Collectively determines which insecurities to address and identifies the available resources including local assets and indigenous coping mechanisms.</li> </ul>
Multi-sectoral	<ul style="list-style-type: none"> <li>• Addresses multi-sectorality by promoting dialogue among key actors from different sectors/fields.</li> <li>• Helps to ensure coherence and coordination across traditionally separate sectors/fields.</li> <li>• Assesses positive and negative externalities of each response on the overall human security situation of the affected community (ies).</li> </ul>
Comprehensive	<ul style="list-style-type: none"> <li>• Holistic analysis: the seven security components of human security.</li> <li>• Addresses the wide spectrum of threats, vulnerabilities and capacities.</li> <li>• Analysis of actors and sectors not previously considered relevant to the success of a policy/programme/project.</li> <li>• Develop multi-sectoral/multi-actor responses</li> </ul>

Context-specific	<ul style="list-style-type: none"> <li>• Requires in-depth analysis of the targeted situation.</li> <li>• Focuses on a core set of freedoms and rights under threat in a given situation.</li> <li>• Identifies the concrete needs of the affected community (ies) and enables the development of more appropriate solutions that are embedded in local realities, capacities and coping mechanisms.</li> <li>• Takes into account local, national, regional and global dimensions and their impact on the targeted situation.</li> </ul>
Prevention-oriented	<ul style="list-style-type: none"> <li>• Identifies risks, threats and hazards, and addresses their root causes.</li> <li>• Focuses on preventative responses through a protection and empowerment framework.</li> </ul>

Source: (UNDP, 1994)

In addition, human security employs a hybrid approach that brings together these elements through a protection and empowerment framework (UNDP, 1994, p. 15). The five principles can be approached by ways as seen by Table 1 above. This paper will then utilize the framework in framing the e-waste problem.

Since human security paradigm is people-centered and gives priority to the well-being of individuals over states, it is frequently cited that as an optimal thinking about non-traditional security. But, the quest to ensure—human security is one that is so broad, such a catch-all for any societal problem, that thinking about security in these terms is in fact more analytically confusing (Warner, 2012). Suhrke (1999) also stressed the discourse by stating,

*“As a social construct, the term [human security] permits many interpretations, and those who promote it are still struggling to formulate an authoritative and consensual definition.”*

Jason Warner (2012) proposed what he called as *double-jump*, a feature that has accompanied the inauguration of the human security paradigm. Double jump can be understood as the two-pronged shift that human security studies have taken: (1) a shift from state to individual as the primary referent for security concerns, and (2) the shift from the focus of violent threats against the object (the state or the individual) to the admissibility of concern about any threat (violent or non-violent) against the object (Warner, 2012, pp. 8-9). The latter allows for a wider range of interpretations in conceptualizing the human security.

## DEFINING WASTE AND E-WASTE

The definitions of waste can be observed by using the following table which is designed to simplify the identification process of defining waste, thus in identifying the definition of e-waste.

Table 2. Definitions of waste

1	The EU (1991)	Waste shall mean any substance or object in the categories set out in Annex I, which the holder discards or is required to discard
2	OECD (1994)	Wastes are materials other than radioactive materials intended for disposal, for reasons specified in Table 1
3	UNEP (1989)	Wastes are substances or objects, which are disposed of or are intended to be disposed of or are required to be disposed of by the provisions of national law.
4	Lox (1994)	Waste is either an output with (‘a negative market’) ‘no economic’ value from an industrial system or any substance or object that has been used for its intended purpose’ (or ‘served its intended function’) by the consumer and will not be re-used.
5	McKinney (1986)	Waste is the unnecessary costs that result from inefficient practices, systems or controls.
6	Baran (1959)	Waste is the difference between the level of output of useful goods and services that would be obtained if all productive factors were allocated to their best and highest uses under rational social order, and the level that is actually obtained
7	Hollander (1998)	Waste is something that needs to be expelled in order that the system continues to function

8	Elwood & Patashik (1993)	Waste, like beauty, is in the eye of the beholder
9	Gourlay (1992)	Waste is what we do not want or fail to use
10	Pongrácz (1998)	Waste is an unwanted, but not avoided output, whence its creation was not avoided either because it was not possible, or because one failed to avoid it
11	Pongrácz (2002)	Waste is a man-made thing that has no purpose; or is not able to perform with respect to its purpose
12	Pongrácz (2002)	Waste is a man-made thing that is, in the given time and place, in its actual structure and state, not useful to its owner, or an output that has no owner, and no purpose

Source: (Pongrácz, *et. al.*, 2004), also compiled from various sources

Definitions 1-4 show that the definition work on the assumption that waste is an object that has been used and is not associated with the production of such waste, thus pursuing waste management functions only as a reaction of the waste. Definition 8 shows that waste is a subjective definition. Definition 9 explained that the failure of human activities generate waste, thus focusing on the “*failure*” aspect. Pongrácz through definitions 10-12 try to explain further why the failure occurred (Pongrácz, *et. al.*, 2004).

One of these various types of waste includes electronic waste or e-waste, a type of waste that is formed from parts or all the electronics or electrical equipment household damaged or no longer desired. Pongrácz, Phillips, & Keiski’s definition of waste can be understood as “*an unwanted man-made thing which no longer serves its purpose*”. Their definition also corresponds with several other definitions on e-waste, such as EU WEEE Directive, Basel Network Actions, and other selected definitions as seen on Table 3 below:

Table 3. Overview of selected definitions of WEEE or e-waste

Reference	Definition
EU WEEE Directive (2003)	Electrical or electronic equipment which is waste. . . including all components, sub-assemblies and consumables, which are part of the product at the time of discarding. Directive 75/442/EEC, Article 1(a) defines waste as any substance or object which the holder disposes of or is required to dispose of pursuant to the provisions of national law in force
Basel Action Network (Puckett & Smith, 2002)	E-waste encompasses a broad and growing range of electronic devices ranging from large household devices such as refrigerators, air conditioners, cell phones, personal stereos, and consumer electronics to computers which have been discarded by their users
OECD (2001)	Any appliance using an electric power supply that has reached its end-of-life
Sinha (2004)	An electrically powered appliance that no longer satisfies the current owner for its original purpose
StEP (2014)	A term used to cover items of all types of electrical and electronic equipment (EEE) and its parts that have been discarded by the owner as waste without intention of re-use

Source: (Widmer, *et. al.*, 2005), also compiled from various sources

This paper will use StEP Initiative’s e-waste definition which defines e-waste as “a term used to cover items of all types of electrical and electronic

equipment (EEE) and its parts that have been discarded by the owner as waste without intention of re-use”. StEP also defines EEE as “any household or

business item with circuitry or electrical components with power or battery supply” (StEP Initiative, 2014, pp. 4-5). By this definition, the initiative is inclined to include both household and business items within the scope of e-waste, since there are national/local policies which differentiate them.

The definition also includes all type of EEE since it tries to leave no room for regional interpretation/variations in formulating a global definition. In any case, if there’s an item which meet the definition “*with circuitry or electrical components with battery or power supply*” then it qualifies to be included as an e-waste, which also includes the “parts” as parts which have been removed from EEE by disassembly and are electrical or electronic in nature. Another important feature of this definition is the term “discarded” which depends on owner’s perception. The act of discarding EEE as e-waste occurs when the owner decides the item is no longer useful to them due to certain reason (StEP Initiative, 2014, p. 5).

## RESULT AND ANALYSIS

The increasing volume of electronic waste in large quantities raises worldwide concerns since electronic waste have different types of components, substances and chemicals that are harmful not only for the environment but also to human health if not handled properly. Electronic devices were assembled from a complex mixture of materials and components, often containing several hundreds of different substances, many of which are toxic and create serious pollution upon disposal. These include heavy metals such as mercury, lead, cadmium, chromium and flame retardants such as Polybrominated Biphenyls (PBB) and Polybrominated Diphenyl Ethers (PBDEs) (Schwarzer, *et. al.*, 2005). The production of Electrical and Electronic Equipment (EEE) is also a very resource-intensive activity. The environmental burden in producing EEE (*ecological baggage*) hugely exceeds the one in producing other household materials. A study conducted by UN found that ecological baggage in manufacturing a Personal Computer (PC) and its

screen needs at least 240kg of fossil fuel, 22kg of chemical substances and 1.5 tonnes of water (Kuehr & Williams, 2003).

Table 4. Metals used for EEE manufacture

Metal	Annual production tonnes (2006)	Demand for EEE Tonnes/y	Demand/production (%)
Silver	20,000	6000	30
Gold	2,500	300	12
Palladium	230	33	14
Platinum	210	13	6
Ruthenium	32	27	84
Copper	15,000,000	4,500,000	30
Tin	275,000	90,000	33
Antimony	130,000	65,000	50
Cobalt	58,000	11,000	19
Bismuth	5600	900	16
Selenium	1400	240	17
Indium	480	380	79

Source: (Balde, *et. al.*, 2015)

Although the risks posed by the existence of e-waste may seriously damage the sustainability of both environment and human security, there are also opportunities associated with e-waste, especially at a time where resource use and depletion are also global issues (Herat & Agamuthu, 2012). A research conducted by UNEP-UNU (Schluep, *et. al.*, 2009) shows that thousands of tonnes of precious metals such as silver and gold are used to produce EEEs annually, as shown by Table 4. It proves to be the pulling force of individuals and families to work in a hazardous environment of e-waste dismantling industry, which directly threatens their health and wellbeing.

### Referent Object: e-waste as a global issue

The existence of e-waste as a global issue is associated with disposal and reuse practices of e-waste that often do not heed the dangers that may be resulted. This is especially a concern in the global south because of pollution and waste is often seen as a price of development, linked to the notion that e-

waste management is a costly, difficult, and impractical practice as well as the assumption that the problem of the environment and society can be solved in the future (Greenpeace, 2011, p. 5). Additionally, examples of cases that have occurred in developed countries (global north) show that efforts to save operating costs backfired to become a very expensive effort to rehabilitate while cannot entirely normalize the once damaged environment. Such examples are the “Swiss Toxic Dump” and “Hudson River vs General Electric” where companies involved have to bear huge costs for the conservation and normalization from its waste management policy.

Another rising problem is the global movement of e-waste, that is, the “*e-waste trade*”. While re-use and re-cycle practices of e-waste are indeed being implemented and shows a significant economic opportunity, it is a costly practice. The production of modern EEES requires the use of scarce and expensive resources and so the recovery of these materials represent a significant need for a costly state-of-the-art recycling technologies (Cucchiella, *et. al.*, 2015). Thus, developed countries seek other means to manage e-waste, such as exporting it to developing countries. The driving force behind such actions can be understood from what Lawrence Summers, then the chief economist for the World Bank wrote back in 1991, which justified the export of e-waste to developing countries as it is less polluted, it has lower cost for health treatment since it has lower wages, and the demand of clean environment is only for aesthetic and health reasons (Vallette, 1999).

Exporting e-waste to developing countries is full of risks but cost-effective, and sometimes it is done by some companies in industrialized countries using illegal waste management option, violating international law especially the Basel Convention (Schwarzer, *et. al.*, 2005). In 2005, inspections conducted by 18 European seaport officials found that 47 percent of export-bound waste, including e-waste, was illegal (Greenpeace, 2011). A great amount of current WEEEs yearly generated by developed

countries continues to be illegally exported under the disguise of “humanitarian aid” such as “computer for the poor” and as used products (Cucchiella, D’Adamo, Koh, & Rosa, 2015; Schwarzer, *et. al.*, & UNEP, 2005; and Greenpeace, 2011).

e-waste disposal practices can be traced from its origin primarily the United States, Europe, Australia, South Korea and Japan with the main destination that have been known are in Mexico, Brazil, Nigeria, Pakistan, Singapore, India, and China. These countries are suspected merely as the tip of the iceberg since numerous researches show that there are other countries that were suspected of being part of export cycle of e-waste such as Haiti, Venezuela, Chile, Argentina, Ukraine, Russia, Kenya, Tanzania, Egypt, UAE, Malaysia, Indonesia, Vietnam and the Philippines (Greenpeace, 2011).

While previous narrative argues that states as referent object, the next two parts of analysis will also provide arguments that the people, as in humankind, is the most threatened by the current practices of management and transboundary movement of e-waste.

### **Existential Threat: The environmental and human risks of e-waste**

It is worth noted that in general consumers use the computer only for two-four years before replacing it, and cell phones are only used in general for two years, which resulted in mounting electronic waste amounted to 20-50 million tons per year (Schwarzer, *et. al.*, 2005). It shows that e-waste is one of the fastest growing waste streams globally, which is rising from 19.5 million tonnes in 1990 to 57.4 million tonnes in 2010 and was set to be tripled by the end of 2015 with 75 million tonnes (Huisman, 2012). e-waste found in the world are often configured as many as 30% are electric washing machines, dryers, air conditioning, vacuum cleaner, automatic coffee machines, irons, and so on, 20% are refrigerators, 15% DVD players, VCR, and radio, 15% are computers, telephone, fax machine, printer, 10% are TVs, and 10% are electronic monitors. Electronic waste often has a



general composition of 30% plastic, 30% oxidant that can alter the chemical composition of its environment, 20% copper, 8.5% iron, 2% nickel, 2% tin, 2% aluminum and the remainder are other materials (UNEP, 2009).

E-waste can be harmful to the environment in four ways. First, electronic waste can contaminate ground water wherein the electronic waste was disposed. Second, electronic waste can contaminate soil by changing soil acidity levels and chemical composition contained in the soil. Both forms of danger for the environment are often associated with electronic waste disposal techniques which is commonly occurred by piling waste in one place and closing it again with soil, which is often referred as landfill. This practice is commonly found in the world today. While it has been avoided by global north countries since the 1990s, but still a common waste disposal practices in developing countries such as China, India, Indonesia, and other global south countries (Greenpeace, 2011). The third is the air pollution caused by the burning of e-waste as an incorrect practice of waste handling and disposal. Fourth, electronic waste composes 40% of tin and 70% of iron contained in landfill practice. The existence of these two components is only part of the total materials of e-waste that cannot be naturally degraded by the environment.

Human health is also being threatened by the presence of electronic waste. Various types of chemical components contained in e-waste can contaminate soil and groundwater in close contact with humans and air pollution as a result of combustion may be toxic if inhaled directly by humans. In general, the dangers of electronic waste, especially computers and mobile phones can be seen from the circuit boards that contain lead and cadmium, mercury found inside the monitor and wall outlet, PVC that coats the wires made of copper and Poly Chlorinated Biphenyls (PCB) found in old type capacitors and transformers which were already banned but still commonly found (Pinto, 2008, p. 66). Table 5 shows several potential threats both to individuals work in e-waste dismantling industry and environment.

Based on Table 5 and previous narrative, e-waste directly and indirectly impacts and threaten three dimensions of human security: health, political and environmental security. Subsequent part of analysis also shows that it affect the economic security which proves that the e-waste threat overlaps at least four out of seven dimensions of human security. It shows that the current trend of exporting e-waste can be considered as exporting hazardous

Table 5. Environment and health hazards

Computer/ e-waste component	Process	Potential occupational hazard	Potential environmental hazard
Cathode ray tubes	Breaking, removal of copper yoke and dumping	<ul style="list-style-type: none"> <li>• Silicosis</li> <li>• Cuts from CRT glass</li> <li>• Inhalation or contact with phosphor containing cadmium or other metals</li> </ul>	Lead, barium and other heavy metals leaching into ground water and release of toxic phosphor
Printer's circuit boards	De-soldering and removing computer chips	<ul style="list-style-type: none"> <li>• Tin and lead inhalation</li> <li>• Possible brominated dioxin, beryllium, cadmium and mercury inhalation</li> </ul>	Air emission of the same substances
Dismantled printed circuit board processing	Open burning of waste boards	Toxicity of workers and nearby residents from tin, lead, brominated dioxin, beryllium, cadmium and mercury inhalation	Tin and lead contamination of immediate environment, including surface and ground waters, brominated dioxins, beryllium,

			cadmium and mercury inhalation
Chips and other gold-plated compounds	Chemical stripping using nitric and hydrochloric acid along riverbanks	<ul style="list-style-type: none"> <li>• Acid contact with eyes, skin may result in permanent injury</li> <li>• Inhalation if mists and fumes of acids, chlorine and sulfur dioxide gases can cause respiratory irritation to severe effects, including pulmonary edema, circulatory failure and death</li> </ul>	<ul style="list-style-type: none"> <li>• Hydrocarbons, heavy metals, brominated substances etc. discharged directly into river and banks.</li> <li>• Acidifies the river destroying fish and flora</li> </ul>
Plastics from the computer and peripherals	Shredding and low-temperature melting	Probable hydrocarbon, brominated dioxin and PAH exposure to workers living in the burning works area	Emission of brominated dioxins and heavy metals and hydrocarbons
Secondary steel or copper and precious metal smelting	Furnace recovers steel or copper from waste	Exposure to dioxins and heavy metals	Emission of dioxins and heavy metals
Wires	Open burning to recover copper	Brominated and chlorinated dioxin and PAH exposure to workers living in the burning works area	Hydrocarbon and ashes, including PAHs discharged into air, water and soil

Source: (Pinto, 2008)

materials which not only directly threaten human's health and environmental degradation, but also hamper international efforts in aiding global south's development and in the preservation of a sustained environment. The mismanagement of e-waste in processing centers located in developing countries can also contribute this threat.

### Functional Actors: The underreported benefit of e-waste

While the threats of e-waste are extensively studied, approaching the issue from human security cannot overlook the benefit it brings to local communities in terms of economic dimension of human security. While this paper does not agree to the pro-export's arguments such as ones stated by Lawrence Summers earlier, there's apparent impact of e-waste dismantling industries for local economy. There are four social networks which benefit from the e-waste trade based on a study conducted in Ghana (Warner, 2012, pp. 10-12).

First, diaspora individuals living in developed countries and their relatives & acquaintances in native countries who receive remittances. The practice was done especially by buying used products in

developed countries and re-selling them in native countries. Such practices are not actually banned by several countries, since the used products are still considered usable in certain developing countries.

Second, second-hand electronics refurbishers, salespeople, and their dependents. This practice of re-selling secondhand electronics, some are not in a decent "working orders" actually provides a source of income, since the e-waste imported from developed countries will be "*fixed and refurbished*" (Warner, 2012, p. 11). While the regulation and preference of "broken electronics" are stricter in developed countries, it is not the case in developing countries thus allowing for the fixed-and-refurbished practices.

Third, social network which benefit from e-waste is individuals working at dismantling centers and the entire sub-economy that exists around them. While this group faces a number of occupational hazards such as the environmental and public health risks described earlier, the center also allows the community to establish a union network, as seen in Ghanaian case, in order to protect workers from loan sharks and other direct threats, such as tax to support workers' family. The center also provides opportunity for family members to set up stalls. There are cases

where once the dismantling center was dissolved, such as the Guiyu case in China, the sub-economy died and people moved out from the region.

The fourth is the growing class of entrepreneurs in e-waste recycling industry which practices safe and environmentally-friendly dismantling of e-waste. The opportunities provided by the rising e-waste products also provides rising opportunity for these entrepreneurs who in turn hires local people thus increasing local economic conditions.

## CONCLUSION

Waste of Electric and Electronic Equipment (WEEE) is traditionally considered a threat to environmental security. But recent studies show that the e-waste is not only a one-dimensional issue. The illegal practice of exporting e-waste from global north to global south and the health risks posed by e-waste mismanagement and bad practices of recycling process demand a comprehensive approach toward the issue. This research thus proposed to approach e-waste from human security framework as an effort to comprehensively analyze the impact of e-waste for individuals and environment. The research found that there are high risks posed by e-waste such as ground water, air, and soil pollution through landfill and burning practices, and the hazardous chemical ingredients in electronic materials which can directly threat human's health. Although there are high risks toward human's health and environment, e-waste also provides opportunities in terms of economic dimensions. This research concludes that while there are some economic benefits, the risks posed by e-waste are more alarming since it will affect both human and environment in the long term. It is imperative to seek for solutions while also consider the economic dimension of e-waste. The three components of securitization utilized in the analysis section provide arguments that whether the process of securitizing e-waste can be considered successful or not rests on the securitizing actors and audience of securitization process.

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