

11-22-2010

Extended Producer Responsibility (EPR): an Alternative Solution to Regulate the International Electronic Waste Trade

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GOLDEN GATE UNIVERSITY

EXTENDED PRODUCER RESPONSIBILITY (EPR):
AN ALTERNATIVE SOLUTION TO REGULATE THE INTERNATIONAL
ELECTRONIC WASTE TRADE

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SUBMITTED TO THE GOLDEN GATE UNIVERSITY SCHOOL OF LAW,
DEPARTMENT OF INTERNATIONAL LEGAL STUDIES, IN FULFILLMENT
OF THE REQUIREMENT FOR THE CONFERMENT OF THE DEGREE OF
SCIENTIAE JURIDICAE DOCTOR (SJD).

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NOVEMBER 22, 2010

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ACKNOWLEDGMENTS

I would like to acknowledge and extend my heartfelt gratitude to the following people who have made the completion of this dissertation possible.

My dissertation committee:

CHRISTIAN N. OKEKE, LL.M., Dr. Jur., Professor of Law, Director of the LL.M. and S.J.D. International Legal Studies, and Director of the Sompong Sucharitkul Center for Advanced International Legal Studies for his invaluable insights, encouragement, and guidance.

SOMPONG SUCHARITKUL, D.C.L. (Oxford), Distinguished Professor Emeritus for his support and breadth of knowledge and experience.

RUTH ASTLE, J.D., S.J.D., Administrative Judge for her precious time, patience, valuable guidance, motivation, and kindness.

Sincere appreciation goes to my family, my boyfriend, and my beloved friends around the world for their encouragement, support, and faith in me, especially to: Udom & Nonglak Rammaniya, Niyarrin Suksinnuwat, Ratanawadi Rammaniya, Shehzad Wazirali, Jonathan Chu, Esq., Nimmual Piewthongngam, S.J.D., Natascha Fastabend, Esq., and Gene Samas.

Thank you to GGU colleagues, especially the Graduate Law Programs Department for their understanding and support.

Last, but not least, special thanks to my editor, Garrick Duckler, Ph.D., for his patience and encouragement through the whole process of producing this dissertation.

ABSTRACT

This dissertation examines the problems associated with the transboundary movement of electronic waste (e-waste), a term that refers to end-of-life or discarded electrical and electronic equipment. These problems occur mostly in developing countries where proper facilities and technology for environmentally sound management of e-waste are not sufficiently available. The Basel Convention on the Control of the Transboundary Movements of Hazardous Wastes and Their Disposal is the only existing international treaty governing the electronic waste trade. However, the Basel Convention, which employs the Prior Informed Consent (PIC) procedure as a control system, exempts electronic assemblies destined for direct reuse, repair, refurbishment, or upgrading from its scope because trade in electronic materials for these stated purposes are not considered waste in some countries. This exception, although intended to protect and increase trade in second-hand products, also creates a loophole for illegal dumping, especially in developing countries where there is a high demand for these low-cost second-hand electronic products and materials. Extended Producer Responsibility (EPR) is an alternative approach invented and used in many European and other developed countries to ensure a proper and effective e-waste management. EPR refers to the Polluter-Pays principle. In the case of electronic products, producers are deemed pollution generators because of their ability to change product design and control the substances used. EPR, therefore, extends the producers' responsibility beyond the factory to the waste management stage when the products reach the end of their useful life. This dissertation explores

and assesses the EPR approach as an alternative solution to the potential setbacks that have resulted from the Basel Convention's exception and considers the possibility of adopting EPR as a standard policy principle on a national level.

ABBREVIATIONS

ABD	Acute Beryllium Disease
AEHA	Association of Electric Home Appliances (Japan)
ARF	Advanced Recycling Fee
BAN	Basel Action Network
BFRs	Brominated Flame Retardants
CBD	Chronic Beryllium Disease
CEA	Consumer Electronics Association
CFC	Chlorofluorocarbon
CITES	Convention on the International Trade in Endangered Species
CNS	Central Nervous System
COP/ CoPs	Conference of Parties
CRTs	Cathode Ray Tubes
CSD	United Nations Commission on Sustainable Development
DTV	Digital Television
EEE	Electrical and Electronic Equipment
EFW	Energy From Waste
EPA	Environmental Protection Agency
EPR	Extended Producer Responsibility
EU	European Union
E-Waste	Electronic Waste
GATT	General Agreement on Tariffs and Trade

HARL	Home Appliance Recycling Law (Japan)
HBCD	Hexabromocyclododecane
HDTV	High-Definition Television
ICJ	International Court of Justice
ICOLP	International Cooperative for Ozone Layer Protection
ICSU	International Council of Scientific Unions
ICT	Information and Communication Technology
IEL	International Environmental Law
IT	Information Technology
IUCN	International Union for the Conservation of Nature
MFN	Most-Favored-Nations
NGOs	Non-Governmental Organizations
Ni-Cd	Nickel-Cadmium
NIMBY	Not In My Back Yard
NRDC	Natural Resources Defense Council
OECD	Organization for Economic Co-operation and Development
OEWG	Open-Ended Working Group
PBB	Polybrominated Biphenyles
PBDEs	Polybrominated Diphenyl Ethers
PCBs	Polychlorinated Biphenyls
PCs	Personal Computers
PIC	Prior Informed Consent
POPs	Persistent Organic Pollutants

PRC	People's Republic of China
PVC	Polyvinyl Chloride
RCRA	Resource Conservation and Recovery Act (United States)
RoHS	Restriction of Hazardous Substances
SECO	Swiss State Secretariat for Economic Affairs
SEPA	State Environmental Protection Agency (China)
StEP	Solving the E-Waste Problem
SVTC	Silicon Valley Toxic Coalition
TBBPA	Tetrabromobisphenol A
TBT	Technical Barriers to Trade
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNCHE	United Nations Conference on Human and Environment
UNCLOS	United Nations Convention on the Law of the Sea
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
US/ USA	United States of America
WCED	World Commission on Environment and Development
WEEE	Waste Electrical and Electronic Equipment
WSSD	World Summit on Sustainable Development
WTO	World Trade Organization

A REVIEW OF SELECTED LITERATURE

International Management of Hazardous Wastes: The Basel Convention and Related Legal Rules by Katharina Kummer¹, Oxford University Press, 1995, published in the United States is the seminal book that recounts history of transboundary movements of hazardous wastes in international law and analyzes the strengths and weaknesses of the Basel Convention and its relation to other hazardous waste management systems. Kummer draws her analysis of the Basel Convention's provisions from an extensive number of United Nation Environment Programme (UNEP) Governing Council Decisions that came about during the negotiation and drafting process as well as reports of governing bodies of the Basel Convention.

Reports prepared by non-governmental organizations on current situations in different countries offer first-hand accounts of various crises relevant to the electronic waste trade. A report entitled "Exporting Harm: The High-Tech Trashing of Asia," prepared by the Basel Action Network (BAN)² and Silicon Valley Toxics Coalition

¹ Ms. Katharina Kummer Peiry, MLaw (Zurich), Ph.D. (London) is currently an Executive Secretary of the Secretariat of the Basel Convention on the Control of the Transboundary Movements of Hazardous Wastes and Their Disposal (Geneva, Switzerland). She is a specialist in international environmental law and policy. She has worked on issues related to the Basel Convention since 1988, when she joined the United Nations Environment Programme in Nairobi to assist in the negotiation process of the Convention.

² The Basel Action Network (BAN) is the world's only organization focused on confronting the global environmental injustice and economic inefficiency of toxic trade (toxic wastes, products and technologies) and its devastating impact. Working at the nexus of human rights and environment, BAN confronts the issues of environmental justice at a macro level, preventing disproportionate and unsustainable dumping of the world's toxic waste and pollution on our global village's poorest residents. At the same time, BAN actively promotes the sustainable and just solutions to the world's consumption and waste crises -- banning waste trade, while promoting green, toxic-free and democratically designed consumer products.

(SVTC)³ in 2002 summarizes a crisis in Asia, particularly in China, India, and Pakistan. A group of representatives from these NGOs visited and investigated the recycling facilities of these three countries in order to evaluate the crisis and determine some solutions. Greenpeace International⁴ published a report entitled “Toxic Tech: Not in Our Backyard, Uncovering the Hidden Flows of e-Waste” (February 2008) to investigate the global sales of electrical and electronic products and assess the amount of waste arising from these sales. This report found that the problem lies in the large amount of hidden-flow e-waste that escapes responsible collection and treatment. The principle of producer responsibility ultimately needs to be at the core of any measures to address e-waste problem.

³ Silicon Valley Toxics Coalition (SVTC) is a diverse non-profit organization engaged in research, advocacy and grassroots organizing to promote human health and environmental justice in response to the rapid growth of the high-tech industry.

⁴ Greenpeace is an independent global campaigning organization that acts to change attitudes and behavior, to protect and conserve the environment, and to promote peace.

Electronic Waste Management, edited by R.E. Hester⁵ and R.M. Harrison⁶, RSC Publishing, 2009, published in the United Kingdom is a comprehensive collection of research essays from a group of leading practitioners in the field of electrical and electronic waste management. The essays focus on the issues of sustainability and alternatives to dumping this type of waste in the third world and Far Eastern countries. Of particular interest were those essays devoted to the problems associated with traditional methods of waste management by disposal in landfills or by incinerations. Part of this book discusses preferred approach for e-waste management through recycling and recovery using an example from the work of the European Recycling Platform. Different models for e-waste management from around the world from an extended producer responsibility perspective are also examined.

⁵ Ronald E. Hester, BSc, DSc(London), PhD(Cornell), FRSC, CChem, Emeritus Professor of Chemistry, University of York, York, United Kingdom. His more than 300 publications are mainly in the area of vibrational spectroscopy, which focus on time-resolved studies of photoreaction intermediates and on bio-molecular systems in solution. He is active in environmental chemistry and is a founder member and former chairman of the Environment Group of the Royal Society of Chemistry and editor of 'Industry and the Environment in Perspective' (RSC, 1983) and 'Understanding Our Environment' (RSC, 1986). As a member of the Council of the UK Science and Engineering Research Council and several of its sub-committees, panels and boards, he has been heavily involved in national science policy and administration. He was, from 1991 to 1993, a member of the UK Department of the Environment Advisory Committee on Hazardous Substances and from 1995 to 2000 was a member of the Publications and Information Board of the Royal Society of Chemistry.

⁶ Roy M. Harrison, BSc, PhD, DSc(Birmingham), FRSC, CChem, FRMetS, Hon MFPH, Hon FFOM, Queen Elizabeth II Birmingham Centenary Professor of Environmental Health, University of Birmingham, Birmingham, United Kingdom. His more than 300 publications are mainly in the field of environmental chemistry, although his current work includes studies of human health impacts of atmospheric pollutants as well as research into the chemistry of pollution phenomena. He is a past Chairman of the Environment Group of the Royal Society of Chemistry for whom he has edited 'Pollution: Causes, Effects and Control' (RSC, 1983; Fourth Edition, 2001) and 'Understanding our Environment: An Introduction to Environmental Chemistry and Pollution' xiv (RSC, Third Edition, 1999). His interest is in the scientific and policy aspects of air pollution, having been Chairman of the Department of Environment Quality of Urban Air Review Group and the DETR Atmospheric Particles Expert Group. He is currently a member of the DEFRA Air Quality Expert Group, the DEFRA Expert Panel on Air Quality Standards, and the Department of Health Committee on the Medical Effects of Air Pollutants.

Waste Treatment: Reducing Global Waste, by Anne Maczulak⁷, Facts on File Inc., 2010, published in the United States of America explores how the waste management industry plays a role in removing, treating, and disposing of human, household, and industrial wastes. One of the world's most pressing waste problems – discarded electronic products pose a unique challenge. The book discusses why e-waste is a particular hazard in developing countries. One of the reasons is that the treatment of e-waste is unlike that of any other waste. The book also describes the steps for salvaging the components of e-waste and the special hazards contained in this waste category. Different methods of waste treatment are discussed and assessed.

High Tech Trash: Digital Devices, Hidden Toxics, and Human Health, by Elizabeth Grossman⁸, Island Press, 2006, published in the United States of America offers the author's perspective of the horrors of e-waste shipped in massive quantities to India, Nigeria, Pakistan and China, where children, women and men bereft of protective clothing and proper tools break apart our discarded electronics by hand. These exploited laborers are exposed, at grave risk, to permanent biological toxic substances, poisons that also flow unchecked into rivers, seas, and the air. Grossman

⁷ Anne Elizabeth Maczulak is a Registered Quality Assurance Professional in Good Laboratory Practices. She has worked as a research scientist in industry for 20 years. She has lab experience as a microbiologist with Fortune 500 companies in both chemical specialties and personal care products, and as clinical information coordinator in the pharmaceuticals industry.

⁸ Elizabeth Grossman is a freelance journalist and writer. Her work on environmental, science, and related policy issues has appeared in a variety of publications including the Washington Post, Amicus Journal, Audubon, California Wild, Cascadia Times, Chicago Tribune, Environmental News Network, Grist, The Nation, New York Times Book Review, Newsday, Oregonian, Orion, the Patagonia catalogue, Salon.com, Seattle Times, and Yes!

argues that policy makers should follow the European model of regulating materials used in electronic products and e-waste recycling.

A report entitled “EPR, Extended Producer Responsibility: An Examination of Its Impact on Innovation and Greening Products,” by Chris Van Rossem⁹, Naoko Tojo¹⁰, and Thomas Lindhqvist¹¹, commissioned by Greenpeace International, Friends of the Earth Europe, and the European Environmental Bureau (EEB), September 2006 explains the concept of Extended Producer Responsibility (EPR), the differences between individual responsibility and collective responsibility, and the application of EPR principle in the e-waste management legislation, particularly in developing countries.

⁹ Chris Van Rossem is currently a research policy manager for Waste Diversion Ontario, Canada. He was a research associate at the International Institute for Industrial Environmental Economics at Lund University, Sweden and has been involved in the development of the European Council Directive on Waste Electrical and Electronic Equipment since its inception.

¹⁰ Naoko Tojo is currently teaching for the M. Sc. Students on environmental management and policy: product policy, international environmental law and policy, supervision of thesis works, tutoring audit exercise for industries and municipalities at Lund University, Sweden.

¹¹ Thomas Lindhqvist, Ph.D. started research in the areas of product policy, and pollution prevention in 1984 and has the distinction of being the first person to coin and use the phrase Extended Producer Responsibility (EPR). He is an Associate Professor at the International Institute for Industrial Environmental Economics at Lund University in Sweden and he was awarded his PhD by Lund University with a dissertation published in April 2000 on "Extended Producer Responsibility in Cleaner Production." He has written extensively on the subject of EPR and is a well-respected contributor to the OECD's EPR work program. Prior to taking up his current teaching and research responsibilities at Lund University he was employed by the UN and by the Swedish Ministry of the Environment.

Extended Producer Responsibility: Reexamining Its Role in Environmental Process by Joel Schwartz¹² and Dana Joel Gattuso¹³, Reason Foundation, 2002, published in the United States of America analyzes the Extended Producer Responsibility principle and some potential challenges posed by EPR legislation in the European Union, especially the matter of costs. The book offers a different concept, namely industrial ecology, to help solve part of the e-waste problem. Industrial ecology refers to market-driven innovation that adds economic value through investments in environmental improvements to products and manufacturing processes as an alternative framework.

¹² Joel Schwartz is a Senior Scientist in the Environment, Health, and Safety Program at Reason Public Policy Institute (RPPI), where he focuses on air pollution and chemical risk policy. Prior to joining RPPI, he was executive officer of the California Inspection and Maintenance Review Committee, where he led an evaluation of California's vehicle emissions inspection program.

¹³ Dana Joel Gattuso is an adjunct scholar with the Washington, D.C.-based Competitive Enterprise Institute. She is also the Washington liaison for PERC – The Center for Free Market Environmentalism, and a policy consultant and freelance writer on environmental issues for a number of organizations, including The Heritage Foundation, the National Foundation for Environmental Education, and the Thomas Jefferson Institute. Previously, Gattuso was a Director of Projects and Issue Management for Environmental and Regulatory Affairs with the U.S. Chamber of Commerce.

INTRODUCTION

In the last thirty years, electronic goods have had an enormous impact on our lives. Not only are electronics a common, if not essential, part of our daily living but they have also improved the quality of our lives in the fields of medicine, communication, law enforcement, industry, and the military to name a few. Although consumers enjoy and rely upon these goods, there is commonly a lack of awareness and understanding about their potential environmental impact when consumers decide to get rid of them. Part of this is due to the relative novelty of such products since there remains much that is unknown about their long-term effects on the environment but equally important is the lack of awareness consumers typically have about what we already know about these products' environmental impact. Although these products are potentially far more harmful than the average paper product waste, consumers are far more familiar with paper, glass, plastic, and tin recycling.

Chapter I of this dissertation, therefore, first looks at the hazardous components in these types of products in order to better understand how laws and agreements are required to regulate the proper management of these products when they reach the end of their lives. The term electronic waste or e-waste is used to describe both end-of-life and obsolete electronic products. Part of what complicates proper management of e-waste (as opposed to other types of hazardous waste) is that e-waste does not contain merely toxic materials but valuable and re-usable parts as well (copper in coaxial cable for instance). Therefore, e-waste management requires

a much more complicated process than simply disposing of it in landfill or by incineration. In order to retrieve the valuable materials, proper technology and facilities are necessary for such an extraction process. Unfortunately, vast amounts of electronics do not make it to these facilities because of the cost associated, the lack of readily available technology for such extraction or because of consumer apathy.

The central issue, however, that this dissertation is concerned with is the international transboundary movement of e-waste – a trade that was partly a result of the differences in regulations between developed and developing countries. In developed countries, there are stricter rules for the disposal of waste and the cost to operate such facilities is much higher as a result. More lenient regulations (as well as lower labor and operating costs) in developing countries make it more appealing to send these items to developing countries. This in addition to the developing countries need for affordable electronic goods – goods that are typically deemed to be outmoded but functioning in developed countries – created a highly active e-waste trade in which the majority of the activity was from developed to developing countries.

Although there is a high demand for such products in developing countries and there is a lucrative opportunity for such countries to make profits from these transactions, facilities and technologies to safely dispose of and manage this e-waste in developing countries are scarce. While the e-waste trade is lucrative to both the

business sector and to the government from an economic perspective, the harm posed to human communities and the environment is profound.

The tragic impact from improper management of hazardous waste has gotten the attention of the international community, resulting in a nearly globally accepted international treaty concerning the transboundary movements and management of hazardous wastes, namely the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal. The Basel Convention has since 1998 been revised to include the new and complicated problem of e-waste and this dissertation will explore the efficacy of such an agreement, looking more closely at the problems surrounding this particular response to the e-waste crisis.

The questions that this dissertation will explore are: what are the ramifications of Basel in regards to e-waste? How does the Basel Convention perform (effectively or ineffectively) at providing standards to ensure the proper disposal of e-waste? What are some alternatives, in light of Basel Convention's potential limitations, that would be worth considering as more effective means for approaching this global problem?

In order to situate these questions within the broader context of legal traditions, Chapter II explores the history of international environmental law in order to understand better the legal ramifications of the Basel Convention's efforts to respond to the problems of e-waste. A basic knowledge of international law is

necessary for understanding the rights and responsibilities of states' actions in international communities. The evolution of international environmental law has grown from merely protecting the environment to integrating a more balanced view between economic and environmental factors.

The Basel Convention is a good example of an international agreement that has emerged from this attempt to find a balance between protecting trade and protecting the environment. As Chapter III explores, the attempt to balance these factors is both part of the Basel Convention's strengths and its limitations. The Basel Convention, although it includes language relevant to e-waste, makes a distinction between waste and reusable products - a distinction created as a compromise given the different definitions of waste among various countries. Since many countries used electronic products destined for direct reuse, repair, refurbishment, or upgrading, such electronics are commonly not considered waste. However, this distinction also leaves the Basel Convention open to a dangerous loophole – electronics designated for reuse quickly become waste and although this exemption was intended to protect a lucrative second-hand electronic products trade, it also makes a vast amount of electronics available for toxic dumping.

Another approach is therefore needed to supplement the Basel Convention because of this loophole in order to respond to the growing threat to environment and human communities. One such alternative this dissertation explores is the concept of Extended Producer Responsibility (EPR), which is as an extension of the Polluter-

Pays principle. The basic premise of EPR theory is that a producer's responsibility for a product is extended to the post-consumer stage of a product's life. By placing the responsibility of waste collection and treatment on producers, EPR seeks to provide an incentive for more environmentally friendly design and promotes an effective collection, recycling, recovery, and disposal operation. Chapter IV explains the scope, objectives, and types of responsibilities under EPR in the context of electronic waste management. Two model examples of EPR legislation – the European Union and Japanese system – are studied and assessed. The chapter concludes that despite some potential shortcomings of this concept, EPR is an excellent approach to supplement the Basel Convention with regard to the electronic waste trade, as well as a policy standard for national implementation.

This dissertation provides important information in order to raise awareness about the nature of e-waste and its potential impact as well as to give an overview of important regulations governing e-waste trade. More importantly, it presents developing countries with an alternative solution or preventive approach to the problems that might occur with trade in electronic products. The comprehensive understanding of EPR helps to resolve the problem of ensuring environmentally sound management of e-waste rather than banning all e-waste trade as suggested by some governments and non-governmental organizations. The implementation and enforcement of Extended Procedure Responsibility theory enacted into law, either at a national, regional, or international level, is much more complicated than merely

understanding the concept. This dissertation is helpful as a starting point for the consideration of this approach.

CHAPTER I

E-WASTE OVERVIEW

I. Introduction

In the past thirty years, technological advancement and the availability of electrical and electronic products have had a profound impact on our individual lifestyles and upon economic growth worldwide. These products are used in a wide variety of fields such as education, health, communication, food production, medicine, security, environmental protection, and culture.¹⁴ Such products include large and small household appliances – refrigerators, televisions, washing machines, mobile phones, personal computers, printers and toys.¹⁵ However, serious environmental concerns have also accompanied the rapid growth in popularity and availability of these electronic products. Statistics from industrialized countries such as United States of America (US) and the European Union (EU) illustrate this remarkable growth. According to the Consumer Electronics Association (CEA), Americans own approximately 24 electronic products per household.¹⁶ In the European Union, electronic products put on the market in 2005 included 44 million

¹⁴ SOLVING THE E-WASTE PROBLEM (StEP), SUSTAINABLE INNOVATION AND TECHNOLOGY TRANSFER INDUSTRIAL SECTOR STUDIES: RECYCLING – FROM E-WASTE TO RESOURCES 27, (United Nations Environment Programme & United Nations University, 2009).

¹⁵ *Id.* at 27.

¹⁶ Consumer Electronics Association, *Market Research Report: Trends in CE Reuse, Recycle and Removal*, April 2008.

large household appliances, 48 million personal computers, 32 million televisions and 776 million lamps.¹⁷

Cell phones, televisions, computers, music devices, and a host of other information technologies have become an integral part of our modern life, changing the way we communicate, the speed of how we get information and the range of places that can be reached as a result of these new technologies. As a result of this technological innovation and the higher demand for electronic products, the replacement process has also been accelerated. With the rapid growth in electronics production, the rate of obsolescence has grown to disturbing proportions. For each new product produced and purchased, one or more becomes outdated or obsolete. In 1998, there were an estimated 20 million computers that became obsolete within one year.¹⁸ In 2005, the Environmental Protection Agency (EPA) estimated that 26-37 million computers have become obsolete.¹⁹ This combination of rapid popularity and the ever-increasing demand for better electronic products has increased such waste exponentially.

The advance of such technology and the production of such electronics have ushered in a new era of globalization. The global spread of such products has rapidly

¹⁷ HUISMAN J. ET AL., 2008 REVIEW OF DIRECTIVE 2002/96 ON WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE), (Bonn: United Nations University, 2007).

¹⁸ United States Environmental Protection Agency (USEPA), *Fact Sheet: Management of Electronic Waste in the United States*, July 2008, at <http://www.p2pays.org/ref/41/40164.htm> (last visited June 20, 2010). [hereinafter US Fact Sheet]

¹⁹ *Id.*

helped developing countries boost their economies. This has signaled a great shift in developing countries where the ability to compete on a global market requires the adoption of advanced technology simply in order to remain competitive. Thus, not only has individual consumption of electronics grown but businesses and governments also now require large amounts of electronic equipment to enhance a nation's development.

Given this heightened race toward greater and more efficient technology, there is an ever-increasing burden on the environment with the built-in obsolescence of such products. However, these products have become disposable not because they are truly obsolete but because of the rapid rate of improvements in costs and technology have made such products less desirable and therefore seemingly obsolete. Everyone wants to get a better, cheaper product and the companies that make these products want to sell better and cheaper products. However, to what degree electronics are truly obsolete (that is, whether they are still useable) depends more often than not upon the consumer than the product itself. Those in developing countries, for instance, make use of electronic goods for which there is little or no market in the US. As a result, the exporting of second-hand electronic products from developed to developing nations has become a profitable business.

This type of trade has provided a temporary solution for the growing number of products, i.e., to keep in circulation as many of these products as possible. Besides the benefits of electronic products in employment, trade, and economic growth

worldwide, there is also the potential for these products to adversely affect human health and the environment if not managed properly. However, one of the distinctive characteristics of e-waste is that, unlike other hazardous waste, e-waste consists a large number of valuable substances that, when properly extracted, can be re-used or sold. In this sense, the waste management of e-waste is not merely an environmental concern but potentially an economic investment, insofar as it not only slows down natural resource depletion but also potentially saves businesses money, energy and time by not having to mine raw materials.

This is especially true for developing countries where these products are imported because they often do not have the means to properly dispose or recycle these products, leaving these countries, essentially, with the economic and environmental burden of what to do with the vast amount of e-waste. One of the essential characteristics of these products is that they contain hazardous material (lead, mercury, chromium, etc.) and such toxic substances require a specialized way of treatment for which traditional means (landfill or incineration) are not viable. A new means of disposal is required and the cost associated with these new means is a challenge to the nations who are left with such waste. This chapter explains in greater detail the specific characteristics of electronic waste, its components, and the current methods used in managing this type of waste. The advantages and shortcomings of each method are also discussed.

II. Definition of E-Waste

While there is no universally accepted definition of electronic waste or e-waste, it is commonly used to describe old, end-of-life, or discarded appliances that use electricity, especially consumer electronics that enter the waste stream.²⁰ E-waste is also used as a generic term embracing various forms of electrical and electronic equipment that have ceased to be of any value to their owners (whether or not this equipment is still functional).²¹

Basel Action Network (BAN), the world's organization focused on confronting the global environmental injustice and economic inefficiency of toxic trade and its devastating impacts,²² defines e-waste as a “broad and growing range of electronic devices ranging from large household appliances such as refrigerators, air conditioners, hand-held cellular phones, personal stereos, and consumer electronics to computers which have been discarded by their users.”²³

The Organization for Economic Co-Operation and Development (OECD), a unique forum where the governments of 30 democracies work together to address the

²⁰ Swiss State Secretariat for Economic Affairs (SECO), *e-waste definition*, available at http://ewasteguide.info/e_waste_definition (last visited July 22, 2009).

²¹ Rolf Widmer et al., *Global Perspective on e-waste*, Environmental Impact Assessment Review 25 (2005), 438.

²² Basel Action Network (BAN), *What is Ban?*, at http://www.ban.org/main/about_BAN.html (last visited July 20, 2009).

²³ Jim Puckett et al., *Exporting Harm: the High-Tech Trashing of Asia*, The Basel Action Network, Seattle: Silicon Valley Toxics Coalition, 5 (February 2002) [hereinafter Exporting Harm Report].

economic, social and environmental challenges of globalization²⁴, defines e-waste as “[a]ny appliance using electric power supply that has reached its end-of-life.”²⁵

Solving the E-waste Problem (StEP), an initiative of various United Nation organizations with the overall aim to solve the e-waste problem²⁶, defines e-waste as any type of “electrical and electronic equipment that [is] no longer desired by a given consumer and has or could enter the waste stream.”²⁷

A more comprehensive and widely recognized definition of e-waste is defined by the European Parliament in the Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).²⁸ Article 3(a) defines “electrical and electronic equipment” or “EEE” as “equipment which is dependent on electric currents or electromagnetic fields in order to work properly and equipment for the generation, transfer and measurement of such currents and fields falling under the categories set out in Annex IA and designed for use with a voltage rating not exceeding 1,000 Volts

²⁴ Organization for Economic Co-Operation and Development (OECD), *About OECD*, at http://www.oecd.org/pages/0,3417,en_36734052_36734103_1_1_1_1_1,00.html (last visited July 20, 2009).

²⁵ Organization for Economic Co-Operation and Development (OECD), *Extended Producer Responsibility: A Guidance Manual for Governments 9*, OECD Publishing 2001.

²⁶ Solving the E-waste Problem (StEP), *Home*, at <http://www.step-initiative.org/index.php> (last visited July 15, 2009).

²⁷ Solving the E-waste Problem (StEP), *What is E-WASTE?*, at <http://www.step-initiative.org/initiative/what-is-e-waste.php> (last visited July 15, 2009).

²⁸ Council Directive of the European Parliament and of the Council of 23 January 2003 on Waste Electrical and Electronic Equipment (WEEE), Directive 2002/96/EC, 2003 O.J. (L37) 24 [hereinafter WEEE Directive].

for alternating current and 1,500 Volts for direct current.”²⁹ Article 3(b) defines “waste electrical and electronic equipment” or “WEEE” as “electrical or electronic equipment which is waste within the meaning of Article 1(a) of Directive 75/442/EEC, including all components, subassemblies and consumables, which are part of the product at the time of discarding.”³⁰ 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.”³¹ It is very broad in scope and virtually covers all electrical and electronic equipment used by consumers or intended for professional use that may end up in the municipal waste stream.³²

Under Annex IA and IB of WEEE Directive, there are ten main categories of electrical and electronic equipment.¹¹

1. Large household appliances: washing machines, dryers, refrigerators, air-conditioners, etc.
2. Small household appliances: vacuum cleaners, coffee machines, irons, toasters, etc.

²⁹ WEEE Directive, *Supra* note 28, art. 3(a).

³⁰ WEEE Directive, *Supra* note 28 art. 3(b).

³¹ EU, Council Directive of 15 July 1975 on waste, Directive 74/442/EEC, 1975 (L 194).

³² Inform, *European Union (EU) Electrical and Electronic Products Directives*, Inform Inc., 2 (June 2003).

¹¹ WEEE Directive, *supra* note 28, Annex IA and IB.

3. Information Technology (IT) and telecommunication equipment: personal computers (PCs), laptops, mobile phones, telephones, fax machines, copiers, printers, calculators, etc.
4. Consumer equipment: televisions, VCR/DVD/CD players, radios, stereos, etc.
5. Lighting equipment: fluorescent tubes, sodium lamps, etc.
6. Electrical and electronic tools: drills, electric saws, sewing machines, lawn mowers, etc. (except large stationary tools/machines)
7. Toys, leisure and sports equipment: electric train sets, coin slot machines, treadmills, video games, etc.
8. Medical devices: ventilators, cardiology and radiology equipment, etc. (except implanted and infected products)
9. Monitoring and control instruments: smoke detectors, thermostats, control panels, etc.
10. Automatic dispensers: vending machines, hot/cold drink dispensers, etc.

Information and telecommunication equipment, particularly, computers and cell phones are among the most problematic products because of their high volume and short life span. For the purposes of this dissertation, my focus will be limited to the three most popular forms of such technologies – computers, cell phones and televisions.

III. E-waste Quantity

It is difficult to measure the quantity of electrical and electronic waste due to the differences in definition of e-waste in each country. For example, the European countries have an extensive list of products and equipments that are considered e-waste under the WEEE Directive. On the other hand, India has no specific legislation that directly addresses e-waste.³³ E-waste is covered under the hazardous waste rules only after the hazardous waste contained in the electronic appliance, such as the motherboard in the computer, is removed from the computer.³⁴

To estimate global quantities of e-waste, numerous methods have been suggested. A study conducted by the Nuclear Safety and Civil Protection of the Commission of the European Communities,³⁵ suggests three methods:

1. The consumption and use method. This method takes the average number of electrical and electronic equipments in a typical household as a basis for a prediction of the potential amount of e-waste.³⁶

2. The market-supply method. This method uses production and sales data in a given geographical region as a basis.³⁷

³³ Nisha Thakker, *India's Toxic Landfills: A Dumping Ground for the World's Electronic Waste*, 6 Sustainable Dev. L. & Pol'y 58, 61 (Spring 2006).

³⁴ *Id.*

³⁵ Widmer et al., *supra* note 21, at 440.

³⁶ *Id.*

³⁷ *Id.* at 441.

3. The Swiss Environmental Agency's method. This method estimates the amount of e-waste based on the assumption that private households are already oversupplied. Therefore, for each new appliance bought, an old one reaches its end-of-life.³⁸

The first two methods require an estimated life span for electronic products, whereas the third method assumes a completely saturated market and does not take into account the life span of such products.³⁹ Another method used in the United States, focusing mainly on the computer and its peripherals, is based on sales data.⁴⁰ This method was developed at Carnegie Mellon University in 1997.⁴¹ It includes the reuse and storage parameters for obsolete machines, which in reality delay their entry into the waste stream.

Although all of these methods are based upon different criteria and therefore suggest different amounts of e-waste, what is incontrovertible is that e-waste has grown in the last ten years at an alarming rate. In 1998, approximately 20 million PCs became obsolete and grew to over 100 million in 2004.⁴² According to Greenpeace International Organization, 183 million computers were sold worldwide in 2004 –

³⁸ *Id.*

³⁹ *Id.*

⁴⁰ Scott Matthews et al., *Disposition and end-of-life options for personal computers*, at <http://gdi.ce.cmu.edu/compsec/NEWREPORT.PDF> (last visited July 20, 2009).

⁴¹ *Id.*

⁴² Exporting Harm Report, *supra* note 23, at 5.

11.6 percent more than in 2003. 674 million mobile phones were sold worldwide in 2004 or 30 percent more than in 2003. By 2010, there will be 716 million new computers in use.

In the early 1980s, a computer's lifespan was about ten years. However, it is now reduced to an average of three years. This is due to the rapid and continual improvements in technology that quickly outdate older models. Cell phones or mobile phones have a lifecycle of less than two years. As a result, the electrical and electronic waste stream is growing rapidly.

Below are some examples on how the electronic producers or governments play an active role in the rapid growth of electronic waste stream.

- Cell phone upgrades. Consumers can easily access newer and better features on cell phones at an affordable price. Cell phone companies often times offer free or very inexpensive upgrades every 1 - 2 years, giving more incentives for consumers to replace their old working cell phones with a new ones.
- Software upgrades. The release of new operating system software, such as Windows Vista and Windows 7, has contributed to a spike in the e-waste stream because the release signals a change in operation, obviating the older model computers that lack the memory or processing speed.
- Built-in rechargeable batteries in small gadgets. Many small electronics have built-in rechargeable batteries. After a certain number of charging

cycles, the batteries can no longer hold a charge and need to be replaced. However, the consumers cannot replace the batteries themselves. They have to bring the product back to the manufacturer with a fee. Instead of getting a battery replaced, consumers are willing to pay a bit more to get a brand new product.

- Digital Television (DTV) and High-Definition Television (HDTV).

The US Congress set June 12, 2009, as the deadline for full-power stations to stop broadcasting analog signals and broadcast over-the-air signals in digital only.⁴³ Consumers who have working analog TVs were compelled to buy either a converter box or new television set that contains a digital tuner. Millions of consumers chose to buy a new TV set and discard a perfectly good, working analog TV so they could enjoy HDTV technology without the hassle of the converter box.

The above are examples of why there has been such a rapid increase of e-waste, especially in industrialized countries, such as the United States, which makes for an eighth of the world's population but is responsible for almost a third of its consumption. The challenges occur when most countries do not have a proper system in place to handle the e-waste after it has been discarded.

The amount of e-waste, when compared with other solid wastes, appears to be minimal. For example, in the United States, e-waste contributes only two to five

⁴³ The Digital TV Transition, *What You Need to Know About Digital TV Transition*, at <http://www.dtv.gov/whatisdtv.html> (last visited August 12, 2010).

percent of current solid waste streams.⁴⁴ However, the unique characteristic of e-waste is that it contains a significant volume of heavy metals, which contribute up to seventy percent of heavy metal found in landfills.⁴⁵ Each computer monitor or television contains a cathode ray tube (CRT), which contains an average of four to eight pounds of lead used to protect customers from radiation.⁴⁶

Table 1: Overview of e-waste generated in different countries⁴⁷

Country	Total E-waste Generated tonnes/year	Categories of Appliances counted in e-waste	Year
Switzerland	66,042	Office & Telecommunications Equipment, Consumer Entertainment Electronics, Large and Small Domestic Appliances, Refrigerators, Fractions	2003
Germany	1,100,000	Office & Telecommunications Equipment, Consumer Entertainment Electronics, Large and Small Domestic Appliances, Refrigerators, Fractions	*Estimated in 2005
United Kingdom	915,000	Office & Telecommunications Equipment, Consumer Entertainment Electronics, Large and Small Domestic Appliances, Refrigerators, Fractions	1998
USA	2,124,400	Video Products, Audio Products, Computers and Telecommunications Equipment	2000
Taiwan	14,036	Computers, Home electrical appliances (TVs, Washing Machines, Air conditioners, Refrigerators)	2003
Thailand	60,000	Refrigerator, Air Conditioners, Televisions, Washing Machines, Computers	2003
Denmark	118,000	Electronic and Electrical Appliances including Refrigerators	1997
Canada	67,000	Computer Equipment (computers, printers etc) & Consumer Electronics (TVs)	*Estimated in 2005

Note: The table above gives only an overview of the quantities of e-waste generated in different countries. It is difficult to make direct country-to-country comparisons regarding e-waste quantities, because each country has as different categories of appliances counted in e-waste and different methodologies of estimation.⁴⁸

⁴⁴ US Fact Sheet, *supra* note 18.

⁴⁵ *Id.*

⁴⁶ *Id.*

⁴⁷ Swiss State Secretariat for Economic Affairs (SECO), *e-waste quantities: WEEE generated (international)*, at <http://ewaste.ch/weee-generated> (last visited July 20, 2010).

⁴⁸ *Id.*

IV. E-Waste Characteristics

Electrical and electronic products consist of numerous parts made of different substances including plastics, metals, glass as well as organic and inorganic compounds. They contain both valuable materials as well as hazardous materials, which require special handling and recycling methods.⁴⁹ High-tech electronics are the most complex mass-produced consumer products ever manufactured – a complexity that presents special challenges when it comes to dealing with this equipment at the end of its useful life.⁵⁰ In a desktop computer, more than half of the materials are metals. Some metals, such as aluminum and iron, are used structurally. Others, particularly, the heavy metals – cadmium, lead, mercury, and other metallic elements that have high molecular weights – are used in circuit boards, semiconductors, and batteries.⁵¹

Most heavy metals are toxic in low concentrations and tend to accumulate in the food chain.⁵² Heavy metals can cause neurological damage and adversely affect fetal development and reproductive systems. They are known to cause kidney disease and some are recognized carcinogens. Disposing of waste electronics in landfills is very dangerous because these elements can leach into water and soil and seep into the

⁴⁹ SECO, *supra* note 20.

⁵⁰ ELIZABETH GROSSMAN, HIGH TECH TRASH: DIGITAL DEVICES, HIDDEN TOXICS, AND HUMAN HEALTH, xii (Island Press, 2006).

⁵¹ *Id.* at 18

⁵² *Id.*

local watershed, where they can be ingested by insects, fish and other aquatic creatures and then work their way into our diet.⁵³

Disposal of WEEE is a growing concern due to rising volumes and toxic content⁵⁴, whether it is domestic disposal or international disposal. Compounds, such as polybrominated diphenyl ethers, that are used as flame retardants to make appliances safer during their use are also highly dangerous persistent organic pollutants that pose extremely serious health and environmental risks.⁵⁵ The hazards of e-waste are most acute in the event of incorrect disposal and incorrect recycling techniques.⁵⁶

Electronic appliances comprise hundreds of different materials that can be toxic when discarded, such as lead and cadmium in circuit boards; lead oxide and cadmium in cathode ray tubes (CRTs); mercury in switches and flat screen monitors; cadmium in computer batteries; polychlorinated biphenyls (PCBs) in older capacitors and transformers and brominated flame retardants on printed circuit boards, plastic

⁵³ *Id.* at 18

⁵⁴ US Fact Sheet, *supra* note 18.

⁵⁵ Sustainable Consumption & Production Branch, Division of Technology, Industry and Economics, United Nations Environment Programme, *E-waste management: FAQs*, at http://www.uneptie.org/pc/pc/wate/e_waste_faq.htm (last visited January 23, 2010).

⁵⁶ *Id.*

casing cables and polyvinyl chloride (PVC) cable insulation.⁵⁷ Even if e-waste is considered hazardous waste, it has a distinct component, valuable or strategic materials that can be extracted or recovered.

A. Hazardous Substances in Electronic Products

More than 1000 substances can be found in e-waste, many of which are highly toxic, including lead, beryllium, cadmium, brominated flame retardants, mercury, hexavalent chromium, and plastics. These components are harmful to both human health and to the environment.

1. Lead

Lead is found in glass panels, in computer monitors, and in the soldering of printed circuit boards.⁵⁸ Each computer or television contains an average of four to eight pounds of lead.⁵⁹ Twenty percent is found in Cathode Ray Tubes (CRTs) or the picture tubes in television, computer, and other electronics that have an image screen.⁶⁰ CRTs amplify and focus high-energy electron beams to create images that appear on the screen. Lead in CRTs works as a protector for humans from the

⁵⁷ Sustainable Consumption & Production Branch, Division of Technology, Industry and Economics, United Nations Environment Programme, *E-waste management*, at <http://www.unep.fr/scp/waste/ewm/> (last visited July 18, 2010).

⁵⁸ GROSSMAN, *supra* note 50, at 19.

⁵⁹ Computer Take Back Campaign, *Poison PCs and Toxic TVs 8* (2004), available at <http://www.computertakeback.com/docUploads/ppcttv2004%20pdf?CFID=17553870&CFTOKEN=11135182> [hereinafter *Poison PCs*] (stating myriad of reasons why electronic waste is growing faster than other kinds of waste).

⁶⁰ GROSSMAN, *supra* note 50, at 19.

radiation that emanates from the electron beams.⁶¹ When these components are improperly disposed of or crushed in landfills, the lead is released and accumulates in the environment, contaminating land and groundwater and therefore, human drinking supplies.

The negative impact of lead is well established. For example, exposure to lead causes damage to the central and peripheral nervous systems, blood systems, kidney and reproductive system in humans. It also has been demonstrated to have serious negative impact on children's brain development.⁶²

2. Beryllium

Beryllium is a metal with unique characteristics. It is extremely light but stiff and stronger than steel, and is a very good conductor of heat and electricity.⁶³ Beryllium is suitable for electrical and electronic equipment, such as computers. It is commonly found on mother-boards, springs, relays and connections.⁶⁴ The primary route of beryllium exposure is inhalation of beryllium dust, fumes or mist, where

⁶¹ Agency for Toxic Substances & Disease Registry, US Department of Health & Human Services, *Toxicological Profile Information Sheet*, at <http://www.cdc.gov/exposurereport/?id=89&tid=22> (last visited July 18, 2010).

⁶² Silicon Valley Toxics Coalition, et al., *Poison PCs and Toxic TVs: California's Biggest Environmental Crisis That You've Never Heard Of*, at <http://www.svtc.org/site/DocServer/ppc-ttv1.pdf?docID=124> (last visited June 12, 2009).

⁶³ Greenpeace International, *Toxic Tech: The dangerous chemicals in electronic products*, at <http://www.greenpeace.org/international/PageFiles/24478/toxic-tech-chemicals-in-elec.pdf> (last visited April 12, 2009) [hereinafter Toxic Tech].

⁶⁴ Swiss State Secretariat for Economic Affairs, *E-waste Recycling in the Delhi Region: Excerpts of a Study-Report on the Assessment of e-Waste Handling in Developing Countries* 11, EMPA (2004).

beryllium and its compounds are processed or manufactured, and during the recycling of electrical and electronic equipment containing beryllium-copper alloys.⁶⁵ Workers can also carry beryllium dust from the workplace on their clothes and shoes, unwittingly exposing their family members to the harmful toxins.⁶⁶

Constant exposure to beryllium, even in small amounts, can develop Chronic Beryllium Disease (CBD), while breathing high concentrations of beryllium dust or fumes can result in acute beryllium disease (ABD).⁶⁷ Furthermore, beryllium has been classified as a human carcinogen as exposure to it can cause lung cancer.⁶⁸

3. Cadmium

Cadmium and its compounds are used in a number of applications in electronic products. It is found in chip resistors, infrared detectors, and semiconductors. Many laptop computers contain rechargeable nickel-cadmium (Ni-Cd) batteries. Cadmium compounds have also been used as stabilizers within PVC formulations, such as those used as wire insulation. Cadmium sulphide has also been used in older cathode ray tubes (CRTs) as a phosphor coating, a material used on the interior surface of the screen to produce light.

⁶⁵ *Id.*

⁶⁶ Toxic Tech, *supra* note 63.

⁶⁷ *Id.*

⁶⁸ Swiss State Secretariat for Economic Affairs, *supra* note 64, at 11.

Recycling operations, such as breaking of CRT glass, may release cadmium to the environment and put workers at risk.⁶⁹ Cadmium is persistent, bioaccumulative, and toxic. Its compounds pose not only short term problems but the possible risk of irreversible effects on human body, particularly the kidneys.⁷⁰

4. Brominated Flame Retardants (BFRs)

Brominated Flame Retardants are a diverse group of organobromine compounds, which are used to inhibit ignition, slow the rate of combustion, and prevent flammability.⁷¹ They are primarily found on printed circuit boards, plastic covers of computers and televisions, as well as cables.⁷² Commonly used BFRs include polybrominated diphenyl ethers (PBDEs), hexabromocyclododecane (HBCD) and tetrabromobisphenol A (TBBPA), as well as brominated polymeric and oligomeric materials.⁷³ These BFRs are highly resistant to degradation in the environment and are bioaccumulative in humans and animals.⁷⁴ TBBPA is used as a reactive component, being chemically bound to the plastic, whereas PBDEs and HBCD are used as additives, blended with plastic and therefore can be released from

⁶⁹ OECD (2003) Technical guidance for the environmentally sound management of specific waste streams: used and scrap personal computers. Organisation for Economic Cooperation and Development (OECD) Working Group on Waste Prevention and Recycling. ENV/EPOC/WGWPR(2001)3/FINAL.

⁷⁰ Swiss State Secretariat for Economic Affairs, *supra* note 64, at 10.

⁷¹ Greenpeace International, *Why BFRs and PVC should be phased out of electronic devices*, at <http://www.greenpeace.org/international/campaigns/toxics/electronics/what-s-in-electronic-devices/bfr-pvc-toxic#>. (last visited February 3, 2010)

⁷² Swiss State Secretariat for Economic Affairs, *supra* note 64, at 11.

⁷³ *Id.*

⁷⁴ GreenPeace International, *supra* note 71.

such products during use, leading to their presence in indoor air and household dust and resulting in increased human exposure.⁷⁵

Chronic exposure to PBDEs has been shown to interfere with brain and skeletal development, which may lead to permanent neurological effects such as impaired learning and memory functions.⁷⁶ BFRs may increase cancer risk to the digestive and lymph systems. It can also affect hormone systems; metabolites of PBDEs and TBBPA can interfere with thyroid hormones with possible effects on growth and development.⁷⁷

5. Mercury

Mercury is found in the lamps that light flat screen displays.⁷⁸ It can also be found in thermostats, position sensors, relays and switches, discharge lamps, circuit boards, and batteries.⁷⁹ Mercury is released during the dismantling of equipment, including incineration and landfill.⁸⁰ Incineration releases mercury into the

⁷⁵ GreenPeace International, *supra* note 71.

⁷⁶ Toxic Tech, *supra* note 63.

⁷⁷ *Id.*

⁷⁸ OECD, *supra* note 69.

⁷⁹ *Id.*

⁸⁰ Toxic Tech, *supra* note 63.

atmosphere, where it travels globally and impacts populations far from the source of its release.⁸¹

Inhalation of high levels of mercury may impact the central nervous system (CNS), while long-term exposure to lower levels of mercury can cause deleterious effects to the central nervous system and can cause kidney damage.⁸² When mercury is released into bodies of water, it is transformed in the sediment to methylated mercury, a highly toxic form of mercury that can progressively grow in concentration to high levels circulating throughout the food chain, primarily transmitted in fish.⁸³ This form of mercury can accumulate in the body and damage the brain and nervous system. Methylated mercury can readily pass through the placental barrier and the blood-brain barrier, and can have adverse effects on the developing brain and central nervous system in fetuses and children.⁸⁴

6. Hexavalent Chromium or Chromium VI

Hexavalent Chromium is a chemical form of the metal chromium, used to protect against corrosion of untreated and galvanized steel plates and as a decorative

⁸¹ *Id.*

⁸² Robert A. Goyer, *Lead Toxicity: Current Concerns*, 100 *Environmental Health Perspectives*, 177-187 (1993).

⁸³ *Id.*

⁸⁴ *Id.*

or hardener for steel housings.⁸⁵ It is more active and soluble in water than other forms of chromium, which makes it more mobile in the environment.⁸⁶

Hexavalent chromium exposure occurs through breathing, ingesting from food and water, or through direct contact with skin.⁸⁷ Chromium VI is highly toxic even at low concentrations, and in some cases carcinogenic.⁸⁸ An increased risk of lung cancer has been demonstrated in workers exposed to Cr(VI) compounds.⁸⁹ Other adverse health effects include dermal irritation, occupational asthma, nasal and sinus cancers, kidney and liver damage, skin and eye irritation and ulceration.⁹⁰ Chromium VI has been reported to damage DNA, kidney and liver, and has been linked to asthmatic bronchitis.⁹¹

⁸⁵ Swiss State Secretariat for Economic Affairs, *supra* note 64, at 10.

⁸⁶ Toxic Tech, *supra* note 63.

⁸⁷ National Toxicology Program, Hexavalent Chromium, <http://ntp.niehs.nih.gov/files/NTPHexaVChrmFactR5.pdf> (last visited February 5, 2010).

⁸⁸ Toxic Tech, *supra* note 63.

⁸⁹ Centers for Disease Control and Prevention, The National Institute for Occupational Safety and Health, *Workplace Safety and Health Topics: Hexavalent Chromium*, at <http://www.cdc.gov/niosh/topics/hexchrom/> (last visited February 5, 2010).

⁹⁰ National Toxicology Program, *supra* note 87.

⁹¹ Toxic Tech, *supra* note 63.

7. Plastic and Polyvinyl Chloride (PVC)

An average computer contains 13.8 pounds of plastics.⁹² The largest volume of plastics used in electronic products is polyvinyl chloride or PVC. PVC is a chlorinated plastic used for its fire-retardant properties.⁹³ It is mainly found in cables and computer housings. Since PVC contains more than 50% of chlorine, dioxins and furans can be formed when PVC is burned within a certain temperature range.⁹⁴ These chemicals are highly persistent in the environment and are toxic at very low concentrations.⁹⁵ Dioxin is known as a human carcinogen, a reproductive toxin or a hormone disrupter.⁹⁶ PVC requires many different additives, stabilizers, and softeners to be functional. These toxic substances also call for a separate collection to prevent them from contaminating other plastics in the recycling process.⁹⁷ With the high collection and separation costs, PVC typically ends up in landfill or being incinerated, where it poses the risk of releasing hazardous leachate and dioxins.⁹⁸

⁹² Swiss State Secretariat for Economic Affairs, *supra* note 64, at 11.

⁹³ Exporting Harm Report, *supra* note 23, at 9.

⁹⁴ *Id.*

⁹⁵ *Id.*

⁹⁶ Beverly Thorpe et al., *Extended Producer Responsibility: A Waste Management Strategy that Cuts Waste, Creates a Cleaner Environment and Saves Taxpayers Money*, Clean Production Action 9, (2004).

⁹⁷ US Environmental Protection Agency, *Wastes & Materials: eCycling*, at <http://www.epa.gov/epawaste/conserva/materials/ecycling/index.htm> (last visited July 19, 2010).

⁹⁸ *Id.*

B. Valuable and Precious Materials

Other than the high volume of toxic substances contained in waste electronics, another unique characteristic of this type of waste is the amount of valuable metal and precious materials that can be recycled, such as copper, steel, aluminum, silver, gold, and palladium. Metals don't get destroyed and can be used indefinitely.⁹⁹ The bulky computers with big monitors may contain two and a half to over four pounds of copper.¹⁰⁰ To put the desktop computer's copper contents in a larger industrial perspective, electrical and electronics products account for about 25 percent of the copper consumed annually worldwide.¹⁰¹ Copper and gold are both 100 percent recyclable. The amount of valuable metal and precious materials that can be recovered from e-waste creates another type of business — e-waste recycling. However, improper recycling practices also pose a concern with respect to environmental damage and workers' health and safety.

⁹⁹ GROSSMAN, *supra* note 50, at 22.

¹⁰⁰ *Id.* at 23.

¹⁰¹ *Id.*

Table 2: Composition of a Desktop Personal Computer¹⁰²

Material name	Content (% of total weight)	Weight of material in computer (kg)	Use	Location
Plastics	22.9907	6.26	Insulation	Cable, Housing
Lead	6.2988	1.72	Metal joining	Funnel glass in CRTs, PWB
Aluminum	14.1723	3.86	Structural, Conductivity	Housing, CRT, PWB, connectors
Germanium	0.0016	< 0.1	Semiconductor	PWBs
Gallium	0.0013	< 0.1	Semiconductor	PWBs
Iron	20.4712	5.58	Structural, Magnetivity	Housing, CRTs, PWBs
Tin	1.0078	0.27	Metal joining	PWBs, CRTs
Copper	6.9287	1.91	Conductivity	CRTs, PWBs, connectors
Barium	0.0315	< 0.1	Â	Panel glass in CRTs
Nickel	0.8503	0.23	Structural, Magnetivity	Housing, CRT, PWB
Zinc	2.2046	0.6	Battery, Phosphor emitter	PWB, CRT
Tantalum	0.0157	< 0.1	Capacitor	Capacitors/PWB, power supply
Indium	0.0016	< 0.1	Transistor, rectifier	PWB
Vanadium	0.0002	< 0.1	Red Phosphor emitter	CRT
Terbium	0	0	Green phosphor activator, dopant	CRT, PWB
Beryllium	0.0157	< 0.1	Thermal Conductivity	PWB, connectors
Gold	0.0016	< 0.1	Connectivity, Conductivity	Connectivity, conductivity/PWB, connectors
Europium	0.0002	< 0.1	Phosphor activator	PWB
Titanium	0.0157	< 0.1	Pigment, alloying agent	Housing
Ruthenium	0.0016	< 0.1	Resistive circuit	PWB
Cobalt	0.0157	< 0.1	Structural, Magnetivity	Housing, CRT, PWB
Palladium	0.0003	< 0.1	Connectivity, Conductivity	PWB, connectors
Manganese	0.0315	< 0.1	Structural, Magnetivity	Housing, CRT, PWB
Silver	0.0189	< 0.1	Conductivity	Conductivity/PWB, connectors
Antimony	0.0094	< 0.1	Diodes	Housing, PWB, CRT
Bismuth	0.0063	< 0.1	Wetting agent in thick film	PWB
Chromium	0.0063	< 0.1	Decorative, Hardner	Housing
Cadmium	0.0094	< 0.1	Battery, blue-green Phosphor emitter	Housing, PWB, CRT
Selenium	0.0016	0.00044	Rectifiers	rectifiers/PWB
Niobium	0.0002	< 0.1	Welding	Housing
Yttrium	0.0002	< 0.1	Red Phosphor emitter	CRT
Rhodium	0	Â	Thick film conductor	PWB
Platinum	0	Â	Thick film conductor	PWB
Mercury	0.0022	< 0.1	Batteries, switches	Housing, PWB
Arsenic	0.0013	< 0.1	Doping agent in transistors	PWB
Silica	24.8803	6.8	Glass, solid state devices	CRT, PWB

Source: Microelectronics and Computer Technology Corporation (MCC). 1996. Electronics Industry Environmental Roadmap. Austin, TX: MCC.

¹⁰² Based on a typical desktop computer, weighing ~70 lbs.

The above table presents the composition of a desktop computer plus a CRT screen in 1996. More than 80% of the weight consists of silica (glass), plastics, iron and aluminum. Precious and scarce materials account for only a small percentage of the total weight. Nevertheless, the concentration of such metals, e.g., gold, is higher in a desktop computer than found in naturally occurring mineral ore.

V. E-waste management

Until recently, there was little distinction between electrical and electronic waste and any other form of municipal waste. E-waste disposal methods were, in large part, the same as other municipal waste disposal methods. These methods include storage, landfill, incineration, reuse, recycle, and recovery.

A. Storage

For most electrical and electronic equipment consumers, both large and small, storage is the first step in the e-waste disposal chain. Often an electronic gadget is replaced by a newer model, but not because the old one stopped functioning, but because the newer one has more advanced functions, design and/or aesthetics. In the United States, the cost associated with safely and legally recycling may outweigh the revenue received from recycled commodities. Recyclers typically charge households and business for this service. Oftentimes consumers choose to store the waste temporarily or even indefinitely because the cost to get rid of such waste is high.

B. Landfill

The dumping of waste in the ground or landfill is the cheapest method of waste disposal. In 2007, the US generated a total of 3 million tons of electronic waste. 86.4% was trashed in landfill and only 13.6% was recycled.¹⁰³ Toxic chemicals in electronics products can leach into the land over time or are released into the atmosphere, impacting nearby communities and the environment. In many European countries, regulations have been introduced to prevent electronic waste being dumped in landfills due to its hazardous content. However, the practice still continues in many countries. In Hong Kong, for example, it is estimated that 10-20 percent of discarded computers go to a landfill.

Where there is no separate collection and recycling system for e-waste, landfill is very common. Landfills, though widely used for waste disposal, are prone to leaking, and e-waste disposed of in landfills can leach heavy metals and other toxins into the soil, and more dangerously contaminate the water table.¹⁰⁴ Besides leaching, vaporization is also of concern in landfills. Disposal of computers in landfills poses environmental hazards when toxic chemicals, such as lead and cadmium, leach into soil and groundwater. However, the disposal of certain types of e-waste in landfills, such as CRTs, is banned in many places.

¹⁰³ US EPA, *Municipal Solid Waste in the United States, 2007 Facts and Figures*, November 2008, at <http://www.epa.gov/osw/nonhaz/municipal/pubs/msw07-rpt.pdf> (last visited July 22, 2010).

¹⁰⁴ Sustainable Consumption & Production Branch, UNEP, *supra* note 55.

C. Incineration

Incineration is the process of burning hazardous materials in electronic waste to destroy harmful chemicals. Incineration also reduces the amount of material that must be disposed of in a landfill.¹⁰⁵ An incinerator is a type of furnace that burns material at a controlled temperature, which is high enough to destroy harmful chemicals.¹⁰⁶ A properly designed and operated incinerator can drastically reduce, through flame combustion, the toxic organic constituents in hazardous waste and the volume of the waste fed to them.¹⁰⁷ Although it destroys a range of chemicals, such as PCBs, solvents and pesticides, incineration does not destroy metals.¹⁰⁸ Since metals will not combust, incineration is not an effective method for treating metal-bearing hazardous wastes, such as electronic wastes.¹⁰⁹ Moreover, if the waste is not sorted or segregated prior to incineration, the output from the combustion process is often toxic stack emissions and residual ash containing heavy-metals, which require a secondary form of disposal.¹¹⁰

¹⁰⁵ Michael R. Harpring, Comment, *Out Like Yesterday's Garbage: Municipal Solid Waste and the Need for Congressional Action*, 40 *CATH. U. L. REV.* 851, 857(1991).

¹⁰⁶ Office of Solid Waste and Emergency Response, US Environmental Protection Agency, *A Citizen's Guide to Incineration*, at <http://www.epa.gov/swertio1/download/citizens/incineration.pdf> (last visited July 18, 2010).

¹⁰⁷ *Id.*

¹⁰⁸ US Environmental Protection Agency, *Hazardous Waste – Treatment and Disposal: Combustion*, at <http://www.epa.gov/wastes/hazard/tsd/td/combustion.htm> (last visited July 18, 2010).

¹⁰⁹ *Id.*

¹¹⁰ Arnold W. Reitze, Jr. & Andrew N. Davis, *Reconsidering Ocean Incineration as Part of a U.S. Hazardous Waste Management Program: Separating the Rhetoric From the Reality*, 17 *B.C. ENVTL. AFF. L. REV.* 687, 714 (1990).

The most basic form of incineration is to just burn waste, reducing the volume and producing an inert ash which could be sent to landfill.¹¹¹ A more advanced technique incinerator allows an energy recovery. Energy from Waste (EFW) and Refuse Derived Fuel (RDF) are now being considered as sources of renewable energy.¹¹² Incineration is also used for metal recovery operations, especially copper from wires. However, incorrect recovery processes commonly practiced in developing countries expose both workers and the environment to toxic emissions.¹¹³ The copper recovery process in developing countries starts when cables and wires are manually stripped or shredded and separated into insulation (PVC) and conductors (copper).¹¹⁴ The cables are then burned in an open fire, where not only copper is extracted, but highly toxic dioxins and furans are also released into the air and soil.¹¹⁵ Finally, the resulting copper is smelted in small furnaces without any environmental safety measures.¹¹⁶ A number of substances produced by the incineration process have a direct effect on human health, such as brominated and chlorinated dioxin,

¹¹¹ IAN HOLMES, ISSUES IN ENVIRONMENTAL SCIENCE AND TECHNOLOGY 82 (R.E. Hester & R.M. Harrison ed., the Royal Society of Chemistry 2009).

¹¹² *Id.* at 83.

¹¹³ Exporting Harm Report, *supra* note 23, at 17.

¹¹⁴ Sustainable Consumption & Production Branch, UNEP, *supra* note 57.

¹¹⁵ *Id.*

¹¹⁶ *Id.*

which is carcinogenic.¹¹⁷ Others have an effect to the local and global environment, such as hydrocarbon ashes, sulfur, and nitrogen, causing acid rain.¹¹⁸

D. Donation and Reuse

Donations and reuse extend the life of an appliance, and is a shift in ownership, rather than final disposal. Donations are frequently made to charitable institutions or to economically weaker sections of society. There are some charitable institutions that collect discarded equipment, especially TVs, PCs and cell phones for donations to developing and low-income countries in Asia and Africa. However, this practice is hotly debated as ‘dumping’ of e-waste from rich to poor countries, saddling them with the burden of safe disposal.¹¹⁹ Because a certain amount of electrical and electronic equipment (EEE) that is discarded by its original owners is still in working condition, reuse of EEE is a common intermediate step that extends its usable life. Often, intermediaries provide channels for reuse, such as second-hand equipment sellers, or online auction sites.¹²⁰

¹¹⁷ Exporting Harm Report, *supra* note 23, at 26.

¹¹⁸ *Id.*

¹¹⁹ Sustainable Consumption & Production Branch, UNEP, *supra* note 57.

¹²⁰ *Id.*

E. Recycling and Resource Recovery

E-waste recycling can include several activities, such as dismantling, sorting and segregation, remanufacturing and recovery operations. These processes can be done mechanically as well as manually. The recycling of e-waste is gaining importance considering the precious metals it contains. In the 1990s, some European countries banned the disposal of e-waste in landfills. This created an e-waste processing industry in Europe. Recycling of computers and their components, when properly implemented, represents the safest and most cost-effective strategy.¹²¹ The process of recycling by removing and treating hazardous components conserves natural resources, reduces environmental and public health hazards, protects workers safety, and reduces the high cost of permanently storing and disposing of hazardous waste in permitted hazardous waste facilities.¹²² Moreover, precious metals and other materials contained in these discarded electronics after being cleaned and sorted have high values in the recycling market.¹²³

Although electronic products contain valuable metals and precious materials, it is not profitable to recycle these products in the developed countries. In the United States, the hazardous chemicals in e-waste make recyclers subject to the Resource

¹²¹ Poison PCs, *supra* note 59.

¹²² *Id.*

¹²³ *Id.*

Conservation and Recovery Act¹²⁴, which draws very strict environmental guidelines with regards to treating, storing, transporting, and disposing of e-waste. The problem with recycling is the lack of collection incentives and the newly emerging recycling infrastructure, as well as the high costs of material collection, handling, and processing.¹²⁵ In the absence of suitable techniques and protective measures, recycling e-waste can result in toxic emissions to the air, water and soil and pose a serious health and environmental threat.¹²⁶ Incorrect recycling processes such as open-air incineration and acid leaching are commonly used to recover precious metals.¹²⁷ Due to halogenated substances found in plastics, both dioxins and furans are generated as a consequence of recycling from e-waste.¹²⁸

VI. Conclusion

Given some of the challenges posed as a result of the particular characteristics of electronic products outlined above, the central issue in terms of e-waste is that it needs a specialized way of handling and managing disposal in order to prevent environmental and human health hazards. The cost to properly manage and dispose or recycle the electronic waste is often very high and the so-called recycler in industrialized countries ends up not making any profit. An e-waste trade thus

¹²⁴ Resource Conservation and Recovery Act (RCRA), 42 U.S.C. §§ 6901-6992k, ELR STAT. RCRA §§ 1001-11011.

¹²⁵ *Id.*

¹²⁶ Sustainable Consumption & Production Branch, UNEP, *supra* note 57.

¹²⁷ *Id.*

¹²⁸ *Id.*

emerged through the path of least resistance. Instead of recycling the material themselves, the recycling company would rather ship it to developing countries where they can find cheaper labor, less stringent environmental regulations, and lower public awareness of the dangers involved. The developing countries are sometimes willing to accept e-waste either in exchange for money to gain revenue or for cheaper raw materials extractable from e-waste, or both. However, e-waste trade creates a bigger problem because the developing countries lack the knowledge and proper facilities to dispose of the waste or to extract such elements, leading to environmental and human risks. It is a conflict between human rights and environmental protection and economic development.

The movement of e-waste between countries without any appropriate control or regulation raises serious concerns over human health and environmental harm. Such ethical concerns have been taken up in the last thirty years by legal instruments of the international community. Chapter II will discuss the history and the development of environmental issues at an international level. The creation of international environmental law relating to e-waste, its legal effect, and the proliferation of many pertinent actors in international community have all played a crucial role to the attempt to respond to this growing problem.

CHAPTER II

INTERNATIONAL ENVIRONMENTAL LAW

I. Introduction

Chapter I outlined the emerging issues regarding the transportation of electronic waste to nation States without proper control and management – a problem, which in turn poses great human health risks and inevitable environmental degradation. Such health and environmental hazards not only occur within States, but also become a transnational problem with the movement of e-waste from one nation to another. Domestic law generally regulates individuals, corporations, and the government while international law applies primarily to the States themselves.¹²⁹ State actors are the creators, implementers, and enforcers of international law.¹³⁰ However, non-State actors, such as international organizations and non-governmental organizations (NGOs), have also become increasingly involved in the development of international law.¹³¹ Various branches of the United Nations – such as the United Nations Environmental Programme (UNEP) – initiate and draft agreements, issue

¹²⁹ JOHNSTON, ET AL, LEGAL PROTECTION OF THE ENVIRONMENT 748, (Thomson/West, 2nd ed, 2007) (2005).

¹³⁰ *Id.*

¹³¹ *Id.* at 749.

guidelines and directives also provide support for the implementation of environmental policy.¹³²

This chapter seeks to provide a background in international environmental law in order to explore, in the next chapter, one of the most important existing international laws governing the transboundary movement of hazardous waste including e-waste, namely, the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal.¹³³

This chapter begins with a brief history of how international laws are made, who are the subjects of international law, and how international environmental law has evolved over time. It is important to note that international environmental law is not a separate or self-contained field of law but merely part of well-established rules, principles, and processes of general international law geared toward the resolution of international environmental problems and disputes.¹³⁴ In other words, international environmental law is the application of international law to environmental problems. The rules of international environmental law are reflected in treaties, binding acts of international organizations, state practice, and soft law commitments.

¹³² UNEP, *About UNEP: The Organization*, at <http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=43> (last visited March 23, 2010).

¹³³ Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, Mar. 22, 1989, S. Treaty Doc. No. 5 (1991), 28 *I.L.M.* 657 (entered into force May 5, 1992) [hereinafter Basel Convention].

¹³⁴ P.W. BIRNIE & A.E. BOYLE, *INTERNATIONAL LAW AND THE ENVIRONMENT* 79 (2d ed., Oxford Univ. Press 2002) (2001).

II. Sources of International Law and the Law-Making Process

As mentioned earlier, international environmental law is merely a branch of international law. Thus, it is crucial to understand the sources and progress of international law-making process in order to assess how far the issue of environmental protection has evolved in such process. The first section begins with the traditional sources of international law (or sometimes referred to as “hard law”) and follows by a further discussion of the non-traditional sources of international law or “soft law.”

A. Traditional Sources of International Law or “Hard Law”

Article 38(1) of the International Court of Justice (ICJ) Statute defines four traditional sources of law that the Court shall apply to a particular case submitted to it. The ICJ is the principle judicial organ of the United Nation (UN) system, composed of 15 judges, elected to nine-year terms of office by the United Nation General Assembly and the Security Council.¹³⁵ The Court acts as both a legal advisory body as well as a court for the settlement of dispute.¹³⁶

¹³⁵ International Court of Justice, *The Court*, at <http://www.icj-cij.org/court/index.php?p1=1&PHPSESSID=848f1aa579205ea55b3f81802840abf8> (last visited January 23, 2010).

¹³⁶ *Id.*

Article 38(1)¹³⁷ of the ICJ Statute provisions refer to four traditional sources of international law (or “Hard Law”), which are treaty, custom, general principles of law, and judicial decisions and the teaching of publicists.

The first three sources – treaty, custom, and the general principles of law – create legal obligations for States that have explicitly or implicitly consented. The fourth source – judicial decisions and the teachings of publicists – serves as a secondary means of discovering what the law is, and therefore does not create binding obligations for States.

1. Treaty

Treaties have been one of the main and most frequent methods of creating binding international rules relating to the environment because States’ consent to be bound by those rules is clearly expressed. The definition of a treaty can be employed from the 1969 Vienna Convention on the Law of Treaties,¹³⁸ which is widely

¹³⁷ Article 38(1) of the ICJ Statute states

1. The Court, whose function is to decide in accordance with international law such disputes as are submitted to it, shall apply:

- a. international conventions, whether general or particular, establishing rules expressly recognized by the contesting states;
- b. international custom, as evidence of a general practice accepted as law;
- c. the general principles of law recognized by civilized nations;
- d. subject to the provisions of Article 59, judicial decisions and the teachings of the most highly qualified publicists of the various nations, as subsidiary means for the determination of rules of law.

¹³⁸ Vienna Convention on the Law of Treaties, May 23, 1969, 8 I.L.M. 689 (entered into force on January, 27 1980) [hereinafter the “Vienna Convention”].

accepted as a codification of existing customary international law.¹³⁹ Article 2.1(a) of the Vienna Convention defines a “treaty” as “an international agreement concluded between States in written form and governed by international law, whether embodied in a single instrument or in two or more related instruments and whatever its particular designation.”¹⁴⁰ The instrument need not be called a treaty. The alternatives include agreement, convention, pact, act, protocol, and covenant, etc. The Vienna Convention governs major aspects of treaties, including negotiation, conclusion, enter into force, interpretation, reservation, amendment, termination, and invalidity. The basic steps of the treaty-making process begin with an identification of needs and goals, a negotiation, an adoption and signature, ratification and accession, and the entry into force.

Most treaties are much like contracts, creating legal obligations only for the parties involved in the negotiations. Some treaties, particularly multilateral treaties, may codify or develop the crystallization of customary international law and bind other States that did not participate in the negotiation process.¹⁴¹ For example, the Vienna Convention on the Law of Treaties is regarded as a partial codification of the customary international law governing international agreements. The 1982 UN

¹³⁹ International Court of Justice, *The Gabčíkovo-Nagymaros Project (Hungary/Slovakia)*, Judgment, I.C.J. Reports 1997, p. 7 (the Court observed: “[The Court] needs only to be mindful of the fact that it has several times had occasion to hold that some of the rules laid down in that Convention might be considered as a codification of existing customary law”).

¹⁴⁰ Vienna Convention, *supra* note 138, art.2.

¹⁴¹ BIRNIE & BOYLE, *supra* note 134, at 13.

Convention on the Law of the Sea has influenced the development of customary law on the protection of the marine environment and conservation of fisheries.

Although States can freely negotiate the scope, form, and subject matter of treaties, the Vienna Convention has introduced the concept of *jus cogens* - peremptory norm of international law – which denotes the grounds that invalidate any treaty conflicting with the peremptory norm or norm accepted and recognized by the international community of States as a whole.¹⁴² In other words, no State can, by treaty, opt out of their obligations under peremptory norm.

2. Custom

Customary law can be described as a universal practice, which is carried out under the belief that it is required by law.¹⁴³ This source of international law was largely accepted before the number of independent States had grown to nearly 200 States with different cultures, interests, and legal systems, which makes it more difficult to identify a universal practice.¹⁴⁴ A rule of crystallized customary law is binding to all nations, regardless of whether those nations contributed to the formation of the custom. To prove that a custom exists, the Court must establish two constitutive elements of customs – State practice and *Opinio Juris*. State practice

¹⁴² Vienna Convention, *supra* note 138, art.53.

¹⁴³ BIRNIE & BOYLE, *supra* note 134, at 16.

¹⁴⁴ DAVID HUNTER ET AL., INTERNATIONAL ENVIRONMENTAL LAW AND POLICY 314, (3d ed. Foundation Press 2007) (1998).

shall be both extensive and virtually uniform and include those States that are particularly affected by the proposed norm.¹⁴⁵ *Opinio Juris* is a sense of legal obligation, not merely of comity or moral obligation.¹⁴⁶

3. General Principles of International Law

Another source of international law recognized by Article 38(1) of the ICJ Statute is the “General principles of law recognized by civilized nations.” These principles are general in the sense that they are potentially applicable to all members of the international community and to the range of activities that such members carry out or authorize in respect to all aspects of environmental law.¹⁴⁷

There are two different approaches to the scope of the general principles. One approach refers to the principles commonly applied to the municipal legal systems of all or most States, such as *res judicata* or *estoppel*, as long as those principles are applicable to relations of all or most States.¹⁴⁸ In this sense, the general principles are applied when there are gaps in international law that have not been filled by treaty or custom.¹⁴⁹ In practice, the Court or tribunals employ elements of legal concepts and

¹⁴⁵ *Id.* at 315.

¹⁴⁶ *Id.*

¹⁴⁷ PHILIPPE SANDS QC, *PRINCIPLES OF INTERNATIONAL ENVIRONMENTAL LAW* 231 (2d ed. Cambridge University Press 2003) (1994).

¹⁴⁸ BIRNIE & BOYLE, *supra* note 134, at 19.

¹⁴⁹ HUNTER ET AL., *supra* note 144, at 318.

private law analogies, rather than details in practice of domestic courts in order to support their conclusions.¹⁵⁰ Another approach refers to principles recognized by international law itself, such as the prohibition on the non-use of force, the freedom of the seas, the need for good faith in the maxim *pacta sunt servanda*, etc.¹⁵¹

4. Judicial Decisions and the Writings of publicists

Judicial decisions and the writings of publicists are listed as subsidiary means for determining international law. The role of the Court is not to make law but to identify and apply it, which clearly provides authoritative evidence of what the law is.¹⁵² On many occasions, the Court and tribunals are faced with the task of interpreting international obligations. The Court jurisprudence as well as the awards of international arbitral tribunals have contributed to the development of international law.¹⁵³

The works and opinions of some writers have been referred to in the ICJ and other tribunals including municipal courts, or cited by law officers and counsel preparing opinions.¹⁵⁴ For example, the Trail Smelter case¹⁵⁵ was influenced by

¹⁵⁰ BIRNIE & BOYLE, *supra* note 134, at 19-20.

¹⁵¹ *Id.* at 19.

¹⁵² *Id.* at 21.

¹⁵³ SANDS, *supra* note 147, at 153.

¹⁵⁴ BIRNIE & BOYLE, *supra* note 134, at 21.

Professor Eagleton's writings.¹⁵⁶ Aside from an individual's writings, reports of international organizations are also much quoted and relied upon as subsidiary means for the determination of rules of law. These include the reports and articles drafted by the International Law Commission, and the reports and resolutions of the Institute of International Law, the International Law Association, and the World Commission on Environment and Development.¹⁵⁷

B. Non-Traditional Sources: "Soft Law"

"Soft Law" is an innovation in international lawmaking, described as a flexible process for States to develop and build consensus around legal norms before they become binding upon the international community.¹⁵⁸ It is a highly contradictory term because what distinguishes "law" from other social rules is that it is both authoritative and prescriptive, therefore binding, whereas soft law has no legal

¹⁵⁵ The dispute arose as a result of damage occurring in the territory of the United States due to activity of a smelter situated in Canada. The damage arose from sulphur dioxide fumes which were emitted from the smelter. It was claimed that the height of stacks increased the area of damage in the US. In 1927, the US proposed that the matter be referred to the International Joint Commission for investigation. Its report was presented in 1931 determining a compensation sum. Two years after this report, the US indicated to Canada that damage was still occurring and both parties resorted to a tribunal as agreed under the Convention for settlement of difficulties arising from operation of smelter at Trail, British Columbia. The Tribunal cited Professor Eagleton's writings from "Responsibility of States in International Law, 1928" which reads "A State owes at all times a duty to protect other States against injurious acts by individuals from within its jurisdiction." The Tribunal held that no State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or persons therein, when the case is of serious consequence and the injury is established by clear and convincing evidence. Therefore, Canada was responsible in international law for the conduct of the Trail Smelter. Accordingly the Trail smelter would be required to refrain from causing any damage through fumes in the US

¹⁵⁶ SANDS, *supra* note 147, at 153.

¹⁵⁷ BIRNIE & BOYLE, *supra* note 134, at 21.

¹⁵⁸ HUNTER ET AL., *supra* note 144, at 353.

binding obligation.¹⁵⁹ Although soft law is not yet law, it provides objectives and guidelines, which may contribute to the future development of customary international law into hard law as well as influences the interpretation of international law.¹⁶⁰

Examples of soft law sources include the declaration, directives, resolutions, and recommendations adopted by the Governing Council of United Nations Environment Programme (UNEP) (such as the Stockholm Declaration). Non-State actors (such as non-governmental organizations (NGOs) and branches of United Nations) play an important role in the development of soft law by promoting certain principles. The repetition and extensive acceptance of a principle may result in the eventual codification of the principle in a binding instrument or the acceptance of the principle into customary law.¹⁶¹

¹⁵⁹ *Id.*

¹⁶⁰ SANDS, *supra* note 147, at 140.

¹⁶¹ JOHNSON ET AL., *supra* note 129, at 751.

III. Subjects of International Environmental Law: States, International Organizations, and Non-State Actors¹⁶²

International law consists of the normative rules created to regulate the interaction of different actors in the international community. The actors or subjects of international law are persons or entities endowed with international rights and duties under international law.¹⁶³ These international legal persons have also been influential in the law-making process from the negotiation, implementation, and enforcement of international environmental law.¹⁶⁴ Whether a person or an entity is a subject in regard to international law determines its roles and functions in the international society. Each of the actor's roles is based upon the international legal personality and obligations granted by the general international law as well as the rules established by particular treaties.¹⁶⁵ For example, subjects of international law have the ability to enter into international agreements, the right to make claims for breaches of international law, the right to be a membership or participate in international bodies, and the enjoyment of privileges and immunities from national

¹⁶² This dissertation provides general explanation on the Subjects of International Law. For in-depth discussion, see CHRISTIAN N. OKEKE, *CONTROVERSIAL SUBJECTS OF CONTEMPORARY INTERNATIONAL LAW*, (Rotterdam University Press, 1974) and CHRISTIAN N. OKEKE, *THE EXPANSION OF NEW SUBJECTS OF CONTEMPORARY INTERNATIONAL LAW THROUGH THEIR TREATY-MAKING CAPACITY*, (Rotterdam University Press, 1973).

¹⁶³ LORI F. DAMROSCH ET AL., *INTERNATIONAL LAW: CASES AND MATERIALS* 249, (4TH ed. West Group 2001) (1980).

¹⁶⁴ SANDS, *supra* note 147, at 70.

¹⁶⁵ *Id.* at 71.

jurisdiction. The subjects of international law are divided into three general categories: States, international organizations, and non-State actors.

A. States

The existence of States is determined by two opposing theories— declaratory and constitutive theories. Under the declaratory theory, a State exists when it meets the conditions of statehood as set out in the international law. Article 1 of the 1993 Montevideo Convention on the Rights and Duties of States¹⁶⁶ reads

The State as a person of international law should possess the following qualifications:

- a) a permanent population;
- b) a defined territory;
- c) government; and
- d) capacity to enter into relations with the other States.

Even though this convention was only signed by the countries in North and South America, it was a codification of an existing customary international law and therefore applies to all subjects of international law.¹⁶⁷ According to this definition,

¹⁶⁶ Convention on Rights and Duties of States, Dec. 26, 1933, art. 1, 165 L.N.T.S. 19, 1934 WL 5129. (Montevideo Convention on the Rights and Duties of States)

¹⁶⁷ D.J. HARRIS, CASES AND MATERIALS ON INTERNATIONAL LAW 99 (6th ed. Sweet and Maxwell, London 2004) (1973).

Antarctica is not a State since it does not meet the permanent population requirement. Although there are a number of government permanently operated research stations with researchers working on the continent year round, there is no permanent population.

Article 3 of the Montevideo Convention states

The political existence of the state is independent of recognition by the other States. Even before recognition the State has the right to defend its integrity and independence, to provide for its conservation and prosperity, and consequently to organize itself as it sees fit, to legislate upon its interests, administer its services, and to define the jurisdiction and competence of its courts.

The exercise of these rights has no other limitation than the exercise of the rights of other States according to international law.

An entity that meets the criteria of statehood may exercise its rights and responsibilities with or without recognition by other States. However, the recognition of statehood by other States may affect an entity that does not possess all four qualifications of statehood. Under the constitutive theory, the act of recognition by other States confers international personality on an entity asserted to be a State and thus constitute new State.

The rights and duties of States¹⁶⁸ include the following:

- (a) sovereignty over its territory and general authority over its nationals;
- (b) status as a legal person, with capacity to own, acquire, and transfer property, to make contracts and enter into international agreements, to become a member of international organizations, and to pursue, and be subject to, legal remedies;
- (c) capacity to join with other States to make international law, as customary law or by international agreement.

States are the main actors in the international society. In many occasions, States would come together and create a group or an organization with mutual objectives, which establish requirements for participation and conditions for cooperation by member States.

B. International Organizations

International or intergovernmental organizations generally refer to organizations composed entirely or mainly of States and usually established by treaty.¹⁶⁹ The organizations provide resources in legal and technical expertise and create a diplomatic apparatus.¹⁷⁰ Being a member of an international organization

¹⁶⁸ Restatement (Third) §206

¹⁶⁹ DAMROSCH ET AL., *supra* note 163, at 359.

¹⁷⁰ BIRNIE & BOYLE, *supra* note 134, at 36.

helps build a stronger knowledge base for advanced technologies and provides an opportunity to help develop personnel training especially for developing countries.¹⁷¹ One of the main international organizations that greatly impacted the international system since its founding in 1945 after the World War II is the United Nations (UN), to which nearly all States in the world are members.¹⁷² The organization's objectives and purposes entail a wide range of issues. In addition to maintaining international peace and security, the UN, according to Article 1 of the United Nations Charter, also serves the purposes of achieving "international co-operation in solving international problems of an economic, social, cultural, or humanitarian character, and in promoting and encouraging respect for human rights."¹⁷³

The current work of the UN thus ranges from sustainable development, environment and refugee protection, disaster relief, counter terrorism, disarmament and non-proliferation, promoting democracy, human rights, gender equality and the advancement of women, governance, economic and social development and international health, clearing landmines, expanding food production, and more, in order to achieve its goals and coordinate efforts for a safer world for both present and future generations.¹⁷⁴

¹⁷¹ *Id.*

¹⁷² Currently, there are 192 Member States to the United Nations with Montenegro as the latest member admitted in 2006.

¹⁷³ U.N. Charter, art.1 para. 3.

¹⁷⁴ United Nations, *UN at a Glance*, at <http://www.un.org/en/aboutun/index.shtml> (last visited June 2, 2009).

The UN structure consists of principal bodies — a General Assembly, a Security Council, an Economic and Social Council, a Trusteeship Council, an International Court of Justice, and a Secretariat — and a growing number of agencies, programmes and subsidiary bodies.¹⁷⁵ The UN and its organs have played a significant role in international environmental law and policy.

1. United Nations Environment Programme (UNEP)

The United Nations Environmental Programme (UNEP) is the first and primary organ of the United Nations with an emphasis on environmental matters. It aims at the wise use and sustainable development of the global environment within United Nations system.¹⁷⁶ UNEP was created at the 1972 United Nations Conference on the Human and Environment by the UN General Assembly and reports directly to the General Assembly. UNEP's headquarter is located in Nairobi, Kenya, which gives the organization an advantage in understanding the environmental issues in developing countries. To ensure its global effectiveness, UNEP also supports offices in six different regions around the world, including Africa, Asia and the Pacific, Europe, Latin America and the Caribbean, North America, and West Asia.¹⁷⁷

¹⁷⁵ U.N. Charter art.7, para. 1-2.

¹⁷⁶ United Nations Environment Programme, *About UNEP*, available at <http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=43&ArticleID=3301&l=en> (last visited August 12, 2009).

¹⁷⁷ United Nations Environment Programme, *UNEP Offices*, available at <http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=296> (last visited August 12, 2009).

In cooperation with other UN entities, international organizations, and other non-state actors, UNEP's work centers in five major areas:

- 1) Environmental conditions assessment in national, regional, and global levels
- 2) International and national environmental instruments development
- 3) Institutions reinforcement for the wise management of the environment
- 4) Transfer of technology and knowledge for sustainable development
- 5) New partnerships and mind-sets within civil society and the private sector¹⁷⁸

UNEP hosted several environmental treaty negotiations, including the Paris Convention for the Prevention of Marine Pollution from Land-Based Sources, the Convention on International Trade in Endangered Species of Wild Fauna and Flora, the Convention on Biological Diversity, the Convention on Migratory Species, and a growing family of chemical-related agreements, including the Basel Convention on the Transboundary Movement of Hazardous Wastes and the recently negotiated Stockholm Convention on Persistent Organic Pollutants (POPs).¹⁷⁹

¹⁷⁸ United Nations Environment Programme, *supra* note 176.

¹⁷⁹ *Id.*

2. The Commission on Sustainable Development (CSD)

The United Nations Commission on Sustainable Development was created by the UN General Assembly after the 1992 United Nations Conference on Environment and Development (UNCED) or Earth Summit and reports directly to the Economic and Social Council. Its key functions, as stated in the UN General Assembly Resolution 47/191, are “to ensure effective follow-up to the Conference, as well as to enhance international cooperation and rationalize the intergovernmental decision-making capacity for the integration of environment and development issues and to examine the progress of the implementation of Agenda 21 at the national, regional and international levels, fully guided by the principles of the Rio Declaration on Environment and Development and all other aspects of the Conference, in order to achieve sustainable development in all countries.”¹⁸⁰ After the 2002 Johannesburg Conference on Sustainable Development or the World Summit on Sustainable Development (WSSD), the CDS continues its functions in providing policy guidance to follow up the Johannesburg Plan of Implementation at the local, national, regional and international levels.

3. The United Nations Development Programme (UNDP)

In addition to the UNEP and the CDS, the UN Development Programme, created in 1965 by the UN General Assembly and reports directly to the General

¹⁸⁰ G.A. Res. 47/191, ¶ 2, U.N. Doc A/RES/47/191 (Jan. 29, 1993).

Assembly. Its primary goals are serving as a principal channel to multilateral technical and investment assistance to developing countries, advocating the implementation of international policy on sustainable development, and helping countries build and share knowledge, experience, and resources in five major areas – democratic governance, poverty reduction, crisis prevention and recovery, environment and energy, and HIV/AIDS.¹⁸¹

With regard to the environment and energy matter, UNDP specifies six areas as its priority:

- Frameworks and strategies for sustainable development
- Effective water governance
- Access to sustainable energy services
- Sustainable land management to combat desertification and land degradation
- Conservation and sustainable use of biodiversity
- National and regional policy and planning to control emissions of ozone-depleting substances and persistent organic pollutants¹⁸²

¹⁸¹ United Nations Development Programme, *About UNDP*, available at <http://www.undp.org/about/> (last visited August 23, 2009).

¹⁸² United Nations Development Programme, *UNDP and Environment and Energy*, available at <http://www.undp.org/energyandenvironment/about.htm> (last visited August 23, 2009).

4. International Court of Justice (ICJ)

The international court of justice (ICJ) or the World Court is a principal judicial organ established under the UN Charters.¹⁸³ The roles and functions of the Court are prescribed in the Statute of the International Court of Justice.¹⁸⁴ The Court consists of 15 judges¹⁸⁵, who are elected from among persons of high moral character¹⁸⁶ by the UN General Assembly and by the Security Council¹⁸⁷ for terms of office of nine years¹⁸⁸. The Court's role is to settle, in accordance with international law, legal disputes submitted to it by States¹⁸⁹ and to give advisory opinions on legal questions referred to it by authorized United Nations organs and specialized agencies.¹⁹⁰

The ICJ, through its judgments and advisory opinions, has contributed tremendously to the development of international environmental law. For instance, in

¹⁸³ U.N. Charters art. 92.

¹⁸⁴ *Id.*

¹⁸⁵ Statute of the ICJ, art. 3.

¹⁸⁶ Statute of the ICJ, art. 2.

¹⁸⁷ Statute of the ICJ, art. 4 para. 1.

¹⁸⁸ Statute of the ICJ, art. 13 para. 1.

¹⁸⁹ Statute of the ICJ, art. 38 para. 1.

¹⁹⁰ U.N. Charter, art. 96

the *Corfu Channel case*¹⁹¹, the ICJ affirmed “the obligation of every State not to allow its territory to be used for acts contrary to the rights of other States.”¹⁹²

In the *Fisheries Jurisdiction Case*,¹⁹³ the ICJ laid down a State’s “duty to have due regard to the rights of other States and the needs of conservation for the benefits of all. Consequently, both parties have the obligation to keep under review the fishery resources in the disputed waters and to examine together, in the light of the scientific and other available information, the measures required for the conservation and development, and equitable exploitation, of those resources.”¹⁹⁴

¹⁹¹ On October 22, 1946, in the Corfu Strait, two British destroyers struck mines in Albanian waters and suffered damage, including serious loss of life. On May 22, 1947, the Government of the United Kingdom filed an Application instituting proceedings against the Government of the People’s Republic of Albania seeking a decision to the effect that the Albanian Government was internationally responsible for the consequences of the incident and must make reparation or pay compensation. Albania, for its part, had submitted a counter-claim against the United Kingdom for having violated Albanian territorial waters. On April 9, 1949, the Court found that Albania was responsible for the explosions and for the resulting damage and loss of human life suffered by the United Kingdom. The Court also found that the later minesweeping by the United Kingdom had violated Albanian sovereignty. On December 19, 1949, the Court ordered Albania to pay the United Kingdom a total compensation of £ 843, 947.

¹⁹² *Corfu Channel Case (U.K. v. Alb.)* (1949) ICJ Reports 4 at 22.

¹⁹³ In 1972, Iceland extended its exclusive fishing zone to fifty nautical miles, catalyzing disputes with the United Kingdom and the Federal Republic of Germany over access to fishing grounds. The disputes were submitted to the ICJ, which was thus presented with an opportunity to consider, inter alia, the issue of conservation and its relationship to traditional fisheries freedoms. The Court denied Iceland’s right to extend its exclusive fishery zone to fifty nautical miles from the baseline and held that Iceland could not unilaterally exclude vessels of the UK and Germany from the area within the fifty-nautical-mile limit from the baseline. The Court also held, however, that as Iceland was a State which was specially dependent on coastal fisheries it had certain preferential fishing rights in areas beyond its territorial sea; the UK and Germany had traditional fishing rights in those areas; an equitable solution required these two potentially conflicting rights to be reconciled; and for these reasons and for conservation needs, neither right was absolute.

¹⁹⁴ *Fisheries Jurisdiction cases (U.K. v. Ice.) (Merits)*, (1974) ICJ Reports 3; *(Federal Republic of Germany v. Iceland) (Merits)*, (1974) ICJ Reports 175.

In the *Gabcikovo-Nagymaros Project case*,¹⁹⁵ the Court held that “the Parties, in order to reconcile economic development with protection of the environment, should look afresh at the effects on the environment of the operation of the Gabcikovo power plant.”¹⁹⁶

In July 1996, the ICJ gave an advisory opinion on the *Legality of the Threat or Use of Nuclear Weapons*¹⁹⁷ that “while the existing international law relating to the protection and safeguarding of the environment does not specifically prohibit the use of nuclear weapons, it indicates important environmental factors that are properly to be taken into account in the context of the implementation of the principles and rules of the law applicable in armed conflict.”¹⁹⁸ Judge Bedjaoui¹⁹⁹, Judge Weeramantry²⁰⁰,

¹⁹⁵ On July 2, 1993, Hungary and Slovakia notified the ICJ that a Special Agreement existed between Hungary and Czechoslovakia regarding the implementation and the termination of the Budapest Treaty of September 16, 1977 on the Construction and Operation of the Gabčíkovo-Nagymaros System of Locks on the Danube. The Special Agreement identified Slovakia as the sole successor of the State of Czechoslovakia. In its Judgment of 1997, the Court asserted that Hungary was not entitled to suspend and subsequently abandon, in 1989, the Nagymaros project and the part of the Gabčíkovo project for which it was responsible, and that Czechoslovakia was entitled to proceed, in November 1991, with a “provisional solution” (damming up the Danube on Czechoslovak territory). The Court also stated that Czechoslovakia was not entitled to put into operation, from October 1992, the system of locks in question, and that Slovakia, as successor to Czechoslovakia, had become Party to the Treaty of September 16, 1977 as of 1 January 1993.

¹⁹⁶ Gabcikovo-Nagymaros Project (Hungary v. Slovakia), Judgment, 1. C. J. Reports 1997, p. 7

¹⁹⁷ On December 15, 1994, the UN General Assembly adopted resolution A/RES/49/75K. This asked the ICJ urgently to render its advisory opinion on the following question: Is the threat or use of nuclear weapons in any circumstances permitted under international law?

¹⁹⁸ Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, 1. C.J. Reports 1996, p. 226

¹⁹⁹ Judge Mohammed Bedjaoui (Algeria) was a member of the ICJ from 1982-2001.

²⁰⁰ Judge Christopher Gregory Weeramantry (Sri Lanka) was a member of the ICJ from 1991-2000.

and Judge Koroma²⁰¹ argued that the use of nuclear weapons not only caused death and destruction to human health but, of equal importance, was that it also damaged the environment and the environmental rights of future generations.

5. Administering Treaties: Conference of the Parties (CoPs), Secretariats, and Subsidiary Bodies

Most environmental treaties establish their own administrative, policy-making, and compliance system in order to assist and monitor the parties for the effective implementation of treaty obligations. The principal bodies are the conference of the parties and the secretariats. The subsidiary bodies (such as technical and expert working groups) may also be created to address specific issues under the treaty.

The Conference of the Parties (CoPs) is the governing body with the policy-making power for the treaty and generally is composed of representatives from all of the member States governments. CoPs usually meet every one or two years to review the treaty's effectiveness and carry out major activities of revising, amending, and implementing the treaty. They have the authority to set up subsidiary or additional institutions as required to accomplish the treaty's goals.

The secretariats are responsible for the administrative or the day-to-day operation of the treaty. The complete detailed tasks vary from one treaty to another.

²⁰¹ Judge Abdul G. Koroma (Sierra Leone) is a member of the ICJ since 6 February 1994 and re-elected as from 6 February 2003.

Common functions assigned to the secretariats include monitoring and reporting on treaty implementation, facilitating international co-operation and information exchange, promoting research pertinent to treaty's objectives, and serve as medium for communication among parties.²⁰²

The subsidiary bodies or committees are created to provide assistance to CoPs and the secretariats in any particular issues, such as developing detailed work plan for the implementation of the treaty, administering compliance mechanism to meet the treaty's obligations, and providing scientific, economic and social evaluation data. These organs usually meet several times a year to review and develop strategic plan as requested by the CoPs.

C. Non-State Actors: Non-governmental Organizations (NGOs) and Private Sectors

Under traditional view of public international law, only States have rights and duties to participate in the international affairs, while non-governmental organizations or industry are not permitted.²⁰³ However, as the world evolved, the number of non-State entities has skyrocketed and these non-State actors have increasingly involved in the developing and implementing process of international environmental law. Such involvement has gained recognition as legitimate and is encouraged in both national

²⁰² HUNTER ET AL., *supra* note 144, at 250-251.

²⁰³ *Id.* at 266.

and international level. While non-State actors' role in the international community is still limited by and different from the role played by the States and international organizations, their legal status is recognized under a number of treaties and other international agreements. Under Article 71 of the Charter of the United Nations, the Economic and Social Council, in carrying out its functions, may consult with non-governmental organizations, which have special competence in the subject matters of concern.²⁰⁴ The partnership roles among global, regional, national, and local organizations are interconnected and affirmed by Agenda 21, a comprehensive plan of action resulted from the 1992 United Nations Conference on Environmental and Development or the Rio Conference.²⁰⁵

Non-State actors may be divided into three general categories: non-governmental organizations (NGOs), industry or corporations, and individuals.

1. Non-governmental organizations (NGOs)

Unlike international organizations, which are composed of States, non-governmental organizations are created by individuals or private groups sharing a common objective, whether it is for the environmental matters, human rights, wildlife, women's rights, or health.²⁰⁶ NGOs have existed and proliferated over times

²⁰⁴ U.N. Charters, art. 71.

²⁰⁵ Agenda 21, Section III.

²⁰⁶ DAMROSCH ET AL., *supra* note 163, at 359.

in local, national, regional, and global level. Their goals and activities are diverse depending on the nature of each organization.

The “scientific organizations” play a key role in the development of international environmental law as experts, providing advanced scientific and technical data from different sources as well as their knowledge and expertise. For example, the International Council of Scientific Unions (ICSU), or International Council of Science as the name changed in 1998, is a global NGOs aiming at strengthening international science for the benefit of society through its interdisciplinary bodies or provide supports to its joint initiatives.²⁰⁷ ICSU has participated in the international environmental law development by acting as a principal scientific adviser to the 1992 United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro and, again in 2002, to the World Summit on Sustainable Development (WSSD) in Johannesburg. ICSU is a primary coordinator for all scientists around the world as well as provides a forum for constructive dialogue among the scientific community and governments, civil society, and the private sector.²⁰⁸

The “legal groups” or associations of lawyers have long played a role in the international environmental law growth, particularly by identifying issues requiring

²⁰⁷ International Council of Science, *ICSU's Mission*, available at http://www.icsu.org/5_abouticsu/INTRO_IntroMiss_1.html (last visited October 12, 2009).

²⁰⁸ *Id.*

international legal action, providing legal assistance to the domestic implementation of international environmental obligations, and acting as observers in international organizations and in treaty negotiations. Natural Resources Defense Council (NRDC), Environmental Defense, the Sierra Club, and the EarthJustice Legal Defense Fund are among the US domestic environmental NGOs that have expanded their interests and roles to international issues. At the international level, the International Union for the Conservation of Nature (IUCN) or the World Conservation Union is one of the most important environmental organizations with its unique characteristics. Founded in 1948, the IUCN was the world's first global environmental organization and to date the largest professional global conservation network. Members to the organization include governments or their agencies, scientific community, professionals, business, local community, and conservation bodies. Its primary goal is to provide governments, NGOs, international conventions, UN organizations, companies, and communities with advice and expertise in the development of environmental law and policy and ecological sustainable best-practices.

The “environmental and developmental organizations,” such as the World Wide Fund for Nature, Greenpeace International, and Friends of the Earth, are among those organizations that operate as parts of global environmental networks. The roles of environmental and developmental groups are to campaign on the current's urgent environmental and social issues, to question and challenge the existing economic and legal models, to promote alternative solutions for environmental sustainability and

just societies, and to review and monitor the international environmental standards and its implementation.

2. Industries and private companies

Industry and private companies' practices have potential impacts on both the cause and solution of most global environmental challenges. Business associations, such as the International Chamber of Commerce and the Business Council for Sustainable Development, often take part in the international environmental affairs to offer knowledge and advice and to observe and ensure that the interests of industries and business community are taken into account in the international environmental policy-making process.

In several occasions, the corporations took initiatives in the environmental leadership. For example, the International Cooperative for Ozone Layer Protection (ICOLP), which comprised of international electronics and aerospace corporations, pioneered the economically viable and effective alternatives to the use of ozone depletion substances, such as chlorofluorocarbon (CFC).²⁰⁹ Members to ICOLP, including companies like IBM, AT&T, and Toshiba, completed their phase-out of the use of CFCs and promoted investment in ozone-safe technologies to other companies.

²⁰⁹ HUNTER ET.AL, *supra* note 144 at 618.

3. Individuals and Indigenous Communities

The rights of individual citizens and indigenous people are progressively recognized. Principle 10 of the Rio Declaration acknowledged individual's rights to participate in decision-making process, to have access to information, and to have access to judicial and administrative remedies.

Principle 10 provided that:

Environmental issues are best handled with participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided.

Although Principle 10 is not binding but the foundation of individual's right is laid down and adopted in other international conventions such as the 1998 United Nations Economic Commission for Europe on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (the Aarhus Convention).

IV. The Evolution of International Environmental Law

International environmental law is considered a branch of international law with the focus on environmental protection and sustainable development. It is worth noting the differences in development pattern between developed and developing countries, which reflected in their international environmental negotiations. Developed countries generally have a higher rate of economic development, literacy and life-expectancy.²¹⁰ They are also the principal consumer of natural resources and the biggest polluter.²¹¹ On the contrary, developing countries, though possessing much of the world's natural resources, are facing with poverty, illiteracy, and lower life-expectancy because of their large populations.²¹²

In the international environmental negotiations, the developed countries prioritize solving global environmental problems and preserving natural resources for future generation, while developing countries seek to enhance their economic growth and overcome poverty for the current generation, which requires natural resources exploitation.²¹³ The environmental protection and natural resources preservation are a potential obstacle to their development can be addressed in the future.²¹⁴ The attempt

²¹⁰ HUNTER ET AL., *supra* note 144, at 163.

²¹¹ *Id.*

²¹² *Id.*

²¹³ *Id.*

²¹⁴ *Id.*

to reach any global environmental agreement must take into account these substantial differences between developed and developing countries in order to find a proper balance.

The creation of international environmental law can be traced back to the nineteenth-century when the process of industrialization and the rapid expansion of economic activities relying on natural resources brought about the awareness that natural resources were limited, that the exploitation of such resources shall be controlled, that industrialization caused pollution, and that the adoption of the appropriate legal instruments is needed.²¹⁵ In this period, the conservation of wildlife (fish, birds, and seals) and the protection of rivers and seas (flora and fauna) were the focus of the development of international environmental rules.²¹⁶ For example, the Treaty for the Preservation and Protection of Fur Seals²¹⁷, a convention between Russia, the United Kingdom, Japan, and the United States, prohibits open-water seal hunting. The Convention between the United States and Great Britain for the Protection of Migratory Birds in the United States and Canada²¹⁸ was the first bilateral treaty for the protection of migratory birds.

²¹⁵ SANDS, *supra* note 147, at 25.

²¹⁶ *Id.* at 26.

²¹⁷ The Treaty for the Preservation and Protection of Fur Seals, July 7, 1911, 37 Stat.1542.

²¹⁸ Convention Between United States and the Great Britain for the Protection of Migratory Birds in the United States and Canada, U.S.-U.K., Dec. 7, 1916, 4 IPE 1638.

As countries industrialized, environmental issues became more prevalent. Developed countries began to address the environmental protection issues in their national laws, which later on were emerged to the international level. One of the landmark disputes, known as the “Trail Smelter” case, was submitted to the international arbitration. This case arose out of a dispute between United States and Canada over the emission of sulphur dioxide from a smelter situated in British Columbia, Canada which caused damage to crop, pasture land, trees, and agriculture in the state of Washington.²¹⁹ The arbitral tribunal held that “Under the principles of international law... no state has the right to use or permit the use of territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or persons therein, when the case is of serious consequence and the injury is established by clear and convincing evidence.”²²⁰ This arbitral award influenced the foundation of international law on transboundary air pollution.

After the Second World War, the United Nations was founded by fifty-one countries in 1945.²²¹ The UN’s purpose is to maintain international peace and security, to develop friendly relations among nations, and to achieve international co-operation in solving international problems of an economic, social, cultural, or

²¹⁹ Trail Smelter Case (U.S. v. Can.), 3 R.I.A.A. 1907 (1941).

²²⁰ *Id.* at 1965.

²²¹ United Nations, *UN at a Glance*, at <http://www.un.org/en/aboutun/index.shtml> (last visited June 12, 2009).

humanitarian character.²²² Even though the UN Charter did not include provisions on environmental protection or natural resources conservation, the third purpose of UN in achieving international co-operation in solving international problems has provided the basis for subsequent environmental activities of the UN.

The international environmental law has evolved and focused on two critical issues – environmental protection and sustainable development. These issues were organized around the three foremost international environmental law conferences, namely, the 1972 UN Conference on the Human Environment (the Stockholm Conference), the 1992 UN Conference on Environment and Development (UNCED, or the Rio Conference, or the Earth Summit), and the 2002 World Summit on Sustainable Development (WSSD or the Johannesburg Summit).²²³

A. 1972 UN Conference on the Human Environment (the Stockholm Conference)

The Stockholm Conference was the first global environmental conference and was convened in December 1968 by the UN General Assembly following the adoption of a resolution in July 1968, first proposed by Sweden. The Swedish representative noted “the continuing and accelerating impairment of the quality of the human environment” and suggested an international conference to address global

²²² U.N. Charter art.1.

²²³ HUNTER ET AL., *supra* note 144, at 162.

environmental problems.²²⁴ Sweden agreed to host the 1972 UN Conference on the Human Environment in Stockholm.

The main purpose of the Conference was to “serve as a practical means to encourage, and to provide guidelines for, action by Governments and international organizations designed to protect and improve the human environment, and to remedy and prevent its impairment, by means of enabling developing countries to forestall occurrence of such problems.”²²⁵

The Conference adopted three non-binding instruments.²²⁶

1) A resolution on institutional and financial arrangements for international environmental Co-operation.

2) An Action Plan was a comprehensive effort to identify those environmental issues requiring international action. It contained 109 recommendations or definitions of a framework for future action to be taken by the international community.

3) A Declaration, containing 26 principles, emphasized the importance of integrating environment and development, of reducing or eliminating pollution, and of controlling the use of renewable and non-renewable resources. The Stockholm

²²⁴ Report of the UN Conference on the Human Environment, U.N. Doc. A/CONF.48/14 at 2-65, and Corr. 1 (1972); 1 ILM 1416 (1972).

²²⁵ U.N.G.A 2581(XXIV) Jan. 8, 1970 (A/RES/2581 (XXIV)).

²²⁶ Report of the UN Conference on the Human Environment, U.N. Doc. A/CONF.48/14 at 2-65, and Corr. 1 (1972); 1 ILM 1416 (1972).

Declaration is a great example of “soft law” and is very important to the development of both national and international law.

The two most influential principles of the Stockholm Declaration for the development of international environmental law are Principles 1 and 21.

Principle 1 states:

Man has the fundamental right to freedom, equality and adequate conditions of life, in an environment of a quality that permits a life of dignity and well-being, and he bears a solemn responsibility to protect and improve the environment for present and future generations. In this respect, policies promoting or perpetuating apartheid, racial segregation, discrimination, colonial and other forms of oppression and foreign domination stand condemned and must be eliminated.

Principle 1 declares a man’s right and responsibility to healthy environment. Even though it has not yet been recognized in international law, it has an important influence on the development of environmental human rights in many countries.

Principle 21 states:

States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their

jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.

Principle 21 affirmed the responsibility of States to ensure that activities within their jurisdiction or control so they would not cause damage in another State or beyond national jurisdiction. This responsibility is extended also to activities under a State's control, such as those carried out by its nationals or by or on ships or aircraft registered in its territory.²²⁷ Principle 21 is largely accepted to reflect a rule of customary international law.²²⁸ New rules, such as the polluter-pays principle and the precautionary principle, were created through Principle 21.²²⁹

Another significant achievement of the Stockholm Conference is the creation of the United Nations Environmental Programme (UNEP), as the main designated authority on the environmental issues, facilitating with the international environmental negotiations. The 1978 UNEP draft Principles of Conduct in the Field of the Environment for the Guidance of States in the Conservation and Harmonious Utilization of Natural Resources Shared by Two or More States²³⁰ is one of the first responsibilities taken by UNEP. The draft contains fifteen principles governing the use of shared natural resources.

²²⁷ SANDS, *supra* note 147, at 38.

²²⁸ *Id.* at 51.

²²⁹ *Id.*

²³⁰ UNEP, Principles of Conduct in the Field of the Environment for the Guidance of States in the Conservation and Harmonious Utilization of Natural Resources Shared by Two or More States, 17 ILM 1097 (1978).

The Stockholm Conference marked a successful step in addressing environmental issues in the international community. Following the Conference, a number of treaties were adopted within the UN system to tackle the issues of waste dumping at sea, pollution from ships, trade in endangered species, pollution and nature conservation, and transboundary movements of hazardous wastes. For example, the 1973 Convention on the International Trade in Endangered Species (CITES); the 1979 Convention on the Conservation of Migratory Species of Wild Animals; the 1985 Vienna Convention on Protection of the Ozone Layer; the 1989 Basel Convention on Control of the Transboundary Movements of Hazardous Wastes and their Disposal; and the 1992 Framework on Climate Change, etc. One of the most important conventions adopted in this period is the 1982 United Nations Convention on the Law of the Sea (UNCLOS), which determined the rights and responsibilities of States regarding the protection of the marine environment and living marine resources, and regulated all aspects of resources of the sea and the peaceful use of the ocean.²³¹ The large number of environmental treaties adopted after the Stockholm Conference indicated that area of law called international environmental law was in place in this period.²³²

²³¹ United Nations Convention on the Law of the Sea (UNCLOS) Preamble, Dec. 10, 1982, 21 ILM 1261.

²³² HUNTER ET AL., *supra* note 144, at 174.

B. 1992 UN Conference on Environment and Development (UNCED, the Rio Conference or the Earth Summit)

Economic and technological development has been the main purpose of both developed and developing countries to overcome poverty and improve quality of life. However, the rate of insensitive economic expansion was not well-balanced with the environmental sustainability. Environmental degradation and the depletion of natural resources resulted from industrial advancement in developed countries and from the efforts of developing countries attempting to survive economic expansion. Without suitable control, the environment continues to deteriorate. Concerns over problems, such as ozone depletion, global warming, water and air pollution, and the depletion of natural resources have become more apparent.

In 1983, the UN General Assembly established the World Commission on Environment and Development (WCED) to address those concerns. The Commission's tasks are²³³:

- (a) To propose long-term environmental strategies for achieving sustainable development to the year 2000 and beyond;
- (b) To recommend ways in which concern for the environment may be translated into greater co-operation among developing countries and between countries at different stages of economic and social development in order to lead to the

²³³ Resolutions adopted by the General Assembly 38/161. Process of preparation of the Environmental Perspective to the Year 2000 and Beyond, A/RES/38/161, Dec. 19, 1983.

achievement of common and mutually supportive objectives, which take account of the interrelationships between people, resources, environment and development;

(c) To consider ways and means by which the international community can deal more effectively with environmental concerns, in the light of the other recommendations in its report;

(d) To help to define shared perceptions of long-term environmental issues and of the appropriate efforts needed to deal successfully with the problems of protecting and enhancing the environment, a long-term agenda for action during the coming decades, and aspirational goals for the world community, taking into account the relevant resolutions of the session of a special character of the Governing Council in 1982.

The Commission, chaired by Norwegian Prime Minister Gro Harlem Brundtland, issued a report titled “Our Common Future” or the Brundtland Report in 1987, emphasizing the concept of sustainable development.²³⁴ The Brundtland report asserted that there was an inextricable connection among poverty, environmental degradation, and population growth and no individual problem could be addressed in isolation.²³⁵ The relationships among people, natural resources, environment, and development shall be taken into account when planning national economic and

²³⁴ Our Common Future: Report of the World Commission on Environment and Development (1987), A/42/427

²³⁵ *Id.*

developmental policy.²³⁶ The report defines the concept of sustainable development as a form of development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts:

- the concept of “needs,” in particular the essential needs of the world's poor, to which overriding priority should be given; and
- the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs.²³⁷

The Brundtland report laid the groundwork for the UN General Assembly to convene the United Nations Conference on Environment and Development (UNCED) in 1992. The purpose of the Conference was to “elaborate strategies and measures to halt and reverse the effects of environmental degradation in the context of strengthened national and international efforts to promote sustainable and environmentally sound development in all countries.”²³⁸

The Earth Summit, held in Rio de Janeiro, Brazil in 1992, adopted three non-binding instruments:

1) The Rio Declaration on Environment and Development is a series of 27 principles defining the rights and responsibilities of States to achieve the balance of

²³⁶ *Id.*

²³⁷ *Id.*

²³⁸ UNGA Res. 44/228, para. 3, Dec. 22, 1989.

environmental protection and economic development. Each principle represents a compromise between developed countries' concerns with global environmental problems and developing countries' concerns with development.

Principle 2 of the Rio Declaration reaffirmed State's rights and responsibilities as stated in Principle 21 of the Stockholm Declaration with an addition of the word "and developmental."

Principle 2 reads:

States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental *and developmental* policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction. (Emphasis added)

The addition of the word "and developmental" affirms the sovereign right of States to pursue their own developmental policies and expands their responsibilities not to cause damage to the environment when carrying out their national development policies.²³⁹

²³⁹ SANDS, *supra* note 147, at 55.

Principle 3 and 4 were the core of the Rio Declaration reflecting the integration of environment and development as a compromise between developed and developing countries.

Principle 3 provides:

The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations.

Principle 4 states:

In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.

Principle 3 was considered a victory for developing countries because it was the first time that “the right to development” was articulated in the international instrument, whereas Principle 4 reflected developed countries’ interest for environmental protection.²⁴⁰

The Rio Declaration reiterated several general principles of international environmental law: principle of common but differentiated responsibility (Principle 7), precautionary principle (Principle 15), and polluter-pays principle (Principle 16). Principle 27 declared States’ responsibilities to cooperate in the fulfillment of the

²⁴⁰ *Id.* at 56.

Principles set forth in the Rio Declaration and in the further development of international law in the field of sustainable development

2) The Statement of Forest Principles is a set of principles underlying the sustainable management of forest worldwide.

3) Agenda 21²⁴¹ is a comprehensive and extensive blueprint or action plan of global partnership adopted by Governments at UNCED to implement the concept of sustainable development. It comprises forty chapters: Preamble (Chapter 1) and four major sections. Each section contains a number of chapters addressing the basis for action, objectives, activities and means of implementation.²⁴²

Section I: Social and Economic Dimensions (Chapter 2-8). This section focuses on national and international action with regards to international cooperation for sustainable development, poverty, consumption patterns, population, human health, sustainable human settlement and the integration of environment and development in decision-making.

Section II: Conservation and Management of Resources for Development (Chapter 9-22). Several natural resources sectors are the main objectives for the protection and sustainable use, including the atmosphere, land resources, deforestation, desertification and drought, mountain, agriculture and rural area, biological diversity, biotechnology, oceans, seas, coastal areas and their living

²⁴¹ UNCED Report, A/CONF.151/26/Rev.1 (vol. I) (1993). [hereinafter “Agenda 21”]

²⁴² Agenda 21, Chapter 1, para. 1.6.

resources, freshwater resources, toxic chemicals, hazardous wastes, solid and sewage wastes, and radioactive waste.

In particular, chapter 20 aims at the environmentally sound management of hazardous wastes, including prevention of illegal international traffic in hazardous wastes.

Section III: Strengthening the Role of Major Groups (Chapter 25-32). Agenda 21 recognizes the importance of public participation at the national and international level in the environmental impact assessment procedure and the decision-making as a prerequisite to the achievement of sustainable development. These major groups include women, children and youth, indigenous people and their community, non-governmental organizations, local authorities, workers and their trade union, business and industry, the scientific and technological community, and farmers.

Section IV: Means of Implementation (Chapter 33-40). This section identifies the critical mechanisms for the implementation of sustainable development by providing financial resources and mechanisms, environmentally sound technology transfer, cooperation and capacity-building, science, education, public awareness and training, capacity-building in developing countries, international institutional arrangements, international legal instruments and mechanisms, and information for decision-making.

In addition, two legally binding Conventions aimed at preventing global climate change and the eradication of the diversity of biological species were also opened for signature at the Earth Summit: the United Nations Framework Convention on Climate Change and the Convention on Biological Diversity.

C. The 2002 World Summit on Sustainable Development (WSSD or the Johannesburg Summit)

The World Summit on Sustainable Development was planned as the tenth anniversary celebration of the Earth Summit. Ten years after the Earth Summit, globalization – defined by Hunter et al. as “a force aided by global policy makers but driven inexorably by market forces and technological changes that were in hindsight uncontrollable” – was on the rise.²⁴³ At the same time, the environmental degradation, poverty, and sheer numbers of people were also increasing at an alarming rate. The Johannesburg Summit reinforced sustainable development as the central goal of the Conference and established a more focused approach to the eradication of poverty and conserving natural resources in a world that is growing in population, with ever-increasing demands for food, water, shelter, sanitation, energy, health services and economic security.²⁴⁴

²⁴³ HUNTER ET AL., *supra* note 144, at 206.

²⁴⁴ Report of the World Summit on Sustainable Development, A/CONF.199/20, Aug. 26 – Sep. 4, 2002.

The Johannesburg Summit produced three major outcomes:

1) The Johannesburg Declaration on Sustainable Development did not provide a set of principles like the Stockholm or Rio Declaration, but gave a broad and general statement regarding the status of the global environmental problems and the commitment to sustainable development.

2) The Plan of Implementation of the World Summit on Sustainable Development is a negotiated plan to guide governments' activities under the commitments to the Rio Declaration, Agenda 21 and United Nations Millennium Declaration. The plan emphasized the sustainable development as its objective and declared required sets of action and timetables to achieve such goal. These actions include²⁴⁵:

- Poverty Eradication.
- Access to safe drinking water and basic sanitation.
- Changing unsustainable patterns of production and consumption by increase investment in cleaner production and eco-efficiency, develop and diversify alternative energy supply, prevent and minimize waste and maximize reuse, recycling, and use of environmentally friendly alternative materials.
- Protecting and managing the natural resource base for economic and social development, including water, oceans and fisheries, atmosphere, biodiversity, and forests.
- Strengthening sustainable development in a globalizing world through promoting corporate responsibility and accountability, developing and

²⁴⁵ Plan of Implementation of the World Summit on Sustainable Development.

implementing intergovernmental agreements and international initiatives and public-private partnerships.

- Enhancing health education and health-care systems, developing programs to reduce mortality rates for infants and children under 5 and reduce disparities between and within developed and developing countries, and implement all commitments agreed in the Declaration of Commitment on HIV/AIDS.
- Promoting sustainable development in certain areas including small-island developing States, Africa, Latin America and the Caribbean, Asia and the Pacific, the West Asia region, and the Economic Commission for Europe region.
- Taking into account the principle of common but differentiated responsibilities when considering countries and international community's participation in the implementation of the plan and Agenda 21.
- Increasing effectiveness and efficiency in institutional frameworks for sustainable development at international, regional, and national levels.
- Assigning the roles of international organizations within and outside the United Nations system (such as the UN General Assembly, the UN Economic and Social Council, the Commission on Sustainable Development, and international institutions) through limiting overlap and duplication activities, based on their mandates and comparative advantages.
- Enhancing partnerships between governmental and non-governmental actors, including all major groups and volunteer groups on activities for the achievement of sustainable development.

3) Partnerships for Sustainable Development are voluntary and non-binding agreements among national governments, international institutions, the business community, non-governmental organizations, and civil society to carry out sustainable development activities. More than 200 partnerships were launched during the Summit process, covering many different aspects and approaches, including water and sanitation, energy, agriculture, and health.

V. Conclusion

This chapter provides the basic understanding of international environmental law, which is a relatively new branch of international law. With the help of developing technologies, the world is getting smaller and today the impact of one country on another is like no other time in our history. For the international community to survive and thrive, there has been a growing need for universally applicable rules that provides fair and consistent regulations regarding serious environmental concerns. Without any overarching government to which all countries must comply, international laws are thus based on various countries agreements between and among countries in the form of treaties, conventions or agreements. States enter into these agreements to protect the interests of their people and to ensure respect of other states' interests.

The field of international environmental law is relatively new, and therefore, there are not yet any general principles of international environmental law. Soft law

is a more common source of international environmental law, in the form of recommendations, guidelines or declarations of various international organizations. Although States are the principal subject of international law, having the rights and responsibilities to participate in international affairs, there are other actors who have played the critical roles in the development of international environmental law, including the UN, NGOs and even individuals.

The three major conferences – the Stockholm Conference, the Rio Conference, and the Johannesburg Conference – mark pivotal moments in the evolving history of international environmental law. Each conference proved to be an important turning point in the development of that history. The Stockholm conference was the first conference to focus on international environmental issues; the Rio conference introduced for the first time the concept of sustainable development; and the Johannesburg affirmed the concept of sustainable development and went on to recognize the importance of globalization. These conferences were important if for no other reason than to help direct public attention and concern to the growing importance of the environmental issue. One of the central issues since the Stockholm conference has been how to monitor and control the shipment of hazardous waste.

Chapter I examined the history and potential threat of e-waste, which is now a global environmental concern because the transboundary movement of this type of wastes from one country to another is not under any uniform regulation. There are, however, attempts to regulate such movement under international laws. Chapter II

outlines how international environmental law was created and developed. Chapter III will explore an existing international treaty, namely, the Basel Convention, which focused directly on the problem of transboundary movement of e-waste in order to assess the actual consequences – both strengths and limitations – of such an agreement.

CHAPTER III

**THE BASEL CONVENTION ON THE CONTROL OF
TRANSBOUNDARY MOVEMENT OF HAZARDOUS
WASTES AND THEIR DISPOSAL**

(“THE BASEL CONVENTION”)

I. Introduction

Chapter I discussed the growing problem of a new type of hazardous waste, namely, e-waste and how trade in e-waste can result in damage to human health and environmental harm. Globalization has made the world smaller and ushered in a new era where the transboundary movement of such waste between countries has potentially enormous impact on the world. Yet because each country has its own legal system, history and culture, such transactions are prone to conflict, misunderstanding and a lack of mutually agreed upon terms when it comes to environmental responsibilities. When the transactions concern more than one state, international laws come into play. Chapter II focuses on the history and sources of international law, one of which is the treaty, the most common source of international law. Treaties are legal binding agreements between two or more countries in which there are often sacrifices made by the members in order to reach mutual goals. Trade in e-waste generally affects more than one State, thus international law governs the transactions.

In this chapter, the only existing international law concerning the issue of e-waste trade, namely the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (The Basel Convention), will be explored, beginning with the background and history that lead to the creation of the Basel Convention. The following section is devoted to the substantive rights and obligations of the parties to the Basel Convention. Lastly, the assessment of the Basel Convention provides the benefits and shortcomings of the Basel Convention in the context of trade in electronic wastes.

II. Background on Hazardous and E-Waste Trade

Both hazardous and electronic wastes are mostly generated by industrial activities. Its composition and quantity largely depend on production patterns. The worldwide amount of hazardous waste being generated is rapidly increasing with growing economic activity and the production and use of consumer items. It is estimated that in 1990, 400 million metric tons of hazardous waste was generated worldwide.²⁴⁶ Over ninety percent of this waste originated in countries belonging to the Organization for Economic Co-operation and Development (OECD).²⁴⁷ The

²⁴⁶ Based on a United Nations Environment Programme (UNEP) report in Greenpeace, *Heavy Burden - A Case Study on Lead Waste Imports Into India*, Greenpeace International Toxics Campaign, March 1997, p. 4.

²⁴⁷ KATRINA KUMMER, INTERNATIONAL MANAGEMENT OF HAZARDOUS WASTES 5 (Ian Brownlie ed., 1999).

United States alone currently generates over 400,000 million tons,²⁴⁸ while the total amount of solid waste generated each year in the Asia-Pacific region is about 700 million tons and the industrial waste generated is 1,900 million tons of waste per year.²⁴⁹

Concerns over hazardous waste have swiftly heightened because this type of waste potentially involves severe environmental harm if managed inappropriately and it potentially impacts every sphere of the environment: land, air, coastal areas, waterways, and seas.²⁵⁰ In the past decades, the uncontrolled and illegal movement and dumping of hazardous waste in developing countries, especially in Africa, Latin America, and Asia by companies from industrialized countries constitutes a serious threat to human health and the environment.

The increase in the transboundary movement of hazardous waste and e-waste can be attributed to at least three different reasons – economic and regulatory imbalance, exporting wastes for the purposes of environmentally sound management, and trade in wastes with value as secondary raw materials.

²⁴⁸ OECD Environmental Data 2002, <http://www.oecd.org/dataoecd/53/43/2958188.pdf> (July 27, 2004).

²⁴⁹ Asia-Pacific Environment Outlook, <http://www.rrcap.unep.org/ap eo/Chp1j-waste.html> (July 27, 2004).

²⁵⁰ KUMMER, *supra* note 2, at 13.

A. Economic and Regulatory Imbalance

As the generation of hazardous wastes rises and the disposal sites continue to be limited, the holders of the waste are faced with a scarcity of disposal facilities. Additionally, a tightening of domestic environmental regulation, the concern over liability, proliferating disposal expenses in industrialized countries, as well as public pressure against land filling and land-based incineration of hazardous wastes – which has been named, “Not In My Back Yard (NIMBY) syndrome”- have all caused the waste generators in the industrialized world to follow the path of least resistance and least expense.²⁵¹ Lower costs and regulatory standards in developing countries are a major incentive for exporting waste. For example, US treatment of PCBs can cost more than \$ 3,000 per ton, whereas the cost to dump them in a developing country's landfill can be as low as \$ 2.50 per ton.²⁵²

The lower price that attracted the hazardous waste producers of industrialized countries, less stringent environmental standards, an absence of public opposition due to a lack of information, less strict or non-existent laws and regulations, and unmonitored compliance have all made the hazardous waste trade more appealing.²⁵³ Although there are strict environmental regulations in some developing countries,

²⁵¹ *Id.* at 6.

²⁵² Sean D. Murphy, *Prospective Liability Regimes for the Transboundary Movement of Hazardous Wastes*, 88 *Am. J. Int'l L.* 24, 31 (1994).

²⁵³ Kimberly K. Gregory, *The Basel Convention and The International Trade of Hazardous Waste: The Road to the Destruction of Public Health and the Environment is Paved with Good Intentions*, 10 *Currents Int'l Trade L. J.* 80, 80 (Winter 2001).

poverty may force the government in those countries to prioritize economic development over environmental concerns.²⁵⁴ Governments of poor countries are tempted to accept hazardous waste shipments in exchange for foreign payments in amounts that sometimes are equal to four times their entire gross national product.²⁵⁵

However, this international trade in hazardous substances to take advantage of cheap labor costs failed to internalize the hidden costs –global environmental costs, creating detrimental effects on human health and the environment. First, accidental spills may occur during transport over long distances prior to disposal. Second, importing States may have inadequate technology or ill-equipped environmental management facilities to dispose of the waste safely and, as a result, it is the people and their environment that have suffered disastrous results.²⁵⁶

There are a number of notorious cases that revealed the practice of exporting hazardous waste from developed countries to developing countries in an unsafe manner since 1980s. In 1986, the ship *Khian Sea* sailed from Philadelphia to the Bahamas carrying 15,000 tons of incinerator ash, labeled as “fertilizer ash.”²⁵⁷

²⁵⁴ Sejal Choksi, *ANNUAL REVIEW OF ENVIRONMENTAL AND NATURAL RESOURCES LAW: INTERNATIONAL LAW The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal: 1999 Protocol on Liability and Compensation*, 28 Ecology L.Q. 509, 515 (2001).

²⁵⁵ Peter Obstler, *Toward a Working Solution to Global Pollution: Importing CERCLA to Regulate the Export of Hazardous Waste*, 16 Yale J. Int'l L. 73, 79 (1991).

²⁵⁶ KUMMER, *supra* note 247, at 13.

²⁵⁷ Maureen T. Walsh, *The Global Trade in Hazardous Wastes: Domestic and International Attempts to Cope with a Growing Crisis in Waste Management*, 42 Cath. U. L. Rev. 103, 105 (1992).

Refused entry into numerous ports including the Bahamas and Haiti, the ship's operators dumped 3000 tons of hazardous waste on the beach at Gonaives in Haiti without the Haitian government permission.²⁵⁸ The *Khian Sea* then wandered about the oceans for eighteen months, changed its name twice, changed its country of registration at least as many times, and finally showed up in Singapore as the *Pelicano* with no cargo.²⁵⁹ While 3,000 to 4,000 tons of the toxic ash continued to contaminate a Haitian beach, investigators concluded that the rest had actually been illegally dumped in the Indian Ocean.²⁶⁰

In 1988, Nigerian authorities discovered eight hundred open drums containing eight million pounds of unprotected industrial and nuclear waste that an Italian company working in Nigeria had dumped in the port city of Koko.²⁶¹ By the time these garbage barges were found, many drums had already been damaged and leaked into an adjacent river.²⁶² Some of the barrels were dumped by residents and used to store drinking water.²⁶³ Workers packing drums into containers to return to Italy suffered severe chemical burns, paralysis, premature births, and fatalities.²⁶⁴ After the

²⁵⁸ Hao-Nhien Q. Vu, *The Law of Treaties and the Export of Hazardous Waste*, 12 UCLA J. Envtl. L. & Pol'y 389, 389 (1994).

²⁵⁹ *Id.*

²⁶⁰ Walsh, *supra* note 257, at 106.

²⁶¹ FRED L. MORRISON & WM. CARROLL MUFFETT, *Hazardous Waste, in* INTERNATIONAL, REGIONAL, AND NATIONAL ENVIRONMENTAL LAW 409, 418 (Fred L. Morrison & Rudiger Wolfrum, eds., 2000).

²⁶² *Id.*

²⁶³ *Id.*

²⁶⁴ A Vir, *Toxic Trade with Africa*, 23(1) ENV'T., SCI. & TECH. J. 24, 25 (1989).

waste was removed, land within a 500 meter radius of the dump site was declared unsafe and there is concern about surface and groundwater contamination.²⁶⁵

These incidents are examples of the NIMBY phenomenon that has provoked a public outcry against such practice. An effort has emerged to ban the transboundary movement of hazardous wastes and create an international waste management system.

A new wave of waste trade –trade in e-waste, which is often justified by calling it recycling, began in late 1990s following the newly adopted e-waste recycling system in many industrialized countries, such as countries in European Union, Japan, and some US states, which makes it more costly to recycle domestically. Computers, for example, are made up of numerous components and are not designed for easy recycling. The dismantling is thus extremely labor intensive. E-waste recyclers in industrialized countries started to export e-waste to developing countries, where the recycling and labor costs are cheaper and the laws pertaining to recycling, including environmental law and labor law, are either less stringent or, as in the case of some countries, nonexistent. The cost of glass-to-glass recycling of computer monitors, for example, is \$0.50 per pound in the US compared to \$0.05 per pound in China.²⁶⁶

²⁶⁵ *Id.*

²⁶⁶ Vu, *supra* note 258, at 391.

B. Exporting wastes for the purposes of environmentally sound management

The volume and characteristics of electronic wastes require the construction of complex facilities equipped with advanced technology. While many countries lack the economical ability for treatment and disposal of these wastes, trading as an alternative will be advantageous as long as it occurs for the purpose of safe disposal. These countries, therefore, export their wastes to other countries where superior technology for treatment or disposal is available.²⁶⁷ The hazardous waste trade on a regional scale also takes place if the nearest facility appropriate for a specific type of waste is located in neighboring countries or if a joint disposal facility has been established in a country other than the country of waste generation.²⁶⁸ This type of waste trade mainly takes place on a regional scale among neighboring industrialized countries, such as within the European Union (EU) or countries belonging to the Organization for Economic Co-operation and Development (OECD).²⁶⁹

C. Trade in wastes with value as secondary raw materials

Transboundary movement of hazardous waste may occur when there is an economic value of certain waste, such as metal scraps, used computers, end-of-life

²⁶⁷ KUMMER, *supra* note 247, at 8

²⁶⁸ *Id.*

²⁶⁹ BIRNIE & BOYLE, *supra* note 134, at 405.

vehicles, etc. This waste is treated as “goods” or “commodities” because the products are used in the operation leading to resource recovery, recycling, reclamation, re-use, or alternative use and thus subject to free trade.²⁷⁰ The hazardous waste trade for recycling or recovery is a controversial issue, in which some believe in a total ban as the solution, whereas others believe it can be helpful insofar as it provides cheaper raw materials for industrial use.²⁷¹

On the one hand, the exporting of hazardous waste for recycling can provide jobs and transform toxic waste into useful products for poor countries.²⁷² When the country of generation lacks recycling facilities, transboundary movement of potential valuable materials to the country with more technology and facilities can delay the depletion of limited natural resources as well as reduce harm to human health and the environment as a whole.²⁷³

On the other hand, to achieve the benefits mentioned above, the country of destination must be equipped with standard recycling facilities.²⁷⁴ This is often impractical, especially in developing countries. The other pitfall of allowing or providing less strict rules for transboundary movement of hazardous wastes for the

²⁷⁰ Jim Puckett, *The Basel Ban: A Triumph over Business-As-Usual* (Basel Action Network), October 1, 1997, at http://www.ban.org/about_basel_ban/jims_article.html.

²⁷¹ KUMMER, *supra* note 247, at 10.

²⁷² Puckett, *supra* note 270, at 24.

²⁷³ KUMMER, *supra* note 247, at 10.

²⁷⁴ *Id.*

purpose of recycling is that it would encourage false recycling. False recycling is the use of a “recyclable” label to facilitate trade for disposal operations; recycling was never intended.²⁷⁵ Waste in this category is taken and dumped, burned, or used as fill material.²⁷⁶

Trade in e-waste has primarily been motivated by the economic value inherent in the secondary raw materials that could be derived from e-waste. The demand in developing countries has grown because of the large amount of valuable substances, including copper, iron, silicon, nickel, gold, and platinum, which can be extracted from e-waste during recycling process. The largest market of non-working equipment in China is for the circuit boards that are rich in gold, palladium and platinum.

III. The Creation of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal

In 1981, the Governing Council of United Nations Environment Programme (UNEP) organized the Montevideo Programme for the Development and Periodic Review of Environmental Law, which sets out the conclusions and recommendations of the experts and constitutes a fundamental policy document for UNEP.²⁷⁷ A group of senior government official experts in environmental law determined the transport,

²⁷⁵ *Id.*

²⁷⁶ Puckett, *supra* note 270, at 24.

²⁷⁷ Jason L. Gudofsky, *Transboundary Shipments of Hazardous Waste for Recycling and Recovery Operations*, 34 Stan. J. Int'l L. 219, 224-25 (1998).

handling and disposal of toxic and dangerous wastes as one of the major subject areas suitable for increased global and regional cooperation in the elaboration of environmental law.²⁷⁸ A year later, the working group of experts elaborated guidelines on the environmentally sound transport, management, and disposal of hazardous wastes: the Cairo Guidelines and Principles for the Environmentally Sound Management of Hazardous waste (“The Cairo Guidelines”).²⁷⁹

The Cairo Guidelines set out the general principles of hazardous waste management. Their goal is to ensure the protection of human health and the environment against the threat of hazardous wastes. Major principles in the guidelines include waste minimization, promotion of new low-waste technologies, exchange of information, and the transfer of technology. The issue of transboundary movement of hazardous waste is also incorporated into the Cairo Guidelines, embodying the principles of non-discrimination, and prior notification to the prospective states of import and transit. Although the guidelines lack legal-binding force, they provide guidance for the conduct of states relating to national and international policies in hazardous waste management.²⁸⁰

²⁷⁸ *Id.*

²⁷⁹ UNEP, Environmental Law Guidelines and principles no. 8: *Environmentally Sound Management of Hazardous Wastes*, Nairobi 1987.

²⁸⁰ KUMMER, *supra* note 247, at 39.

In 1989, UNEP Council organized a diplomatic conference in Basel, Switzerland to promote a global agreement based on the Cairo Guidelines to effectively regulate the hazardous waste trade rather than prohibit it. This conference formed the basis for the first attempt at international regulations – the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. The Basel Convention entered into force on May 5, 1992.

IV. Parties to the Basel Convention

The Basel Convention was adopted on March 22, 1989, by 116 States that participated in the Conference of Plenipotentiaries on the Global Convention convened by the UNEP. The Convention was entered into force on May 5, 1992. Currently, there are 175 parties to the Basel Convention.²⁸¹ The only three countries who have signed the treaty but not yet ratified, accepted, approved, or acceded to the Convention are Afghanistan, Haiti, and the United States of America.²⁸² The number of parties to the Basel Convention accounted for approximately ninety percent of all countries in the world. This amount represented global awareness of the problem of uncontrolled transboundary movement of hazardous wastes and their disposal and the need to solve such problem.

²⁸¹ United Nations Treaties Collection, Status of Treaties, available at http://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-3&chapter=27&lang=en#4 (last visited October 21, 2010).

²⁸² *Id.*

However, failure to implement the Convention by the United States has had a direct impact on the effectiveness of the Basel Convention because the US is one of the largest industrialized countries producing and exporting hazardous wastes. Without its ratification, the Convention has no binding implication on the US. In the United States, the senate must ratify and the congress must incorporate the international regulations into its domestic law either by amending existing law or create new law.

After President George Bush signed the Basel Convention in 1990 and the Senate ratified it, there were a numerous attempts to include the obligations under the Basel Convention in U.S Federal law because of concerns over the possible disruption to existing export arrangements with States that were party to the Convention.²⁸³ However, Congress failed to adopt any of the proposed bills implementing the Basel Convention for a number of reasons.²⁸⁴ Prior to the introduction of the Ban Amendment – an absolute prohibition of transboundary movement of hazardous wastes from developed to developing countries, environmental groups expressed strong opposition to the US ratification, asserting that the language of the Basel Convention was too weak to protect developing countries.²⁸⁵ Moreover, the exemption clause in Article 11, which permits parties to enter into bilateral,

²⁸³ Mark Bradford, *Note: The United States, China & The Basel Convention On The Transboundary Movements Of Hazardous Wastes And Their Disposal*, 8 Fordham Env'tl. Law J. 305, 327 (1997).

²⁸⁴ Choksi, *supra* note 254, at 527.

²⁸⁵ *Id.* at 531.

multilateral, or regional agreement with a non-party or other parties, was seen as a way to legalize waste-dumping in developing countries.²⁸⁶ After the creation of the Ban Amendment, the recycling industry groups were the major opponents to the ratification of the Basel Convention, claiming that the broad definition of “wastes” as well as the total ban would restrict or even put an end to their businesses.²⁸⁷

In addition to the lack of cooperation with the international community, the US has done little to address the problem associated with such practices regarding hazardous waste trades. The Resource Conservation and Recovery Act (RCRA)²⁸⁸ established a regulatory program to manage solid waste. It was later amended to include Subtitle C, referred to as a cradle-to-grave system of hazardous waste regulation. Although § 3017 of RCRA creates a monitoring and consent program for the export of hazardous waste, the range of hazardous wastes regulated under RCRA is much narrower than wastes controlled under the Basel Convention. For instance, RCRA exempts hazardous wastes from households, from small quantity generators (less than 1000kg per month), and hazardous wastes intended to be reused, recycled or reclaimed.²⁸⁹ Substances exempt from the control of RCRA are also exempt from the export restriction.²⁹⁰ Furthermore, RCRA imposes stringent regulations on the

²⁸⁶ *Id.*

²⁸⁷ *Id.*

²⁸⁸ RCRA, *supra* note 124.

²⁸⁹ RCRA, *supra* note 124, § 3001-3004 and § 261.21-261.22.

²⁹⁰ RCRA, *supra* note 124, § 3017.

treatment, storage, and disposal facilities of hazardous wastes, which create an incentive for waste management industries to find disposal sites where regulation is less strict and less expensive.

V. Scope of the Basel Convention

The Basel Convention governs and controls the movement and disposal of hazardous wastes as well as other wastes at international and national levels. It represents the intention of international community to solve this global environmental problem in a collective manner. Article 1 specifies the scope of the Convention according to the type of wastes.

Article 1 Scope of the Convention states:

1. The following wastes that are subject to transboundary movement shall be “hazardous wastes” for the purposes of this Convention:
 - (a) Wastes that belong to any category contained in Annex I, unless they do not possess any of the characteristics contained in Annex III; and
 - (b) Wastes that are not covered under paragraph (a) but are defined as, or are considered to be, hazardous wastes by the domestic legislation of the Party of export, import or transit.

2. Wastes that belong to any category contained in Annex II that are subject to transboundary movement shall be “other wastes” for the purposes of this Convention.
3. Wastes, which, as a result of being radioactive, are subject to other international control systems, including international instruments, applying specifically to radioactive materials, are excluded from the scope of this Convention.
4. Wastes which derive from the normal operations of a ship, the discharge of which is covered by another international instrument, are excluded from the scope of this Convention.

Article 1 identifies wastes that are subject to the Basel Convention’s provisions and wastes that are excluded from the control regulations under the Basel Convention. “Wastes” are defined under the Basel Convention as “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”.²⁹¹ The notion of “disposal” is defined by reference to Annex IV, listing the disposal operations covered by the Convention.²⁹² Annex IV A is comprised of operations which lead to final disposal of the wastes, such as landfill, incineration on land and at sea, permanent storage, and release into water body, seas, oceans, including sea-bed insertion.²⁹³ The disposal operations also include the recycling, reclamation, resource recovery of components,

²⁹¹ Basel Convention, *supra* note 133, art. 2(1)

²⁹² Basel Convention, *supra* note 133, art. 2(4)

²⁹³ Basel Convention, *supra* note 133, Annex IV A

and direct re-use or alternative uses in Annex IV B.²⁹⁴ In this regard, the provisions of the Basel Convention apply to both wastes destined for final disposal and wastes destined for recycling.

A. Wastes controlled under the Basel Convention.

1. Hazardous Wastes

Wastes that fall under the scope of the Convention must be a “hazardous wastes” and must be subject to transboundary movement.²⁹⁵ The “transboundary movement” is defined as the movement from the area of jurisdiction of one State to or through that of another, or to or through an area beyond national jurisdiction, provided at least two States are involved in the movement.²⁹⁶

There are two types of “hazardous wastes” for the purpose of the Basel Convention. First, waste that belongs to one of the forty-five categories (Y1 –Y45) contained in Annex I of the Convention that possesses any “hazardous” characteristic (H3 –H33) listed in Annex III.²⁹⁷ Second, waste not covered by Annex I and III is

²⁹⁴ Basel Convention, *supra* note 133, Annex IV B

²⁹⁵ Basel Convention, *supra* note 133, art. 1(1).

²⁹⁶ Basel Convention, *supra* note 133, art. 2(3)

²⁹⁷ Basel Convention, *supra* note 133, art. 1(1)(a)

also considered hazardous for the purposes of the Convention if it is defined as hazardous by national legislation of the party of export, import or transit.²⁹⁸

2. Other Wastes

Another type of waste that is controlled under the Basel Convention is “other wastes,” subject to transboundary movement.²⁹⁹ “Other wastes” are defined under the Basel Convention as wastes collected from households and residue arising from the incineration.³⁰⁰ Other wastes are not considered hazardous waste but categorized as wastes requiring special consideration.³⁰¹ For the purpose of the Basel Convention, other wastes are treated as hazardous waste because they may pose an equal threat to human health and environment.

In sum, there is a two-step requirement for Basel Convention to apply to the substances or objects in question.

1) The objects or substances in question must fulfill the characteristics listed in Annex I *and* possess the characteristic listed in Annex III in which case they are defined as “hazardous waste,” or they are considered hazardous by national definition of the party of export, import or transit, then they are defined as “other wastes.”

²⁹⁸ Basel Convention, *supra* note 133, art. 1(1)(b)

²⁹⁹ Basel Convention, *supra* note 133, art. 1(2)

³⁰⁰ Basel Convention, *supra* note 133, art. (1)(2) and Annex II

³⁰¹ *Id.*

2) Those hazardous or other wastes must be subject to transboundary movement.

3. E-Waste

E-Waste may also be controlled under the Basel Convention if it meets the two-step requirement. Parties to the Convention recognized the growing problem of e-waste trade and at the fourth meeting of Conference of the Parties (COP-4) in February 1998, the Conference, decided to add two more lists of wastes, List A and B. The specific wastes contained on these two lists are an elaboration and clarification of the provisions of Article 1, paragraph 1(a) of the Convention by reference to the Annexes I and III. The two new lists, prepared by the Technical Working Group as two new annexes to the Convention, namely Annex VIII (List A) and Annex IX (List B) specifically included e-waste as hazardous waste under the scope of the Basel Convention with some exceptions. In particular, wastes contained in List A are presumed to be hazardous and thus subject to the control of the Basel Convention unless they do not possess any of the characteristics contained in Annex III.

The following entries of Annex VIII are applicable to e-waste.

- A1010 Metal wastes and waste consisting of alloys of any of the following:
- Antimony
 - Arsenic

- Beryllium
- Cadmium
- Lead
- Mercury
- Selenium
- Tellurium
- Thallium

but excluding such wastes specifically listed on list B.

A1020 Waste having as constituents or contaminants, excluding metal waste in massive form, any of the following:

- Antimony; antimony compounds
- Beryllium; beryllium compounds
- Cadmium; cadmium compounds
- Lead; lead compounds
- Selenium; selenium compounds
- Tellurium; tellurium compounds

A1030 Wastes having as constituents or contaminants any of the following:

- Arsenic; arsenic compounds
- Mercury; mercury compounds
- Thallium; thallium compounds

A1150 Precious metal ash from incineration of printed circuit boards not included on list B

A1160 Waste lead-acid batteries, whole, or crushed

- A1170 Unsorted waste batteries excluding mixtures of only list B batteries.
Waste batteries not specified on list B containing Annex I constituents
to an extent to render them hazardous
- A1180 Waste electrical and electronic assemblies or scrap³⁰² containing
components such as accumulators and other batteries included on list
A, mercury-switches, glass from cathode-ray tubes and other activated
glass and PCB-capacitors, or contaminated with Annex I constituents
(e.g., cadmium, mercury, lead, polychlorinated biphenyl) to an extent
that they possess any of the characteristics contained in Annex III.³⁰³
- A2010 Glass waste from cathode-ray tubes and other activated glasses

B. Waste Excluded from the Scope of the Basel Convention

1. Radioactive Wastes

Certain types of wastes are not under the scope of the Basel Convention. Article 1(3) excludes radioactive wastes from the Convention's scope and delegates the regulation of those wastes to other international instruments.³⁰⁴

³⁰² This entry does not include scrap assemblies from electric power generation.

³⁰³ PCBs are at a concentration level of 50 mg/kg or more.

³⁰⁴ Basel Convention, *supra* note 133, art. 1(3)

2. Wastes from the Normal Operations of a Ship

Wastes that derive from the normal operations of ships are also excluded from the scope of the Convention. The term “wastes derived from the normal operations of ships” is generally meant to refer to waste generated in the course of activities directly related to the purpose of the ship.³⁰⁵ This type of waste is regulated by the International Convention for the Prevention of Pollution from Ships (MARPOL Convention) and its protocol.³⁰⁶

3. E-Waste Destined for Direct Reuse (including repair, refurbish, and upgrade but not major reassembly).

Annex IX List B contains lists of wastes presumed not to be hazardous and thus excluded from the scope of the Basel Convention unless they contain Annex I material to an extent causing them to exhibit an Annex III characteristics. Entry B1110, in particular, is applicable to e-waste.

B1110 Electrical and Electronic assemblies:

- Electronic assemblies consisting only of metals or alloys
- Waste electrical and electronic assemblies or scrap³⁰⁷ (including printed circuit boards) not containing components such as

³⁰⁵ KUMMER, *supra* note 247, at 52.

³⁰⁶ Russell H. Shearer, *Comparative Analysis of the Basel and Bamako Conventions on Hazardous Waste*, 23 *Envtl. L.* 141, 156 (1993).

³⁰⁷ This entry does not include scrap from electrical power generation.

accumulators and other batteries included on list A, mercury-switches, glass from cathode-ray tubes and other activated glass and PCB-capacitors, or not contaminated with Annex I constituents (e.g., cadmium, mercury, lead, polychlorinated biphenyl) or from which these have been removed, to an extent that they do not possess any of the characteristics contained in Annex III (note the related entry on list A 1180)

- Electrical and electronic assemblies (including printed circuit boards, electronic components and wires) destined for direct reuse³⁰⁸, and not for recycling or final disposal.³⁰⁹

Entry B1110 is the exception criteria when determining whether e-waste falls under the scope of the Basel Convention. The first criterion lies in e-waste components. If the e-waste components no longer possess Annex III characteristics, e-waste in question will not subject to the Basel Convention. The second criterion relies on the disposal destination and recovery process. As discussed in Chapter I, e-waste also includes products that are still functioning but are no longer needed by the owners. These types of e-waste can be reused, repaired, refurbished or upgraded (but not major reassembly) and therefore are not considered wastes, but are regarded as used electronic products in some countries. Consequently, the Basel Convention,

³⁰⁸ Reuse can include repair, refurbishment or upgrading, but not major reassembly.

³⁰⁹ In some countries, these materials destined for direct re-use and not considered waste.

with a primary goal of controlling hazardous waste, exempts used products destined for reuse, refurbish, and upgrade from its scope.

While the Basel Convention defines “disposal operations” to include direct reuse in Annex IV B, entry B1110 made a clear distinction for e-waste destined for direct reuse to be excluded from the scope of the Convention. Although used electronic products may not be considered as waste in some countries, this exception may overlook another important dimension of e-waste –a foreseeable lifespan– and undermine the primary goal of the Basel Convention. This issue will be discussed further in the assessment of the Basel Convention.

VI. General Obligations of the Basel Convention

Article 4 contains 13 provisions outlining the general obligations of the Basel Convention. Party States are required to take appropriate measures in order to achieve these obligations.

A. Minimization of generation and transboundary movement of hazardous wastes

The Basel Convention emphasizes that the most effective way of protecting human health and the environment from the dangers posed by such waste is the reduction of their generation to a minimum in terms of quantity and/or hazard

potential.³¹⁰ Parties are required to take appropriate measures to ensure the reduction of hazardous waste to a minimum, taking into account social, technological and economic aspects.³¹¹ Under the principle of proximity of disposal, the transboundary movement of hazardous wastes must also be minimized to the minimum consistent with environmentally sound and efficient management of such wastes.³¹² The Basel Convention accentuates that these wastes should be disposed of in the state or close to the site where they were generated.³¹³ Importing parties may prohibit the import of hazardous waste but must consent in writing to the specific imports they have not prohibited.³¹⁴

B. Environmentally sound management of hazardous waste

Parties to the Basel Convention, exporting, transit and importing States are obligated to manage the transboundary movement of hazardous wastes in an environmentally sound manner.³¹⁵ However, States where hazardous wastes are generated have the primary duty to ensure environmentally sound management and may not, under any circumstances, transfer this obligation to the importing or transit

³¹⁰ Basel Convention, *supra* note 133, Preamble

³¹¹ Basel Convention, *supra* note 133, art. 4(2)(a).

³¹² Basel Convention, *supra* note 133, art. 4(2)(d)

³¹³ Basel Convention, *supra* note 133, Preamble

³¹⁴ Basel Convention, *supra* note 133, art. 4(1)(a) and (c).

³¹⁵ Basel Convention, *supra* note 133, art. 4(8)

States.³¹⁶ The generating States thus retain a responsibility for ensuring its proper management at all stages until final disposal. Moreover, each party must ensure the availability of disposal facilities for the environmentally sound management of hazardous wastes located within it.³¹⁷ Hazardous wastes may be exported only if the State of export does not have the technical capacity and facilities to dispose of them in an environmentally sound and efficient manner, or if the wastes are required as raw material for recycling or recovery industries in the state of import, or in accordance with additional criteria to be determined by the party States.³¹⁸

The term “environmentally sound management of hazardous wastes or other wastes” generally means taking practicable steps to ensure that hazardous wastes or other wastes are managed in a manner that will protect human health and the environment against the adverse effect that may result from such wastes.³¹⁹ The Convention itself does not give much detail on what would constitute environmentally sound management. Various provisions, however, provide some steps to be taken for the management of hazardous wastes according to the Convention’s goals. The transport and disposal of hazardous and other wastes may only be carried out by authorized persons, and transboundary movement must conform with generally accepted and recognized international rules and standards in

³¹⁶ Basel Convention, *supra* note 133, art. 4(10)

³¹⁷ Basel Convention, *supra* note 133, art. 4 (2)(b).

³¹⁸ Basel Convention, *supra* note 133, art. 4(9)

³¹⁹ Basel Convention, *supra* note 133, art. 2

the field of packaging, labeling, and transporting, taking into account relevant internationally recognized practices, and be accompanied by a movement document containing the declaration and information specified in Annex V A from a starting point until disposal.³²⁰

C. Duty of Cooperation and Information

Parties must provide information on proposed transboundary movements of hazardous wastes and other wastes to the states concerned, and prevent imports if they have reason to believe that the imports will not be managed in an environmentally sound manner.³²¹ The exporting states have the parallel obligation not to allow the export of wastes to parties that have prohibited, by their legislation, all imports, or if they have reason to believe that the wastes will not be managed in an environmentally sound manner.³²² Transboundary movements to or from non-party States to the Basel Convention are strictly prohibited³²³ unless there are other bilateral, multilateral, or regional agreements governing the transboundary movement of hazardous wastes. However, those agreements must contain provisions on environmentally sound management that meet the Basel Convention's standard.³²⁴

³²⁰ Basel Convention, *supra* note 133, art. 4(7) and 6(1)

³²¹ Basel Convention, *supra* note 133, art. 4(2)(f) and (g).

³²² Basel Convention, *supra* note 133, art. 4(2)(e)

³²³ Basel Convention, *supra* note 133, art. 4(3).

³²⁴ Basel Convention, *supra* note 133, art. 11.

VII. Restrictions on Transboundary Movement of Hazardous Wastes

The Basel Convention sets out some restrictions on transboundary movement of hazardous wastes and other wastes. These restrictions shall be taken into account when assessing the state of import's ability to accept particular waste.

A. Hazardous waste movement between parties

Every state has its sovereign right to prohibit the import of hazardous wastes into its territory for transit or disposal.³²⁵ Any state wishing to exercise this right must inform the other parties, through the Convention Secretariat, of its decision.³²⁶ Party States shall prohibit the export of hazardous wastes and other wastes to a party which has exercised its sovereign right referred to in Article 4, Paragraph 1(a) to prohibit the import.³²⁷ In the event that State of import has not prohibited the transboundary movement of such wastes, a written consent to the specific import is required.³²⁸ The parties must also ban the export of hazardous wastes and other wastes to a group of States, belonging to an economic and/or political integration organization, particularly developing countries, which prohibit such imports by their legislation.³²⁹ Moreover, each party shall not allow the export of such wastes if it has

³²⁵ Basel Convention, *supra* note 133, Preamble para. 6 and art. 4(1)(a)

³²⁶ Basel Convention, *supra* note 133, art. 4(1)(a) and art. 13(2)(c)

³²⁷ Basel Convention, *supra* note 133, art. 4(1)(b)

³²⁸ Basel Convention, *supra* note 133, art. 4(1)(c)

³²⁹ Basel Convention, *supra* note 133, art. 4(2)(e)

reason to believe that the wastes in question will not be managed in an environmentally sound manner.³³⁰

B. Hazardous waste movement between parties and non parties

The Basel Convention adopted the concept of a limited ban, which prohibits parties to the Basel Convention from import or export to non-parties.³³¹ However, a transit of hazardous wastes from a party through a non-party State, by implication, is not included in this limited ban and therefore not prohibited, provided that the transboundary movement is carried out in accordance with the notification procedure.³³² This provision is designed to prevent party States from engaging in hazardous waste trade with non-party States in order to ensure the application of the Basel Convention's rules and standards in all transactions.³³³ It also provides incentives for non-party States to accede to the Convention. However, this concept of limited ban is modified by Article 11, which allows parties to the Convention to be excluded from the Basel Convention's system. Article 11 will be discussed further.

³³⁰ *Id.*

³³¹ Basel Convention, *supra* note 133, art. 4(5)

³³² Basel Convention, *supra* note 133, art. 7 and 6(1)

³³³ KUMMER, *supra* note 247, at 61.

C. Absolute prohibition

Waste export to Antarctica for disposal is prohibited, whether or not such wastes are subject to transboundary movement as defined by the Basel Convention.³³⁴

D. The Basel Ban Amendment: Prohibition of hazardous waste movement from Annex VII to non-Annex VII countries

Article 15 of the Basel Convention established a Conference of the Parties (COP) to act as a government body of the Basel Convention. One of the COP duties is to hold a regular interval meeting.³³⁵ At the second meeting (COP-2) in March 1994, the parties agreed to an immediate ban on the export of hazardous waste intended for disposal from OECD³³⁶ to non-OECD countries and extend the ban to hazardous wastes destined for recovery by December 31, 1997 (Decision II/12). However, a question was raised with regard to the legal binding effect of COP Decision because the Decision was not incorporated into the text of the Basel Convention. As a result, the Basel Ban was proposed in the third meeting of COP in

³³⁴ Basel Convention, *supra* note 133, art. 4(6)

³³⁵ Basel Convention, *supra* note 133, art. 15(1)

³³⁶ Organization for Economic Co-operation and Development (OECD) consists of 33 member countries who share the common distinction of being among the world's wealthiest and most economically developed. The members of the OECD are: Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, and United States.

1995 (Decision III/1) to be adopted into the text of the Convention as an amendment to Article 4.

The scope of the Basel Ban in the Decision III/1 does not use the distinction between OECD and non-OECD as it originated. Rather, Decision III/1 proposed a new annex, Annex VII, which covers “Parties and other States which are members of OECD, EC³³⁷, Liechtenstein” as the distinction for the ban. The amendment of the Convention and the Annex must follow the procedure prescribed in Article 17.

Article 17 (5) of the Basel Convention reads “Instruments of ratification, approval, formal confirmation or acceptance of amendments shall be deposited with the Depositary. Amendments adopted in accordance with paragraphs 3 or 4 [of Article 17 of the Convention] shall enter into force between Parties having accepted them on the ninetieth day after the receipt by the Depositary of their instrument of ratification, approval, formal confirmation or acceptance by at least three-fourths of the Parties who accepted the amendments to the Protocol concerned, except as may otherwise be provided in such protocol. The amendments shall enter into force for any other Party on the ninetieth day after that Party deposits its instrument of ratification, approval, formal confirmation or acceptance of the amendments.” Currently, there

³³⁷ European Community (EC), now European Union (EU) consists of 27 countries founded to enhance political, economic, and social co-operation in the European region. Member states of EC are: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom of Great Britain and Northern Ireland.

are only 69 parties ratifying the Ban Amendment, less than three-fourths of the parties who accepted it. Consequently, the Amendment has not yet entered into force.³³⁸

VIII. Article 11 exclusion

Article 11 of the Basel Convention has been the focus of a controversial debate since the provision is seen to simply weaken the concept of limited ban as stated in Article 4. On the other hand, Article 11 allows parties and non-parties to create an agreement with higher standards and more details suitable to the nature of their waste trades.

Article 11 states:

1. Notwithstanding the provisions of Article 4 paragraph 5, Parties may enter into bilateral, multilateral, or regional agreements or arrangements regarding transboundary movement of hazardous wastes or other wastes with Parties or non-Parties provided that such agreements or arrangements do not derogate from the environmentally sound management of hazardous wastes and other wastes as required by this Convention. These agreements or arrangements shall stipulate provisions which are not less environmentally sound than those

³³⁸ United Nations, *Status of Treaties*, United Nations Treaty Collection, at http://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-3-a&chapter=27&lang=en (last visited June 23, 2010).

provided for by this Convention in particular taking into account the interests of developing countries.

2. Parties shall notify the Secretariat of any bilateral, multilateral or regional agreements or arrangements referred to in paragraph 1 and those which they have entered into prior to the entry into force of this Convention for them, for the purpose of controlling transboundary movements of hazardous wastes and other wastes which take place entirely among the Parties to such agreements. The provisions of this Convention shall not affect transboundary movements which take place pursuant to such agreements provided that such agreements are compatible with the environmentally sound management of hazardous wastes and other wastes as required by this Convention.

Article 11 of the Basel Convention gives parties the right to enter into bilateral, multilateral, or regional agreements on transboundary movement of hazardous wastes with other parties as well as non-parties, provided that such agreements conform to the environmentally sound management of hazardous wastes and other wastes provisions as required by the Basel Convention.³³⁹ These agreement provisions shall not be less environmentally sound than those provided by the Basel Convention in particular taking into account the interests of developing countries.³⁴⁰

³³⁹ Basel Convention, *supra* note 133, art. 11(1)

³⁴⁰ *Id.*

The Secretariat must be notified of any agreement entered into by a party State either before or after the entry into force of the Basel Convention.³⁴¹ If all the conditions are met, the provisions of the Basel Convention, thus, do not affect the transboundary movement of hazardous wastes and other wastes pursuant to such agreements.³⁴²

Examples of an agreement within the meaning of Article 11 include the North American bilateral agreements on transboundary movement of hazardous waste between Canada and United States and between United States and Mexico, the Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement of Hazardous Wastes within Africa, and the Organization of Economic Co-operation and Development Decision and Recommendation of the Council Concerning the Control of Transfrontier Movements of Hazardous Wastes.

IX. The Control System

The transboundary movements of hazardous wastes and other wastes, which do not fall under restrictions and which are in conformity with the general obligations, must be carried out under the Convention's control system. Article 6 sets forth the regulatory system for the transboundary movement between parties, referred to as the

³⁴¹ Basel Convention, *supra* note 133, art. 11(2)

³⁴² *Id.*

“Prior Informed Consent (PIC) Procedure.” Parties must designate at least one competent authority to oversee the PIC procedure.³⁴³

The State of export must notify the prospective importing and transit State of any intended transboundary movement of hazardous wastes.³⁴⁴ The notification must be in written form and contain information sufficiently detailed as specified in Annex V A, including the reason for the export, the exporter and the generator, the site and process of generation, the nature of the wastes and its packaging, the site and method of disposal and the disposer, etc. in a language acceptable to the importing State.³⁴⁵ The State of import then has several options; accept the movement with or without conditions, reject the movement, or request further information.³⁴⁶ Copies of the final response of the importing State must be sent to the competent authorities of the State parties involved in the transaction.³⁴⁷

In any event, the exporting State must not allow the transboundary movement of hazardous wastes until it received written consent and a contract between the exporter and the disposer, specifying the environmentally sound management of the

³⁴³ Basel Convention, *supra* note 133, art. 5 and 6

³⁴⁴ Basel Convention, *supra* note 133, art. 6 para.1

³⁴⁵ Basel Convention, *supra* note 133, art. 6 para.1 and Annex V A

³⁴⁶ Basel Convention, *supra* note 133, art. 6 para. 2

³⁴⁷ *Id.*

wastes.³⁴⁸ Transit states can prohibit transit passage, and the exporting State must not allow transboundary movement to commence until it has the written consent of the transit State.³⁴⁹ The convention allows for the use of general notifications, with the prior written consent of importing and transit States, for shipments of wastes having the same characteristics and the same transport route, for a maximum period of twelve months.³⁵⁰

Importing and transit States which are parties to the convention may require that the transboundary movement of hazardous wastes be covered by insurance, bond or other guarantee.³⁵¹ After the completion of disposal operation, the exporting State must be informed accordingly.³⁵²

X. Illegal Traffic

Illegal traffic occurs when parties to the Basel Convention conduct a transboundary movement of hazardous wastes in contravention to their obligations required under the PIC system. Illegal traffic is considered a criminal offense.³⁵³ Article 9(1) of the Basel Convention specifies circumstances which cause the

³⁴⁸ Basel Convention, *supra* note 133, art. 6 para. 3.

³⁴⁹ Basel Convention, *supra* note 133, art. 6 para. 4.

³⁵⁰ Basel Convention, *supra* note 133, art. 6 para. 6-8.

³⁵¹ Basel Convention, *supra* note 133, art. 6 para. 11.

³⁵² Basel Convention, *supra* note 133, art. 6 para. 9.

³⁵³ Basel Convention, *supra* note 133, art. 4 para. 3.

movement to be illegal, including a movement in violation of prior informed consent provisions, movement with falsified consent, misrepresentation or fraud, movement that does not conform in a material way with the documents, and movement that results in deliberate disposal of hazardous waste in contravention of the Basel Convention and of the general principles of international law.³⁵⁴

Article 9(2) to (4) stipulates the duties of States involved in the illegal traffic to either take back the hazardous waste or responsible for the disposal of such waste in an environmentally sound manner. The Convention does not contain any enforcement provisions but renders the parties to the Convention an obligation to cooperate among themselves in enacting national or domestic legislation to prevent and punish illegal traffic.³⁵⁵

XI. Liability and Compensation

Article 12 instructs parties to prepare a protocol addressing rules and procedures for liability and compensation for damage resulting from hazardous waste trade.³⁵⁶ After six years of negotiation, the Basel Protocol on Liability and Compensation³⁵⁷ was adopted at the Fifth Conference of Parties (COP-5) on

³⁵⁴ Basel Convention, *supra* note 133, art. 9 para. 1.

³⁵⁵ Basel Convention, *supra* note 133, art. 9 para. 5.

³⁵⁶ Basel Convention, *supra* note 133, art. 12.

³⁵⁷ Basel Protocol on Liability and Compensation for Damage Resulting from Transboundary Movements of Hazardous Wastes and their Disposal, Dec. 10, 1999, available at <http://basel.int/meetings/cop/cop5/docs/prot-e.pdf> (last visited June 12, 2010) [hereinafter Basel Protocol].

December 10, 1999. The objective of the Protocol is to provide for a comprehensive regime for liability as well as adequate and prompt compensation for damage resulting from the transboundary movement of hazardous wastes and other wastes, including incidents occurring because of illegal traffic in those wastes.³⁵⁸

The Protocol imposes financial responsibility in the event of an incident that causes damages, including illegal traffic on generators, exporters, importers, and disposers at different stages of waste's journey –from the point where the wastes are loaded on the means of transport in the country of export to the international transit, import, and final disposal.³⁵⁹ The Protocol also established two types of liability: strict liability and fault-based liability. Strict liability applies in two cases – when both importing and exporting States are parties to the Basel Convention, and when trading with non-party States to the Basel Convention for damages caused while the waste is in possession of a party State.³⁶⁰ Fault-based liability applies when damages occurred as a result of failure to comply with the Basel Convention, or by wrongful, intentional, reckless, or negligent acts or omissions.³⁶¹ When several parties are liable, liability is joint and several. Strict liability limits are determined by national

³⁵⁸ Basel Protocol, *supra* note 357, art. 1.

³⁵⁹ Basel Protocol, *supra* note 357, art. 3.

³⁶⁰ Basel Protocol, *supra* note 357, art. 4.

³⁶¹ Basel Protocol, *supra* note 357, art. 5.

law.³⁶² However, the Protocol also set a minimum level of financial liability using a formula based on the amount of waste.³⁶³

Although UNEP praises the Protocol as a major breakthrough at an international level since legal instruments that impose comprehensive liability for international environmental harms are rare, the Protocol has been heavily criticized by environmentalists for its weaknesses, such as failure to assign liability for the consequences after the disposal, including long-term air, soil and groundwater pollution.³⁶⁴ The Protocol does not apply to damage from transboundary movements of hazardous wastes carried out under Article 11 bilateral, multilateral, or regional agreements of the Basel Convention when those agreements provide liability regimes that fully meet or exceed the Protocol's provisions.³⁶⁵

Under Article 29, the Protocol will enter into force and become part of the Basel Convention when twenty countries ratify the provision. Currently, there are only 13 signatories and 10 parties to the Protocol; thus, the Protocol has not yet entered to force.

³⁶² Basel Protocol, *supra* note 357, Annex B(1).

³⁶³ Basel Protocol, *supra* note 357, Annex B(2).

³⁶⁴ HUNTER ET AL., *supra* note 144, at 965.

³⁶⁵ Basel Protocol, *supra* note 357, art. 3(7) and art. 11.

XII. Governance

The Basel Convention creates its administrative, policy-making, and compliance system in order to ensure the implementation of the Convention in a suitable manner to the emerging global waste management regime. At an international level, the governance system consists of two primary bodies – Conference of the Parties (COP) and the Secretariat. The COP has the power to create any subsidiary bodies as necessary.

A. Conference of the Parties (COP)

COP, established by Article 15 of the Convention, is the governing body of the Basel Convention³⁶⁶ and is composed of all governments that have ratified or acceded to it.³⁶⁷ The COP has the overall policy-making power and meets periodically every 1-3 years to review and evaluate the effective implementation of the Convention.³⁶⁸ In addition, the Conference may consider and adopt amendments or protocols to the Convention as well as establish subsidiary bodies as necessary for the implementation of the Convention.³⁶⁹

³⁶⁶ Basel Convention, *supra* note 133, art. 15.

³⁶⁷ Secretariat of the Basel Convention, Governing Bodies: COP, at <http://basel.int/convention/govbod.html> (last visited December 22, 2009).

³⁶⁸ Basel Convention, *supra* note 133, art. 15 para. 5.

³⁶⁹ *Id.*

A number of subsidiary bodies established by the Conference include:

- *The Open-Ended Working Group (OEWG)* was assigned to assist the Conference of the Parties in the development, evaluation, and implementation of the Convention's work plan, specific operational policies and decisions taken by the Conference of the Parties for the implementation of the Convention.³⁷⁰
- *The Expanded Bureau* provides administrative and operational support to the secretariat between the meetings of the Conference of the Parties as well as to the Open-ended Working Group.³⁷¹
- *The Compliance Committee* oversees the mechanism to promote the Convention's implementation and assists the parties in fulfilling their obligations under the Convention.³⁷²
- *Ad Hoc Working Groups* are established under Decision III/4 at the third meeting of COP to perform the tasks assigned by the COP on an ad hoc basis. Examples include the Working Group for the Implementation, the Legal Working Group, the Technical Working Group, and the Ad Hoc Working Group on a Protocol on Liability and Compensation.

³⁷⁰ Secretariat of the Basel Convention, *Governing Bodies*, at <http://basel.int/convention/govbod.html> (last visited September 12, 2010).

³⁷¹ *Id.*

³⁷² Secretariat of the Basel Convention, *Implementation and Compliance Committee*, at <http://basel.int/legalmatters/compcommittee/index.html> (last visited September 12, 2010).

B. The Secretariat

Article 16(1) of the Basel Convention established the Secretariat and its functions. The Secretariat is primarily responsible for facilitating the meetings, preparing reports, communicating with Competent Authorities, compiling and exchanging information, and supporting international co-operation.³⁷³ The Secretariat also has a duty to assist parties in identifying cases of illegal traffic and secure necessary equipments and experts in the event of emergency situation.³⁷⁴

At a national level, each party is required to designate or establish two agencies –a competent authority and a focal point– to facilitate the implementation of the Convention.³⁷⁵ Parties may designate one or more governmental competent authorities for the management of the control procedure by receiving and responding to a notification of a transboundary movement of hazardous wastes and other wastes.³⁷⁶ A focal point is responsible for the exchange of information with other parties and with the Secretariat.³⁷⁷

³⁷³ Basel Convention, *supra* note 133, art. 16(1)(a)-(h).

³⁷⁴ Basel Convention, *supra* note 133, art. 16(1)(i)-(j).

³⁷⁵ Basel Convention, *supra* note 133, art. 5(1).

³⁷⁶ Basel Convention, *supra* note 133, art. 2(6).

³⁷⁷ Basel Convention, *supra* note 133, art. 2(7).

XIII. Settlement of Disputes

Article 20 of the Convention provides two channels when a dispute occurs. First, parties can seek a settlement of dispute by negotiation or other peaceful means. Second, if the negotiation was not successful and the parties agreed, they can submit their dispute to the International Court of Justice or arbitration under the conditions specified in Annex VI.³⁷⁸

XIV. Assessment of the Basel Convention in the Context of E-Waste Trade

The Basel Convention is the only existing international treaty addressing the issue of transboundary movement of hazardous wastes, including e-waste, and their disposal. It represents a compromise and a consensus of nearly 200 countries in the world, spanning a great variety of histories, legal systems, and economic and social cultures, in order to achieve a common goal of minimizing hazardous waste and to enhance the environmentally sound management of hazardous wastes.

³⁷⁸ Basel Convention, *supra* note 133, art. 20.

A. Benefits of the Convention

1. Restriction of transboundary movements of hazardous wastes

In response to the countless tragic incidents in which developing countries were used as dumping grounds for hazardous wastes from developed countries as a result of unregulated trades, the Basel Convention was intended to reduce the volume and particular types of hazardous wastes trade, taking into account the impact to human health and the environment. The global notification and consent system or Prior Informed Consent (PIC) system illustrates the principle of shared responsibility to protect health and environment among States and principal of good neighborliness.

The PIC system may be seen as a legalization of hazardous wastes trades rather than an absolute prohibition on all hazardous wastes trade. However, the preamble and Article 4(1) of the Basel Convention confirms States' sovereign rights to ban individually or regionally the importing of hazardous wastes into their territories³⁷⁹. This provision allows States to create the best measures that are most suited to their policies and interests. The Basel Convention strengthens the rights to prohibit trade in hazardous waste by providing for import bans in which other parties are notified through the Secretariat. No State may then permit transboundary movement of hazardous waste to the parties exercising their import ban rights. The African Union, for example, decided to ban all imports of hazardous wastes from

³⁷⁹ Basel Convention, *supra* note 133, Preamble and art. 4(1)(a).

non-African countries by creating the Bamako Convention on the Ban of Import into Africa and the Control of Transboundary Movement of Hazardous Wastes within Africa.

2. Minimization of hazardous wastes generation

The underlying solution to the damages as a result of transboundary movement of hazardous wastes is the minimization of hazardous waste generation and the promotion of self-sufficiency in waste management at the source. This preventative principal is one of the general obligations under the Basel Convention. It is clear that the hazardous substances are significant in technological and industrial productions. Recycling and resource recovery present the prime advantage in the decrease in both demand for virgin resources and production of hazardous wastes. The Basel Convention, therefore, permits transboundary movement of hazardous waste only in circumstances where the State exporting the goods does not have the necessary technical capacity or facilities to dispose or recycle the wastes or when the wastes are required as a raw material for recycling or recovery in the State of import.

Moreover, Article 10(4) of the Basel Convention requires an international co-operation among parties to promote technology transfer for the development of sound management of hazardous waste and the creation of cleaner production technologies.

3. Environmentally Sound Management Standard

The Basel Convention stipulates the “environmentally sound management” standard for waste disposal operations for the protection of human health and the environment. While “environmentally sound management” is only defined in a broad and general sense, the Technical Working Groups, a subsidiary body of the Basel Convention, has continued working to prepare sets of provisional guidelines on the environmentally sound management of different categories of wastes in order to establish a global standard and reference for State parties. Parties are under the obligation to take appropriate measures to ensure the environmentally sound management of wastes before permitting any import or export. The Convention allows for parties’ discretions and interpretations suitable to their abilities.

4. Framework for National and Regional Implementation

The Basel Convention imposes liability on States involved in the transboundary movement of hazardous wastes. States are obligated to take appropriate legal, administrative and other measures to ensure the implementation and enforcement of the Basel Convention. In this respect, the subsidiary bodies under the Basel Convention (such as, the Working Group for Implementation, the Technical Working Group, and the Legal Working Group) develop and prepare guidelines that are intended to be reference documents for the adoption and implementation of national waste management strategies in compliance to the Basel Convention’s obligations.

5. Control of E-Waste Trade

The Basel Convention continues its development in response to a new series of wastes, namely e-waste, by elaborating the term “wastes” and adding Annex VIII List A, which includes under the rubric of waste electrical and electronic assemblies or scrap to be controlled under the Basel Convention. E-waste has more complex characteristics than other types of wastes and therefore requires different standards to ensure the environmentally sound management. The Conference of the Parties has devoted its eighth meeting (COP-8) to the issue of e-waste and initiated a Partnership Programme for the environmentally sound management of end-of-life mobile phones and end-of-life computing equipment.

B. Weaknesses of the Convention

1. Broad and Indefinite Terms

A number of provisions under the Basel Convention use terms that are too broad or too imprecise, which creates loopholes in the implementation.

Article 4(2)(a) instructs parties to take *appropriate* measures to ensure that the generation of hazardous wastes and other wastes within it is reduced to a minimum, “*taking into account social, technological and economic aspects*” (emphasis added). This obligation is not absolute because it leaves open the extent of appropriate measures pursuant to social, technological, and economic aspects of each country.

The crucial notion of “environmentally sound management” is used as a condition before commencing any trade but it is defined only in general terms. Although the subsidiary bodies of the Basel Convention has worked on creating guidelines for the sound management of various waste types, this broad definition allows for States’ different interpretations, which may cause future controversies especially in the issue of electronic wastes because they contain a number of complex components, requiring different methods and standards in the treatment process from other hazardous wastes. Comprehensive definitions of these terms are needed in order to effectively implement the obligations on the parties.

2. Article 11 exclusion

The Basel Convention permits parties to enter into a bilateral, multilateral, or regional agreement with other parties or non-parties so long as such agreements contain provisions comparable to the environmentally sound management standards under the Basel Convention. This exception provision is meant to undermine the effectiveness of the Basel Convention because it allows parties and non-parties to trade outside the control system laid down in the Basel Convention.

Although Article 11 specifies the condition of an equal level of environmentally sound management, defined as “taking all practicable steps to ensure that hazardous wastes or other wastes are managed in a manner which will protect human health and the environment against the adverse effects which may result from

such wastes,” this definition alone is too broad and is subject to the view and interpretation of exporting and importing States. The technical guidelines, issued by the subsidiary bodies, may give a better picture of what constitutes the environmentally sound management but these guidelines are not considered part of the Basel Convention and thus are not binding.

3. The Non-Party Status of the United States to the Basel Convention

The United States remains a signatory but not a party to the Basel Convention, although there have been many attempts to adopt and include the obligations under the Convention into domestic laws. This lack of participation by the United States has had a significant impact to the effectiveness of the Convention because the US is one of the largest generators and exporters of e-waste. Moreover, the US environmental law regarding the issue of trade in e-waste, RCRA, which exempts toxic electronic components destined for recycling or recovery from its scope, is a major contributor to the growing unregulated e-waste trade.

4. The Exception of E-Waste Destined for Direct Reuse

The Basel Convention adopted two additional lists of wastes to clarify wastes subject to the Basel Convention (Annex VIII List A) and wastes excluded from the Basel Convention (Annex IX List B). With regards to e-waste, the Convention exempts electrical and electronic assemblies destined for direct reuse, including repair, refurbishment, and upgrading, from its control procedure unless national

legislation stated otherwise. This exception derived from the notion that such objects are not wastes but second-hand or used products. While it might be true that functional but used items are not yet wastes, electrical and electronic assemblies are also known to have a certain lifespan. This exception creates a big loophole and allows e-waste exporters to export products that have very little lifespan left to other countries outside the Basel Convention's control system before these products reach the end of their lives and become wastes.

Moreover, although the term “repair”³⁸⁰ was not defined under the Convention, the general meaning refers to a product in which something is broken or damaged. Within this general definition, certain parts or components of electronic products in need of repair are those that are not functioning and need to be replaced. The non-functioning part may clearly be considered hazardous waste, as it applies to the definitions of waste in the Convention. However, the Basel Convention does not provide any restrictions regarding what needs to be done with the part before the trade takes place. If, for instance, a computer is sent to be repaired and the parts in need of repair contain hazardous materials, the Basel Convention does not contain language to restrict the shipping or disposal of this product because it falls under the category of “repair,” even though the part in need of repair would clearly on its own fall under the definition of hazardous waste as outlined in the Convention. Thus, as a result, the Basel Convention allows for a large amount of e-waste as a result of this loophole.

³⁸⁰ OXFORD DICTIONARY defines repair as “the action of restore something damaged, faulty, or worn to a good condition”

XV. Current Situations of E-Waste Trade

The background and history of electronic wastes trade discussed earlier present the reasoning and motivation behind the continuity in such practices. Although e-waste trade may appear to be perfectly suitable to the economic supply and demand formula, problems associated with this trade, including the threat to human health and environment may outweigh the short-term economic benefits. While the benefits of the technological revolution are well known, the health and environmental impact from electronic wastes, discussed in Chapter I, have only recently received attention. Electronic wastes trades, therefore, require proper standards and regulations in order to prevent those potential hazards and ensure safe management.

Reports prepared by many non-governmental organizations, such as Greenpeace, Toxic Links, Silicon Valley Toxic Coalition (SVTC), and the Basel Action Network (BAN), witnessed a significant amount of e-waste being exported to developing countries in Asia, Africa and Latin America, for example, China, India, and Nigeria, etc. where they are either disposed of or recycled by primitive methods that threaten human health and the environment, regardless of the fact that these countries are party to the Basel Convention. This section will explore the current situations in some of these major recipients of e-waste in the context of their relationships with the Basel Convention provisions.

Although these problems are evidenced in many other countries, especially in African, Asian, and Latin American regions, the two most discussed countries – China and India – will be used as examples in this dissertation.

A. China

In December 2001, the Basel Action Network (BAN) and a supporting group of Greenpeace conducted an investigation to the recycling conditions of imported e-waste in China. Guiyu, a small rural town in the Guangdong Province of China, has been converted from a rice-growing community into a busy e-waste processing center, where each neighborhood handles the processing of different parts of electronic wastes for approximately \$1.50 per day.³⁸¹ Most of these wastes, according to institutional labels, markings, maintenance stickers, and phone numbers, originated in North American countries.

Workers, including women and children, are seen working in the so-called “recycling” operations, where the activities take place in the open scrap-yard by using simple dismantling tools, such as hammer, chisel, screw driver, or even bare hand and without any proper clothing respiratory protective equipments.³⁸² These operations encompass printers dismantled to retrieve residual toner, open burning of wires and removing copper-laden yokes to recover copper, de-soldering circuit boards to

³⁸¹ Exporting Harm Report, *supra* note 23, at 16.

³⁸² Grossman, *supra* note 50, at 183..

remove chips for resale or for gold recovery, and acid-stripping of chips from circuit boards to remove precious metals.³⁸³ As discussed in Chapter I, improper managements like these operations in Guiyu, pose great risks to both workers' health and the surrounding environment, while local residents have limited knowledge of this hidden threat.³⁸⁴

China is a party to the Basel Convention; therefore, it is considered illegal for non-party States, such as the United States, to conduct an e-waste trade with China unless there is a separate bilateral or multilateral agreement between non-party States and China governing trade in e-waste provided that such agreement conforms with the environmentally sound management requirements stipulated by the Basel Convention. However, the recycling operations in Guiyu are clearly not conducted in an environmentally sound manner. China, as a party to the Basel Convention, is obligated to prevent the import of e-waste. Other parties to the Basel Convention must not allow the export of e-waste to China. Although Guiyu is only one town and may not represent the recycling practices in other areas of China, it should trigger an alarm to the existence of harmful processes.

The current condition in Guiyu provides some evidence for problems to the implementation of the Basel Convention in China. In 1996, China passed the "Law on Prevention and Control of Solid Waste Pollution to the Environment," prepared by

³⁸³ *Id* at 187.

³⁸⁴ *Id.*

the State Environmental Protection Administration (SEPA).³⁸⁵ Among its provisions, the law prohibits the import of solid wastes, which are unusable as raw materials and strictly regulated the import of solid wastes that can be used as raw materials.³⁸⁶ Violation of the law results in fines and criminal penalties.³⁸⁷ However, the sheer volume of waste traffic through Chinese ports and intentionally falsified labels have caused this law to be less effective, thus, the problems of illegal traffic continue to rise.

In 2000, China issued another law, “Notification on Import of the Seventh Category of Wastes,”³⁸⁸ also prepared by SEPA, which completely ban the entry of following seven categories of wastes;

- a. Computers, monitors, and CRTs
- b. Copiers
- c. Microwave ovens
- d. Air conditioners
- e. Video cameras
- f. Electric cooking devices, rice cookers
- g. Telephones (except for pay-phones)

³⁸⁵ P.R.C. State Environmental Protection Agency (SEPA). *Law on The Prevention of Environmental Pollution from Solid Waste*, PRC Presidential Order, No. 58, October 30, 1995.

³⁸⁶ *Id.*

³⁸⁷ *Id.*

³⁸⁸ P.R.C. State Environmental Protection Agency (SEPA), *Notification on the import of the seventh category of wastes*, SEPA Document 19/2000, 2000.

- h. Video games (except for processing for re-export)
- i. Televisions and picture tubes
- j. Refrigerators.

Even with the total ban on these seven types of e-wastes, China still faces the problem of e-waste management due to the insufficient of administrative infrastructure to enforce these stringent environmental laws and regulations. Bribery and corruption are also among other challenges China is coping with. SEPA later issued a “Notice on Strengthening the Environmental Management of E-Waste”³⁸⁹ in 2003 providing guidance on the management of e-waste to meet the requirements of the Law on Prevention and Control of Solid Waste Pollution to the Environment.

Two new legislations, enacted in 2006, were drafted with a framework comparable to the European Union’s Directives on e-waste management. The “Ordinance on the Management of Waste Household Electrical and Electronic Products”³⁹⁰,” implements the Extended Producer Responsibility principle for the collection, recycle and disposal of e-waste. The “Measures for the Administration of Prevention and Treatment of Pollution by Electronic Information Products”³⁹¹,

³⁸⁹ P.R.C. State Environmental Protection Agency (SEPA), *Notice on strengthening the environmental management of E-Waste*, (2003).

³⁹⁰ P.R.C. National Development and Reform Commission (NDRC), *Ordinance on the management of waste household electrical and electronic products recycling and disposal*, NDRC Express, September 19, 2004.

³⁹¹ P.R.C. Ministry of Information Industry (MII), *Measures for the Administration of Prevention and Treatment of Pollution by Electronic Information Products*, (2006).

impose restrictions on the use of certain hazardous substances in electrical and electronic products and encourage green product designs.

China is a great example of one of the major recipients of electronic wastes. Not only has China accepted the obligations under the Basel Convention, but it also adopted a total ban on certain categories of wastes that were most problematic. China resorted to the Extended Producer Responsibility principle to focus the e-waste management at a different stage as well as asserted a restriction on the use of hazardous substances as a prevention of pollution at its source.

B. India

New Delhi, the capital city of India and one of the nine districts of Delhi, is a major port of electronic wastes export and distribution. After e-waste dealers make bids and get containers full of computer parts, the materials are sorted and distributed among recyclers in various zones according to their areas of specialization. For example, the specific recycling function of the disassembly of the computer and breaking the CRTs is located in Turkman Gate, whereas lead recovery is located in Mustafabad and circuit boards recycling in Mandoli, gold recovery in Meerui, and glass recovery in Ferozabad.³⁹²

³⁹² Toxic Links, System Failure Imminent – Take Action Now, available at http://www.toxiclink.org/docs/06040_repsumry.pdf (last visited April 20, 2009).

E-waste recycling is a thriving business in Delhi, secretly carried out in the “informal sectors,” high-fenced recycling units where workers sit on the ground amongst piles of computer parts working with bare hands, without masks or ventilation fans.³⁹³ The e-waste recycling procedures in India are very similar to the ones in China but on a much larger scale and typically performed under much worse conditions. Children and women labors are also widely used without legal protection.

Like China, India is a party to the Basel Convention and must abide by the obligations under the Convention. Trade with a non-party to the Basel Convention is prohibited. The recycling units in the form of “informal sectors” are evidently not conforming to the Basel Convention’s requirements in Article 4(2)(b) and (c), which call for safe disposal facilities with the environmentally sound management.

India adopted the provisions from the Basel Convention as an amendment to the Hazardous Waste (Management and Handling) Rules (1989) by adding provisions with regards to the transboundary movements of hazardous waste in 2000.³⁹⁴ However, the existing hazardous waste rules aim at the management and disposal of hazardous wastes from municipal and industrial process,³⁹⁵ and therefore are inadequate to deal with the problem of e-waste management. The other relevant

³⁹³ *Id.*

³⁹⁴ The Hazardous Waste (Management and Handling) Rules (1989) and Amendment (Management, Handling, and Transboundary Movement) (2000), available at <http://www.envfor.nic.in/legis/hsm/hsm1.html> (last visited June 22, 2010).

³⁹⁵ *Id.*

legislation is the Municipal Solid Wastes (Handling and Managing) Rules (2000),³⁹⁶ which covers the collection, segregation, storage, transportation, and disposal of commercial and residential wastes.³⁹⁷

To date, there is no specific law regulating the trade or the management of e-waste. The Government of India and the Ministry of Environment and Forests drafted the E-Waste (Management and Handling) Rules in 2009 and 2010, integrating the Extended Producer Responsibility principle as a framework for e-waste management³⁹⁸ However, this law has not yet entered into force.

Poverty has driven many people in India to work in unsafe sites only to earn enough income to get by in each day. A proper and effective policy is an important tool needed to improve the standard in e-waste recycling operation and to protect human health and the environment at the same time. Nonetheless, the challenges are left to the implementation and enforcement of such policy.

XVI. Conclusion

The creation of the Basel convention was a big step in setting a global standard and regulatory scheme to monitor and control the hazardous waste trade. It was

³⁹⁶ The Municipal Solid Wastes (Management and Handling) Rules (2000), available at <http://www.envfor.nic.in/legis/hsm/mswmhr.html> (last visited June 22, 2010).

³⁹⁷ *Id.*

³⁹⁸ Draft E-Waste (Managing and Handling) Rules 2010, available at <http://www.indiaenvironmentportal.org.in/files/DraftE-waste-Rules30.3.10.pdf> (last visited June 22, 2010).

crafted to ensure safe transboundary movements of hazardous wastes and their disposal while maintaining the flexibility of this trade among nations. An absolute restriction or a total ban on e-waste trade may present some serious side effects since many countries rely heavily on imported hazardous wastes as an important source of raw materials for their economies. The Convention acknowledged the different stages of readiness and ability in each States party and allowed for to the parties' discretion and interpretation to manage waste in an environmentally sound manner. Almost every country in the world became a party to Basel Convention, which proved its great success with regard to the willingness of countries around the world to share the responsibility for the protection of the environment.

However, in terms of e-waste, which has a more complex composition than other hazardous waste, there has been great disagreement about what constitutes a used product and what constitutes waste. The Basel Convention compromises those differences by exempting used products destined for re-use, which includes repair, refurbishment, and upgrading from its scope. That the Basel Convention exempted electronic products destined for reuse without determining the life-span and products destined for repair without considering the non-functioning parts created a big loophole for trade in e-waste so that parties were able to trade freely but without regard to how that trade impacted human health and the environment.

Chapter IV will explore an alternative approach to the complexities concerning the management of e-waste, namely the Extended Producer Responsibility principle –

a principle that seeks to manage the problem of e-waste by making the producer responsible for the product from its birth through the end of its life, regardless of the determination on when the product becomes waste.

CHAPTER IV

EXTENDED PRODUCER RESPONSIBILITY (EPR)

I. Introduction

The impact on human health and the environment as a result of improper transboundary movements of hazardous wastes is well documented and widely known. There have been many attempts to solve such problems at various levels – local, national, regional, and international. The hazardous wastes trade between States calls for international regulations as a global standard so as to establish the various rights and responsibilities of States involved in the trade. Chapter III explored the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal as an international treaty governing hazardous wastes trade and their disposal. As the name suggests, the Basel Convention aims at controlling the transboundary movement and the disposal of hazardous wastes. The material that is being transported must fall under the scope of “hazardous wastes” in order to apply to the Convention’s terms (the term “wastes” generally means material or products that are being discarded or disposed of).

In light of an emerging new type of hazardous wastes, electronic wastes or e-waste, the criterion used to determine when electronic products become waste is more problematic than other types of waste. Electronic wastes are sometimes narrowly defined and represent only end-of-life electronic products that are no longer

functioning and have no economic value. However, in many countries, the definition is much broader and includes not only end-of-life products but also obsolete products that are still functioning but no longer have any value to the first owners. This far-reaching definition considers the owner's intention to discard or dispose of the products as a point when products become waste while the narrower meaning focuses on the value of the products and the possibility of reuse and recycling. As long as an item can be utilized and serve its original purposes – regardless of its condition (new or used) – it is deemed a product and not waste.

The vagueness of the e-waste definition has caused the Basel Convention to consider electronic assemblies destined for direct reuse exempt from its scope, which creates a loophole for traders to escape from the responsibilities and liabilities stipulated by the Convention. They are able to do this by falsifying shipment labels or simply by shipping electronic assemblies that have short remaining lifespan, which would reach the end-of-life condition in the importing countries. Given the high (and growing) volume of electronic products being manufactured, the amount of unregulated e-waste trade among countries, and its possible threat to the environment as a result of improper management, can be excessive.

This Chapter explores a relatively new theory – Extended Producer Responsibility (EPR) – which has received much more attention from policy makers as a practical and suitable system for waste management. The concept of EPR is based on the two important principles under international environmental law: the

Principle of Pollution Prevention and the Polluter-Pays Principle, which places responsibility on the producers throughout the products' life cycle. An overview of the EPR theory and its application to the waste management regime is explored. A few models of EPR legislations are also studied. Finally, an evaluation of the benefits and shortcomings of EPR policy and the possibility of applying EPR theory to existing international law, such as the Basel Convention, to ensure the proper waste management and enhance the effectiveness of the Convention is conducted.

II. The Underlying Principles of International Environmental Law

The concept of Extended Producer Responsibility stems from a combination of two main principles of international environmental law. These principles are commonly accepted and reflected in wide-ranging state practice as well as in treaties, international organizations agreements, and soft law commitments. However, these principles should not be mistaken for the General Principles of International Law under Article 38 of the Statute of the International Court of Justice as described in Chapter II. The status of these principles is generally not binding except when they apply to treaty obligations or when they develop into custom. Nevertheless, these principles play a critical role in providing guidance to policy-makers and state practice.

A. The Principle of Pollution Prevention

The principle of pollution prevention is sometimes referred to as a State's obligation not to cause environmental harm especially when engaging in a transaction with other States.³⁹⁹ It is based on the notion that environmental protection is best achieved by preventing harm before it occurs rather than seeking remedies or compensation for the damage.⁴⁰⁰ The principle is, therefore, commonly adopted in the international negotiation of environmental management policy.

Principle 6 and 7 of the Stockholm Declaration laid down general terms with respect to the principle of pollution prevention.⁴⁰¹ Article 4(3)(f) of the Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes Within Africa provides that:

Each Party shall strive to adopt and implement the preventive, precautionary approach to pollution problems which entails, inter-alia, preventing the release into the environment of substances which may cause harm to humans or the environment without waiting for scientific proof regarding such harm. The Parties shall co-operate with each other

³⁹⁹ HUNTER ET AL., *supra* note 144, at 507.

⁴⁰⁰ *Id.*

⁴⁰¹ Principle 6 of the Stockholm Declaration states, "The discharge of toxic substances or of other substances and the release of heat, in such quantities or concentrations as to exceed the capacity of the environment to render them harmless, must be halted in order to ensure that serious or irreversible damage is not inflicted upon ecosystems. The just struggle of the peoples of ill countries against pollution should be supported." Principle 7 states "States shall take all possible steps to prevent pollution of the seas by substances that are liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea."

in taking the appropriate measures to implement the precautionary principle to pollution prevention through the application of clean production methods, rather than the pursuit of a permissible emissions approach based on assimilative capacity assumptions.

B. The Polluter-Pays Principle

The polluter-pays principle establishes the requirement that the users and polluters of natural resources bear the social and environmental costs caused by their activities or internalized the environmental externalities⁴⁰².⁴⁰³ The application of this principle is primarily correlated with the allocation of financial responsibilities in the environmentally impaired activities and the use of economic instruments as an incentive (subsidy) or obligations (tax and fee).⁴⁰⁴

⁴⁰² Beate Sjafjell, *Internalizing Externalities in EU Law: Why Neither Corporate Governance Nor Corporate Social Responsibility Provides the Answers*, 40 Geo. Wash. Intl. L. Rev. 977, 987 (2009) explains that externalities are the external costs of an exchange in a market. Product externalities exists when the product creates negative environmental consequences, either while in use or when it is disposed of, and neither the manufacturer nor the user is required to take these consequences into account. This situation leads to over-production and consumption as well as unrestricted disposal of these products, with grave environmental effects that would not have taken place if these consequences had been internalized somewhere along the chain.

⁴⁰³ HUNTER ET AL., *supra* note 144, at 315

⁴⁰⁴ SANDS, *supra* note 147, at 236.

The polluter-pays principle is reflected in Principle 16 of the Rio Declaration, which provides that:

National authorities should endeavor to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the costs of pollution, with due regard to the public interests and, without distorting international trade and investment.

This principle was also adopted by various international legal instruments. For example, the Organization for Economic Co-operation and Development (OECD) issued Council Recommendation on Guiding Principles Concerning the International Economic Aspects of Environmental Policies, affirming the polluter obligations for costs of pollution prevention and control measures.⁴⁰⁵ The European Union implemented the Council Directive on the landfill of waste⁴⁰⁶, requiring the set-up and operating costs of landfills to be charged to operators.

⁴⁰⁵ OECD Council Recommendation C(72) 128 (1972), 14 ILM 236 (1975).

⁴⁰⁶ Council Directive 99/31/EC on the landfill of waste, OJ L182, 16 Jul. 1999, 1.

III. An Overview of the Concept of Extended Producer Responsibility (EPR)

A. Definition of EPR

The concept of “Extended Producer Responsibility” was first introduced by Thomas Lindhqvist⁴⁰⁷ in a report to the Swedish Environmental Protection Agency.⁴⁰⁸ In a subsequent report, “Extended Producer Responsibility as a strategy for Cleaner Products,” which was presented at invitational seminar at Trolleholm Castle, Sweden on May 4-5, 1992, the following definition of EPR was published in English for the first time.

Extended Producer Responsibility is an environmental protection strategy to reach an environmental objective of a decreased total environmental impact from a product, by making the manufacturer of the product responsible for the entire life-cycle of the product and especially for the take-back, recycling, and final disposal of the product.

⁴⁰⁷ Thomas Lindhqvist is an associate professor at the International Institute for Industrial Environmental Economics (IIIEE) at Lund University in Lund, Sweden.

⁴⁰⁸ Thomas Lindhqvist, “About a Waste-Conscious Product Development,” Swedish EPA Report 3488, (Solna, Sweden, May 1988). The report “EPR as a Strategy for Cleaner Products,” presented at Invitational Expert Seminar, Trolleholm Castle, Sweden, May 4, 1992.

According to this definition, EPR is a market-incentive policy principle designed to improve the environmental performance of products and their associated systems.⁴⁰⁹

B. Objectives of EPR

The general concept of EPR by Lindhqvist was widely accepted but the interpretation and incorporation into domestic policies varies among policy-makers. Some limit this concept to apply only to waste management system or to the post-consumer stage.⁴¹⁰ Others apply the concept to a wider range of environmental improvements, consisting of rules related to products and their management policy at a various phases throughout the product's life cycle.⁴¹¹ Regardless of these various applications, an effective implementation of EPR would result in the achievement of two main goals.

1. Minimization of the Environmental Impact of a Product and Waste

The main goal of EPR is to reduce pollution that results from a product's usage and disposal.⁴¹² To achieve this goal, EPR incorporates the Pollution

⁴⁰⁹ CHRIS VAN ROSSEM ET AL., EXTENDED PRODUCER RESPONSIBILITY: AN EXAMINATION OF ITS IMPACT ON INNOVATION AND GREENING PRODUCTS, 2 (Greenpeace International) (2006).

⁴¹⁰ *Id.*

⁴¹¹ *Id.*

⁴¹² Megan Short, Taking Back the Trash: Comparing European Extended Producer Responsibility and Take-Back Liability to U.S. Environmental Policy and Attitudes, 37 Vand. J. Transnat'l L. 1217, 1220 (2004).

Prevention principle and acknowledges that the risks associated with the production, usage, and disposal of a product could be significantly reduced in the development stage by replacing or eliminating the toxic substances in the product and by means of proper pretreatment of the waste – separation of toxic substances from the rest of the waste stream.⁴¹³ The establishment of proper facilities for collection, separation, and recovery of discarded products is not only essential to improve waste management, but also enhance the opportunity for manufacturers to close their material loops by retrieving parts or components for reuse and recycling resulting in reduction of natural resources exploitation.⁴¹⁴ Although preventing waste in the first place is usually preferable to any waste management option (including recycling) demand for proper waste treatment may promote the innovation in recycling and recovery technology, resulting in waste reduction.⁴¹⁵

2. Products Design Improvement for Effective Environmentally Sound Management of Discarded Products

Traditionally, a product's price reflects the producer's costs of manufacture, distribution, marketing, plus a profit margin.⁴¹⁶ Once the product is sold, the

⁴¹³ ROSSEM ET AL., *supra* note 409, at 4.

⁴¹⁴ *Id.* at 50

⁴¹⁵ James Salzman, Symposium on Population Law: Sustainable Consumption and the Law, 27 *Envtl. L.* 1243, 1274 (1997).

⁴¹⁶ Short, *supra* note 412, at 1220.

manufacturer no longer has responsibility for its ultimate disposal.⁴¹⁷ Therefore, all costs of waste disposal are paid by the consumer through municipal taxes.⁴¹⁸ Manufacturers have little incentive to reduce the wastes associated with product disposal because they do not have to pay these costs.⁴¹⁹ The important factor in the EPR concept, as stated in its name, is the extension of producer's responsibility to the post-consumer stage of a product's life on the basis of Polluter-Pays principle and shifting some of waste management responsibility from consumers and municipalities directly to the producers and manufacturers.⁴²⁰

Based on the capacity level of the producers in the control and the environmental impact of their products at the source, the EPR approach focuses on a different critical stage – product design – which determines the nature, quantity of pollution, and environmental impact created by a product through its entire life cycle as well as after the end of its useful life.⁴²¹ The reallocation of waste management responsibility seeks to provide an incentive for more environmentally friendly design

⁴¹⁷ *Id.*

⁴¹⁸ *Id.*

⁴¹⁹ *Id.*

⁴²⁰ Sustainable Consumption & Production Branch, Division of Technology, Industry, and Economics, United Nations Environment Programme, *Life Cycle & Resource Management*, at <http://www.unep.fr/scp/lifecycle/index.htm> (last visited July 20, 2010).

⁴²¹ Salzman, *supra* note 415, at 1274.

products – products using less resources in production to reduce waste and products designed to facilitate effective dismantling, recycling, reuse, recovery, and disposal.⁴²²

IV. Responsibilities under EPR

A. Types of Responsibilities

According to Thomas Lindhqvist, there are four distinct types of manufacturer's responsibility, which can be carried out individually or collectively with other manufacturers:

1. Economic Responsibility

Manufacturers are required to pay all or some of the costs of collection, recycling, or final disposal of the products. These costs could be paid directly by the producer or by special fee.

2. Physical Responsibility

Manufacturers have to take physical possession and management of end-of-life products and its effects.

⁴²² Aaron Ezroj, *Extended Producer Responsibility Programs in the European Union: In Search of the Optimal Legal Basis*, 20 Colo. J. Intl. Env'tl. L. & Pol. 199, 200 (2009).

3. Informative Responsibility

Manufacturers are required to provide information such as labeling products to ease later waste management.

4. Liability

Manufacturers may be liable for proven environmental damage and clean-up efforts resulting from improper disposal of the product in question.⁴²³

B. Scale of Responsibility (Individual Responsibility vs. Collective Responsibility)

Producers may choose to carry out their responsibilities, either individually or collectively, depending on the degree of cooperation among producers. Individual responsibility refers to producers who choose to take responsibility only for their own end-of-life product management.⁴²⁴ In practice, producers assume individual financial responsibility by paying for the cost of their end-of-life product treatment.⁴²⁵ Individual physical responsibility can be implemented when end-of-life products are separated by brand or when the producers obtain control over the management

⁴²³ Thomas Lindhqvist, *Extended Producer Responsibility as a Strategy to Promote Cleaner Products*, Department of Industrial Environmental Economics, Lund University.

⁴²⁴ ROSSEM ET AL., *supra* note 409, at 26.

⁴²⁵ *Id.*

decision of their discarded products with involvement in the downstream operation.⁴²⁶

A collective responsibility system allows producers to join together with other producers in the same product group and take responsibility collectively in the management of end-of-life products irrespective of brand.⁴²⁷

To achieve the goal of product design change, individual responsibility is preferable among industries, governments, and experts because producers have an absolute personal interest in the end-of-life products.⁴²⁸ When producers' responsibilities are equally distributed among brands without considering the environmental impact of each brand, the system leaves open loopholes for free riders. Producers who made the effort to reduce such impact from their products would end up subsidizing others who did not make such efforts, thus diminishing the incentives to enhance product design.⁴²⁹ However, an individual responsibility program, especially for complex products such as cars and electronic equipment, presents some difficulties in the implementation than a collective responsibility program due to the uncertainty in cost estimation, possible duplicated infrastructures for end-of-life product management, and the increase in transport to designated sites.⁴³⁰

⁴²⁶ *Id.*

⁴²⁷ MARK DEMPSEY & KIRSTIE MCINTYRE, ISSUES IN ENVIRONMENTAL SCIENCE AND TECHNOLOGY 213 (R.E. Hester & R.M. Harrison ed., the Royal Society of Chemistry 2009).

⁴²⁸ *Id.*

⁴²⁹ *Id.* at 214.

⁴³⁰ *Id.*

An alternative approach applying the strengths from both programs results in a practice of individual responsibility within a collectively-organized compliance system.⁴³¹ This approach suggests that the distinction of products for individual responsibility can be made in various stages of the operation, including the point when the end-user discards products, at product collection points, and at recovery facilities.⁴³²

V. The Role of EPR in the Context of E-Waste Management

EPR is a policy principle seeking to improve the environmental performance of both products and their associated systems.⁴³³ Traditional environmental regulations focus on controlling the pollution at the end of product chains with little regard to the hazards at any other stages. This approach has started to change in the area of hazardous waste as seen in the Basel Convention, which placed emphasis on minimizing hazardous waste including toxic reduction in the production phase. However, these efforts have not been extended to the disposal stage of the discarded products after the end of its useful life.

⁴³¹ ROSSEM ET AL., *supra* note 409, at 11.

⁴³² *Id.* at 25.

⁴³³ *Id.* at 2.

EPR as a policy principle has been successfully applied especially in Europe to the management of waste from packaging.⁴³⁴ It later extended its application to waste from electrical and electronic equipment, batteries, and end-of-life vehicles.⁴³⁵ Policy makers can implement EPR policy, either by incorporating into existing waste management law or creating new law, through different and multiple instruments, such as administrative, economic, and/or informative instruments.⁴³⁶

Administrative instruments are the responsibilities placed on producers and/or stakeholders, such as collection or take-back duties of discarded products, hazardous substance restrictions, landfill disposal bans, collections or recycling targets, environmentally sound management standards, recycled materials content standards, etc.⁴³⁷

Economic instruments employ financial incentives and/or obligations (for instance, taxes, subsidies, advance disposal fee systems, deposit-refund systems, tradable recycling credits, etc.).⁴³⁸

⁴³⁴ *Id.* at 201. In 1991, the German Packaging Ordinance introduced the first EPR program in Europe facing a severe landfill crisis and packaging waste is one of the major sources of municipal waste. Although costly, the program was successful in the reduction of packaging waste. In 1994, the European Community enacted and enforced the Packaging and Waste Packaging Directive on all twenty-seven member States.

⁴³⁵ Ezroj, *Supra* note 422, at 202.

⁴³⁶ ROSSEM ET AL., *supra* note 409, at 3.

⁴³⁷ *Id.*

⁴³⁸ *Id.*

Informative instruments involve information sharing and communication among stakeholders. Producers may be requested to consult and report to authorities, mark or label their products and components, inform consumers about collection or recycling sites, communicate with waste managers about the structure and substances used in products, etc.⁴³⁹

EPR regulations usually contain multiple instruments. For example, EPR on electronic products require manufacturers to take back end-of-life products they produced. To achieve this task, advanced disposal fees or deposit-refund systems may be set up to motivate consumers to bring back products to designated collection sites. Producers may also be required to supply substance composition of products' components by labeling on the products or provide such information to the recyclers. Recyclers must follow the minimum recycled material content standards.⁴⁴⁰

VI. EPR Policy in Electronic Waste Management Legislations

The application of EPR policy principle in e-waste management legislation differs among countries, depending on the degree of responsibilities and commitments of key stakeholders – manufacturers, suppliers, retailers, service providers, government authorities, individual consumers, and waste managers.⁴⁴¹

⁴³⁹ *Id.*

⁴⁴⁰ *Id.*

⁴⁴¹ Holly K. Towle et al., *The European Union Directive on Waste Electrical and Electronic Equipment: A Study in Trans-Atlantic Zeolotry*, 31 Rutgers Computer & Tech. L. J. 49, 54 (2004).

Current EPR-initiatives schemes vary from product take-back⁴⁴² and mandatory fee collection⁴⁴³ systems, which apply the EPR concept only to the producers for their waste treatment, while product stewardship⁴⁴⁴ and comprehensive EPR systems places the responsibility on all parties – designers, suppliers, manufacturers, distributors, retailers, consumers, recyclers, and disposers – involved in producing, selling, or using a product in order to respond to the environmental and economic impact of that product throughout its life cycle.⁴⁴⁵ This section will explore two models of EPR legislation for electronic waste management – the European Union model and the Japanese model – that are widely recognized as well as potentially impacted the change of policy at international level.

A. The European Union (EU)

The European Union consists of twenty-seven member States taking part in the three main decision-making bodies.⁴⁴⁶ Member States are responsible to

⁴⁴² *Id.* at 55. Product take-back requires producers or distributors to accept the return of discarded products from consumers and send to recycling facility for proper disposal.

⁴⁴³ *Id.* A Mandatory fee system requires producers or distributors to charge a fee, such as recycling fee at the time of sale and transmit that fee to a general fund which is then used to pay for collection and recycling services. A deposit-refund system may also be used to collect a deposit which will be refunded to the consumer upon proper disposal.

⁴⁴⁴ Institute for Local Self-Reliance, *Waste to Wealth: Extended Producer Responsibility (EPR)*, at <http://www.ilsr.org/recycling/epr/index.html#footnote> (last visited July 19, 2010).

⁴⁴⁵ Towle et al., *supra* note 441, at 54 - 55.

⁴⁴⁶ Europa, *Key Facts and Figures about Europe and the Europeans*, available at http://europa.eu/abc/keyfigures/successstory/index_en.htm (last visited September 22, 2010). The Council of the European Union, which represents the member States, shares the legislative power with the European Parliament, which represents the people. The European Commission, representing the common interest of the EU, has the right to propose legislation and ensures that EU policies are properly

implement national policies to ensure compliance with EU secondary legislations, such as regulations, directives, and recommendations. The European Union was among the first to implement EPR policy under the broad definition in the electronic waste management system.⁴⁴⁷ The Directive on Waste Electrical and Electronic Equipment and Directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment was enacted in a cooperative and interrelated manner assigning responsibilities to all parties involved in the manufacture, utilization, and disposal of electronic equipment while including material restrictions in products in order to achieve the highest rate of environmental impact reduction.

1. Directive on Waste Electrical and Electronic Equipment (WEEE Directive)⁴⁴⁸

Prior to the enactment of the WEEE Directive, many EU countries took initiatives in creating their own e-waste management regulations. Belgium required manufacturers and retailers to take back white goods (major household electrical appliances such as refrigerators) and brown goods (household electrical entertainment equipments) for free.⁴⁴⁹ Germany applied shared responsibility system, where local

implemented. The Treaty establishing the European Community is a basis for the enactment of secondary legislations, which have a direct impact on EU citizens.

⁴⁴⁷ Ezroj, *Supra* note 422, at 201.

⁴⁴⁸ WEEE Directive, *supra* note 28.

⁴⁴⁹ Joel Boon, Note: Stemming the Tide of Patchwork Policies: The Case of E-Waste, 15 *Transnat'l L. & Contemp. Probs.* 731, 736 (2006).

authorities collect the waste, but manufacturers were responsible for its treatment and proper disposal.⁴⁵⁰ Italy had a nationwide collection centers and recovery facilities where customers can drop off their e-waste.⁴⁵¹ Sweden permits consumers to take e-waste back to retailers or municipal collection points before being recycled by manufacturers or municipalities.⁴⁵²

Several EU countries also had various restrictions on hazardous substances in electrical and electronic products. However, the EU Parliament and the Council of the EU acknowledge that different national applications of the producer responsibility principle may affect the functioning of the internal market and the effectiveness of recycling policies.⁴⁵³ The WEEE Directive was drafted to lay down ground rules and standards at the EU Community level.⁴⁵⁴

1.1 Objectives of the WEEE Directive

The WEEE Directive main objectives are to prevent the generation of e-waste, to promote reuse, recycling, and other forms of recovery in order to reduce the amount of waste for disposal, and improve the environmental performances of all

⁴⁵⁰ *Id.*

⁴⁵¹ *Id.*

⁴⁵² *Id.*

⁴⁵³ WEEE Directive, *supra* note 28, Preamble (8).

⁴⁵⁴ *Id.*

operators involved in the life cycle of electronic equipment, such as producers, distributors, consumers, and waste managers.⁴⁵⁵

1.2 Scope of the WEEE Directive

The Directive applies to electrical and electronic equipment used by consumers and for professional use including imported products and products sold electronically.⁴⁵⁶ Annex IA listed ten categories of electrical and electronic equipment (EEE) covered by this Directive⁴⁵⁷:

1. Large household appliances
2. Small household appliances
3. IT and telecommunications equipments
4. Consumer equipment
5. Lighting equipment
6. Electrical and electronic tools (with the exception of large-scale stationary industrial tools)
7. Toys, leisure and sports equipment
8. Medical devices (with the exception of all implanted and infected products)

⁴⁵⁵ WEEE Directive, *supra* note 28, art. 1.

⁴⁵⁶ WEEE Directive, *supra* note 28, Preamble (9) and (10).

⁴⁵⁷ WEEE Directive, *supra* note 28, art. 2 and Annex IA. Article 3(a) of WEEE Directive defines ‘electrical and electronic equipment’ or ‘EEE’ as “equipment which is dependent on electric currents or electromagnetic fields in order to work properly and equipment for the generation, transfer and measurement of such currents and fields falling under the categories set out in Annex IA and designed for use with a voltage rating not exceeding 1,000 Volt for alternating current and 1,500 Volt for direct current.”

9. Monitoring and control instruments

10. Automatic dispensers

Waste electrical and electronic equipment (or WEEE) means electrical or electronic equipment which is waste including all components, subassemblies and consumables which are part of the product at the time of discarding.⁴⁵⁸

1.3 Obligations under the WEEE Directive

The Directive's criteria are based on the principle of producer responsibility.⁴⁵⁹ "Producer," as defined in Article 3, includes manufacturers, sellers, resellers, importers, and exporters.⁴⁶⁰ Member States are responsible to implement domestic policies in compliance with the following requirements.

a. Product Design

The producer responsibility principle is established to promote designs and productions of EEE which facilitate dismantling, recovery, reuse, and recycling of WEEE.⁴⁶¹ Producers may not use specific design features or manufacturing processes

⁴⁵⁸ WEEE Directive, *supra* note 28, art. 3(b).

⁴⁵⁹ WEEE Directive, *supra* note 28, Preamble (5).

⁴⁶⁰ WEEE Directive, *supra* note 28, art. 3(i).

⁴⁶¹ WEEE Directive, *supra* note 28, Preamble (12) and art. 4.

that prevent WEEE from being reused unless such features present overriding benefits, such as environmental protection or safety requirements.⁴⁶²

b. Separate Collection

Producers are responsible for financing the collection and management of WEEE from their own products, either individually or by joining a collective scheme.⁴⁶³ In order to minimize the disposal of WEEE as unsorted municipal waste, a separate collection system for WEEE is needed.⁴⁶⁴ The EU sets a timeframe for member States to establish a collection system for WEEE.⁴⁶⁵ Convenient collection facilities must be set up for consumers and municipalities collecting WEEE from private households to return such waste free of charge.⁴⁶⁶ Distributors or retailers are responsible for free take-back on a one-to-one basis for equipment of the same type or purpose.⁴⁶⁷ For example, a consumer who buys a new computer may return an old computer free of charge. The EU also set a mandatory target rate of separate collection of WEEE from private households to be achieved by member States.⁴⁶⁸

⁴⁶² WEEE Directive, *supra* note 28, Preamble (14) and art. 4.

⁴⁶³ WEEE Directive, *supra* note 28, Preamble (20).

⁴⁶⁴ WEEE Directive, *supra* note 28, art. 5(1).

⁴⁶⁵ WEEE Directive, *supra* note 28, art. 5(2).

⁴⁶⁶ WEEE Directive, *supra* note 28, art. 5(2)(a) & (b).

⁴⁶⁷ WEEE Directive, *supra* note 28, art. 5(2)(b).

⁴⁶⁸ WEEE Directive, *supra* note 28, art. 5(5).

c. Management of WEEE

The producer, either an individual or a collective, must set up systems to provide for treatment and recovery of WEEE collected using the best available treatment, recovery, and recycling techniques, which ensure the protection of human health and the environment.⁴⁶⁹ The directive establishes separate target percentage rates for reuse, recycling, and recovery of WEEE based on its type and average weight.⁴⁷⁰ Priority should be given to the reuse of WEEE and its components and producers should integrate recycled materials in new equipment.⁴⁷¹ The waste export, in compliance with EU and OECD regulations on the export of waste, is permitted but will not count toward required targets unless the exporter can prove that the recovery, reuse, or recycling operations meet the Directive's standard.⁴⁷²

d. Financing Systems

Beginning August 13, 2005, producers are financially responsible for the collection, treatment, recovery and disposal of WEEE from their own products.⁴⁷³ They also have to provide a waste management guarantee, in the form of participation in appropriate financing schemes, a recycling insurance, or a blocked bank account

⁴⁶⁹ WEEE Directive, *supra* note 28, art. 6 and 7.

⁴⁷⁰ WEEE Directive, *supra* note 28, art. 7.

⁴⁷¹ WEEE Directive, *supra* note 28, Preamble (18).

⁴⁷² WEEE Directive, *supra* note 28, art. 6(5).

⁴⁷³ WEEE Directive, *supra* note 28, art. 8 and 9.

when placing new products on the market.⁴⁷⁴ In the case of WEEE historical products (those put on the market before August 13, 2005), the cost of waste management is shared proportionately by all producers on the market⁴⁷⁵ However, producers are permitted to impose an Advanced Recycling Fee (ARF) system by displaying the cost of collecting, treating, and disposing of the historical waste in environmentally sound manner on the price tag at the time of sale.⁴⁷⁶ These costs may thus be passed on to the purchasers of historical products in a form of higher product price. With regards to WEEE from business users, the Directive permits producers to make the business end users fully or partly responsible for the financing of historical business WEEE.⁴⁷⁷

e. Labeling and Product Information

Products put on the market after August 13, 2005, are required to be labeled with the Annex IV symbol, consisting of a crossed-out wheeled bin to indicate separate collection.⁴⁷⁸ Users are entitled to the information regarding the requirement not to dispose of WEEE, the collection systems, their roles in WEEE management, the meaning of Annex IV symbol, and the potential environmental and human health impacts of hazardous substances presented in EEE.⁴⁷⁹ Producers must prepare

⁴⁷⁴ WEEE Directive, *supra* note 28, art. 8 (2).

⁴⁷⁵ WEEE Directive, *supra* note 28, art. 8 (3).

⁴⁷⁶ WEEE Directive, *supra* note 28, art. 8 (3) para. 2.

⁴⁷⁷ WEEE Directive, *supra* note 28, art. 9.

⁴⁷⁸ WEEE Directive, *supra* note 28, art. 10(3).

⁴⁷⁹ WEEE Directive, *supra* note 28, art. 10(1).

information for treatment facilities to facilitate the environmentally sound management of WEEE, such as products' components and materials, location of dangerous substances in the products, etc.⁴⁸⁰

f. Reporting

A registry of producers, collection information, estimated quantities and categories of EEE put on the market, collected, reused, recycled, and recovered must be created and submitted to the EU Commission every two years.⁴⁸¹

2. Directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS Directive)⁴⁸²

2.1 Objective of the RoHS Directive

The key objective of the RoHS Directive is the protection of human health and the environment through restrictions on the use of certain hazardous substances.⁴⁸³ The European Council acknowledges that even when WEEE were collected, separated and recycled, some hazardous content would be likely to pose risks to

⁴⁸⁰ WEEE Directive, *supra* note 28, art. 11.

⁴⁸¹ WEEE Directive, *supra* note 28, art. 12(1).

⁴⁸² Council Directive 2002/95/EC, Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment, 2003 O.J. (L 37) 19 (EC) [hereinafter RoHS Directive].

⁴⁸³ RoHS Directive, *supra* note 482, art. 1.

health or the environment.⁴⁸⁴ Thus, the most effective way to reduce those risks and contribute to the protection of human health and the environmentally sound recovery and disposal of WEEE is the restriction of the use of certain hazardous substances and the substitution of those substances in electrical and electronic equipment by safer materials.⁴⁸⁵ Hazardous substances restriction possibly enhances the economic profitability of WEEE recycling and decrease the negative health impact on workers in recycling plants.⁴⁸⁶

2.2 Scope of RoHS Directive

The RoHS Directive is a companion to the WEEE Directive and its scope is similar. Products covered by the WEEE Directive are also covered by the RoHS Directive, with the exception of medical and monitoring equipment.⁴⁸⁷ It also applies to electric light bulbs and luminaries in households.⁴⁸⁸

2.3 Obligations under the RoHS Directive

New electrical and electronic products put on the market beginning July 1, 2006 may not contain lead, mercury, cadmium, hexavalent chromium,

⁴⁸⁴ RoHS Directive, *supra* note 482, Preamble (5).

⁴⁸⁵ RoHS Directive, *supra* note 482, Preamble (6) and art. 1.

⁴⁸⁶ *Id.*

⁴⁸⁷ RoHS Directive, *supra* note 482, art. 2.

⁴⁸⁸ *Id.*

polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE).⁴⁸⁹ However, in some case, it is not possible to completely eliminate these substances, the Directive states a specific maximum percentage weight of the materials allowed to be present.⁴⁹⁰ Exceptions for use of these substances are provided in the Annex,⁴⁹¹ which are subject to review and amendment,⁴⁹² which are necessary to adapt the Annex to scientific and technical progress.⁴⁹³

3. Global Impacts of WEEE Directive and RoHS Directive

The development in electronic waste management legislation in the EU has had a great impact on other countries around the world to adopt similar legislation. Both WEEE Directive and RoHS Directive apply to all products put on the European market and their producers, regardless of the products origin and selling technique.⁴⁹⁴ Therefore, any manufacturers wishing to sell their products in this market have to comply with both Directives' requirements. As a result, manufacturers need to develop new product lines by making design changes and adopt new technologies to eliminate or replace the prohibited substances with other substances.⁴⁹⁵

⁴⁸⁹ RoHS Directive, *supra* note 482, art. 4(1).

⁴⁹⁰ RoHS Directive, *supra* note 482, Annex.

⁴⁹¹ RoHS Directive, *supra* note 482, art. 4(2).

⁴⁹² RoHS Directive, *supra* note 482, art. 4(3) and art. 6.

⁴⁹³ RoHS Directive, *supra* note 482, art. 5.

⁴⁹⁴ WEEE Directive, *supra* note , art. 2 and 3.

⁴⁹⁵ Ezroj, *supra* note 422, at 211.

Although, manufacturers may create a different product line exclusively for the European market and retain the existing line for other markets, it is very costly to have multiple product lines.⁴⁹⁶ Moreover, suppliers of parts and components to the manufacturers are forced to change their production in order to maintain their business relationships.⁴⁹⁷

B. Japan

Challenged by the increasing amount of electronic appliances in the municipal waste stream and the lack of adequate processing capacity of these waste, Japan has incorporated the concept of EPR within its Home Appliance Recycling Law (HARL) in April 2001. A campaign for the take-back of computers was also enforced in a separate regulation in October 2003. Nonetheless, the Japanese perspective on the management of end-of-life electronic products is very much different from the European Union perspective. In Japan, these discarded products are considered a valuable source of raw materials rather than waste.⁴⁹⁸ This approach results in a special system of collecting, sorting, and handling these discarded products to minimize damage during transit from collection point to recycling plants, which gave rise to a higher recycling rates and yielded better quality recovered materials.⁴⁹⁹

⁴⁹⁶ Ezroj, *Supra* note 422, at 211.

⁴⁹⁷ *Id.*

⁴⁹⁸ MARTIN GOOSEY, ISSUES IN ENVIRONMENTAL SCIENCE AND TECHNOLOGY 1 (R.E. Hester & R.M. Harrison ed., the Royal Society of Chemistry 2009).

⁴⁹⁹ GOOSEY, *supra* note 498, at 17.

1. Scope of HARL

The scope of Japanese Home Appliance Recycling Law (HARL) is much narrower than the WEEE Directive. The HARL covers four major types of home appliances — televisions, refrigerators, washing machines, and air conditioners.⁵⁰⁰ Orphan or historical products – those discarded when the manufacturers are out of business – are managed by the Association of Electric Home Appliances (AEHA).⁵⁰¹

2. Obligations under the HARL

The HARL applies EPR by extending responsibility not only to producers, but also to any key stakeholders, including retailers, local government, and consumers. Consumers are responsible to pay recycling fees when disposing of appliances within the scope of HARL.⁵⁰² The HARL imposed a take-back scheme with an old-for-new or one-to-one basis on Japanese retailers.⁵⁰³ This means that every time retailers sell a new product, they must take-back discarded products of similar type or products they sold in the past and transfer them to manufacturers.⁵⁰⁴ Manufacturers have individual responsibilities to finance the recycling of their own discarded products.⁵⁰⁵ The law

⁵⁰⁰ Tadashi Matsuo, *Impact of the Home Appliance Recycling Law*, available at <http://www.nli-research.co.jp/english/socioeconomics/1999/li9908a.pdf> (last visited August 12, 2010).

⁵⁰¹ *Id.*

⁵⁰² *Id.*

⁵⁰³ GOOSEY, *supra* note 498, at 21.

⁵⁰⁴ *Id.* at 22.

⁵⁰⁵ *Id.* at 20.

permits the manufacturers to coordinate with other entities, such as the AEHA and local government in the rural areas, to provide collection services on their behalf.⁵⁰⁶ Parties responsible in the collection are also obligated to send the collected items to the consolidation centers, set up and operated by manufacturers.⁵⁰⁷

Although the HARL imposes individual responsibility on manufacturers, it allows industry to cooperate among others in a collective manner. To carry out this responsibility, the Japanese industry thus establishes two consortia.⁵⁰⁸ Each consortium, consisted of specified manufacturers, is responsible to set up and operate consolidation centers in each region and to ensure the transfer of collected appliances from these centers to recycling plants.⁵⁰⁹ Companies having limited shares in the Japanese market may authorize other entities to fulfill their collection and recycling responsibility on their behalf.⁵¹⁰

3. Ticketing and Financing System

Consumers are required to pay for recycling fees at the time of discarded products collection. These fees are then sent to manufacturers as funding for the cost associated with recycling process – the cost of transporting collected products to

⁵⁰⁶ *Id.*

⁵⁰⁷ *Id.* at 22.

⁵⁰⁸ *Id.*

⁵⁰⁹ *Id.*

⁵¹⁰ *Id.*

consolidation and recycling sites, the cost of operating consolidating facilities, and the cost for recycling operation.⁵¹¹ Manufacturers are responsible for any remaining costs.⁵¹² Consumers are also required to purchase a recycling ticket booklet.⁵¹³ Each booklet contains five copies printed with a tracking number and details of the appliances, the name of the retailer and manufacturer.⁵¹⁴ The cost of ticket varies among the appliance types.⁵¹⁵ The ticket system serves as an online tracking tool of discarded appliances from consumer to the recycler.⁵¹⁶ Consumers are able to check the status of their products to ensure the transparency and proper management.⁵¹⁷

It is worth observing that Japan does not have companion legislation to restrict the hazardous substances used in their electronic products like the EU RoHS Directive.⁵¹⁸ Nevertheless, Japan was among the first to invent and succeed in lead-free manufacturing in their electronic products industry.

⁵¹¹ *Id.* at 23.

⁵¹² *Id.*

⁵¹³ *Id.* at 22.

⁵¹⁴ *Id.*

⁵¹⁵ *Id.*

⁵¹⁶ *Id.* at 23.

⁵¹⁷ *Id.*

⁵¹⁸ *Id.* at 24.

C. Key Lessons from the Model Legislation

The overall objective of the EPR legislation for e-waste management is to decrease the quantity of discarded products being sent to landfill by setting mandatory recycling and recovery targets and assign responsibilities to parties involved. To achieve this goal, safe and proper recycling facilities as well as cost-effective and efficient systems to transport e-waste from the collection points to the recycling sites must be in place. The restrictions on the use of certain hazardous substances and the allocation of recycling responsibilities prove to give producers an incentive to develop changes in their product design and recycling technology. The WEEE Directive covers an extensive list of products to be controlled and lays down general rules and standards for the purpose of creating a uniform rule among member States.

However, the legal basis for member States to transpose the WEEE Directive into their national law gives freedom and flexibility to establish the specific requirements of their countries' legislation.⁵¹⁹ Such flexibility allows member States to create a number of different WEEE management systems across Europe. Such disparities, combined with the complexity of the WEEE management nature, have caused the delay in effective implementation of EPR legislation.

⁵¹⁹ WEEE Directive, *supra* note 28, Preamble. See also Ezroj, *supra* note , at 205. The Treaty establishing the European Community provides legal basis determining how much flexibility each member States will have when transposing a Community law into national law or how similar national legislation will be throughout the Community. Article 175, which provides legal basis to the WEEE Directive, gives member States a lot of flexibility. It allows member States to transpose certain measures at a minimum but not prohibiting States from maintaining or introducing more stringent measures that go beyond the required minimum standards.

In contrast, the Japanese system targets only a small group of its most problematic products. This system is simpler and more effective than the implementation. In addition, a different view toward discarded products, as a valuable source of raw materials and not waste, alters the collection, handling, and recycling practice. Specific treatment of discarded electronic products yields a higher recycling and resource recovery rate as well as better quality of recovered materials. The Japanese ticket system, which allows for traceability of discarded products from consumer to recycler, also contributes to the success in their EPR legislation implementation.

However, the Japanese system is viewed to be unsuccessful in some other countries where there are less effective means of enforcement. While the HARL's financing system collects recycling fee when consumers discard their products, this financing system is viewed as encouraging illegal disposal to avoid paying the fees. The EU system allows producers and retailers to collect an advanced disposal fees at the time of purchase to prevent the illegal disposal problems and also induce consumers to bring back the end-of-life product at the collection site.

The review of some existing EPR policy in e-waste management legislation provides substantial evidence for the applicability of the concept of EPR in developing countries and at an international level.

VII. Assessment of the EPR Policy Principle in E-Waste

Management Regime

A. Benefits of EPR

1. Ensure Proper Allocation of Responsibility to the Key Stakeholders

(Polluter-Pays Principle)

The concept of EPR is an extension of the Polluter-Pays principle aiming to address and allocate responsibility to parties involved at every stage throughout the product's lifecycle, but mainly to the producers due to their capabilities to make changes to the products at source. In the context of electronic waste management, EPR theory is implemented as a preventative measure to reduce the impact on human health and the environment from the production, usage, and disposal of such products. Producers are responsible for their products from the manufacturing process through the collection and treatment of end-of-life products. Producers thus internalize the cost of waste management which often is included into the product price.

In this sense, consumers who function as polluters during the utilization stage are responsible for the cost of waste management. The internalization of environmental and social cost is conducted through different systems, such as Advanced Recycling Fee (ARF) system, deposit-refund system, and recycling fee when discard. These systems increase consumers' awareness of the extra cost and

provide incentives for consumers to generate less waste and rethink before disposing of obsolete but functioning products.

The EPR policy in waste management and the allocation of responsibility is a good policy choice especially in developing countries where there exists a large gap between wealthier consumers and the poor. The policy ensures that the producers and consumers, but not general taxpayers, are responsible for the management of end-of-life products.

2. Product Design Change

The EPR policy promotes a product's total lifecycle improvement by holding the producer responsible to the fate of its products at different stages of product's lifecycle, especially the collection, recycling, and disposal. To reduce the cost and environmental impact of end-of-life product management, producers are encouraged to make design change to their products for the ease and effectiveness of collection, disassembly, recyclability, reuse, resource recovery, and disposal. Design changes include reduction of the use of hazardous substance in the products, enhancement of source reduction of raw material through reuse and recycling, and innovation of new technologies both in production and end-of-life management phases. The improved design for end-of-life management along with proper facilities and technology would facilitate the closing of material loops to achieve the resource benefits of reduced material use.

B. Weaknesses of EPR

1. The Complexity in the Implementation of EPR

The underlying objectives of EPR theory are very attractive to the e-waste management regime. However, the effective implementation of EPR policy into legislation may pose some challenges. For instance, the components of electronic products are typically very complex so to manage the intricacy of recycling each product would require, potentially, a great many different types of technologies to perform this function. In practice, it might be difficult to create a uniform action that would apply to all types of electronic products. In addition, the standard of determining the fee is by calculating environmental costs but this cost is difficult to determine and could therefore be a setback when establishing guidelines or rules for what companies would ask of their consumers to defray the costs of recycling. Finally, because of the disparity among the cost of living in different countries, it would be impossible to establish a cost for recycling a product across the board (seven dollars in the US does not hold the same value as seven dollars in India).

2. Possible Trade-Barriers

The application of EPR into each nation's legislation is based on different factors, such as the legal system (Common Law or Civil Law), the scope of products concerned (broad or narrow scope), the purposes intended to achieve (minimization of waste, minimization of hazardous substances used, recycling rate target, etc.), and the

stage for which the responsibility of producers are extended. As a result, the policy principles cannot be established uniformly by all countries. This could be a potential burden for manufacturers to comply with the various rules. A manufacturer would be compelled to create products for different markets at a great expense.

With regard to trade in goods, many countries who are members of the World Trade Organization (WTO),⁵²⁰ may argue that EPR legislation is a technical barrier to free trade contrary to the WTO rules under General Agreement on Tariffs and Trade (GATT) and the Technical Barriers to Trade (TBT) Agreement. The WTO system recognized that technical standards and regulations are important and vary among countries. However, the TBT agreement provides standards and procedures to ensure

⁵²⁰ World Trade Organization (WTO) is the only global international organization dealing with the rules of trade between nations. The main goal is to ensure that trade flows as smoothly, predictably, and freely as possible. It currently has 153 member States. The WTO system, known as multilateral trading system, is governed by the WTO's rules, which are the result of negotiation by member countries; a large majority of the world's trading nations. The current set of WTO's rules with regard to trade in goods is the General Agreement on Tariffs and Trade (GATT). GATT is a contract binding governments of member countries to keep their trade policies within agreed limits to everyone's benefit.

The main principles of the trading system are:

- 1) Trade without discrimination: member countries cannot discriminate between their trading partners and giving them equally "most-favored-nation" or MFN status. In addition, member countries must give a national treatment to both local and foreign products. National treatment is only applied when the product has entered the market.
- 2) Freer trade: member countries are encouraged to enter into negotiation to lower tariffs.
- 3) Predictable trade: Trading partners should be certain that trade barriers either in tariffs or non-tariff form will not be raised without negotiation. The agreement to open the market to trading partners is bound on member countries. Such commitments also include the ceilings on custom tariff rates.
- 4) Promoting fair competition: the WTO rules are designed to secure fair conditions of trade and discouraging any unfair practices, such as export subsidies and selling products below cost to gain market share.
- 5) Encouraging development and economic reform: GATT provisions allow developing countries and countries in economic transitions for special assistance, such as more time to adjust, greater flexibility, and some privileges.

that these regulations do not arbitrarily set or unnecessary create obstacle to international trade.⁵²¹

For example, the European Union Directive intends to provide more incentive for manufacturers for the improvement of their products design as well as the prevention of hazardous substances in their electronic products by restricting the maximum amount of certain hazardous substances used in each product category. This restriction has a direct impact on manufacturers and the production process since producers are responsible to find substitutes for these substances by certain deadline. While the underlying objective of this policy receives a lot of support, many countries express concerns that such restriction does not take into account the different level of technological advancement among countries and the targeted risk assessment on the substitution and elimination of certain substances has not been carried out properly.⁵²²

However, the WTO rules allow member States to adopt trade-related measures for the environmental objectives. Article XX of GATT provides an exception to the GATT rules in order to ensure a balance between the rights of members to take regulatory measures and trade restrictions to achieve legitimate policy objectives (such as stated in Article XX (b) and (g), which are particularly relevance to the environmental protection) and the rights of other WTO members under the general

⁵²¹ World Trade Organization, *WTO Rules and Environmental Policies: Introduction*, available at http://www.wto.org/english/tratop_e/envir_e/envt_rules_intro_e.htm (last visited September 22, 2010).

⁵²² LAWRENCE A. KOGAN, *LOOKING BEHIND THE CURTAIN: THE GROWTH OF TRADE BARRIERS THAT IGNORE SOUND SCIENCE* 69, (National Foreign Trade Council Inc. 2003)

trade rules. Therefore, member States may adopt policy measures that are contradictory to the basic trade rules as long as they are necessary to protect human, animal or plant life, or health, or relate to the conservation of exhaustible natural resources.⁵²³

There has yet to be any dispute on EPR legislation submitted to the WTO dispute settlement body to determine the application of GATT rules. Although this issue is beyond the scope of this dissertation, it is a critical field for further research and study.

3. Costs

There are many costs that would be associated with such a transition toward EPR – design, manufacturing, marketing, extraction and recycling to name a few. Cost allocation among producers is problematic and unclear, particularly to non-local producers. The overall costs, who should pay for it, and how to establish it is made even more difficult because the true cost of recycling is very hard to determine since it depends on so many different factors. Also, the costs to retrieve the materials and

⁵²³ GATT Article XX (b) and (g) reads “Subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade, nothing in this Agreement shall be construed to prevent the adoption or enforcement by any contracting party of measure:...

(b) necessary to protect human, animal or plant life or health;...

(g) relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption...”

recycle them can, in many instances, cost more than the initial costs of extracting the raw materials.

By placing the responsibility on the producer for collection and treatment of the end of life products, the costs associated with establishing take-back programs can be very high and although large manufacturing companies could absorb such expenses, small businesses might not be able to do so and would be forced out of the market. For example, the WEEE Directive establishes measures intended to prevent e-waste from entering into the municipal waste stream by imposing the collection and treatment responsibilities of such waste on the producers, regardless of where the producers are situated. The WEEE Directive also applies to long distance and electronic sellers as well as to importers. Producers are required to provide for appropriated financial guarantees for the recycling of their own products when placing products on the market.⁵²⁴

VII. Application of EPR Policy to E-Waste Management Regime under the Basel Convention

The Basel Convention adopted a cradle-to-grave approach for the management of transboundary movements of hazardous wastes from the point when trade begins until wastes are disposed of. The underlying objective of the Basel Convention is the minimization of the generation and transboundary movement of e-waste by managing

⁵²⁴ WEEE Directive, *Supra* note 28, art. 8(2) para. 2.

waste in an environmentally sound manner as close to the site where products become wastes. However, the scope of the Basel Convention falls short of controlling the illegal transboundary movements of electronic wastes destined for direct reuse due to the complex nature and the ambiguity in determining the point where a product becomes waste.

Generally, trade in goods or merchandise is governed by the GATT/WTO rules, which promote countries to trade freely in a non-discriminatory manner. Thus, electronic wastes destined for direct reuse can be carried out under GATT/WTO rules. Given the nature of electronic equipments – containing both hazardous and valuable substances – free trade without any environmental impact protection undermines the spirit of the Basel Convention and the principle of sustainable development.

This problem is illustrated in the case of used and end-of-life mobile phones. According to guidance documents on the environmentally sound management of used and end-of-life mobile phones prepared by the Open-ended Working Group of the Basel Convention, mobile phones were selected as priority among other electronic products because of the exponential growth of mobile phones usage globally.⁵²⁵ The

⁵²⁵ Open-ended Working Group of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, *Guidance Document on the Environmentally Sound Management of Used and End-of-Life Mobile Phones* 11, UNEP/CHW/OEWG/7/INF/7 (seventh session, May 2010) [hereinafter OEWG mobile phones guidance].

guideline emphasizes reuse and recycling in order to divert end-of-life mobile phones from final disposal operations, such as landfills or incinerators.⁵²⁶

Four critical steps for environmentally sound management of used and end-of-life mobile phones are collection, evaluation, refurbishment, and material recovery and recycling.⁵²⁷ A separate collection system from other municipal waste must be set up to collect and evaluate the condition of mobile phones whether they are suitable for reuse, reuse after repair, refurbishment, upgrading, or they are destined for material recovery and recycling or final disposal.⁵²⁸ Transboundary movement procedures to be applied to each shipment, thus, depend on the condition of the collected mobile phones after evaluation and testing.⁵²⁹ The working group did not specify who would bear the responsibility for the collection and evaluation. In a traditional municipal waste management system, the government and municipalities are responsible for the collection and treatment of waste, financing from tax collected. After the mobile phones are separated by condition, the next step is to determine whether the Basel Convention control procedure would apply.

⁵²⁶ OEWG mobile phones guidance, *supra* note 525, p. 6.

⁵²⁷ *Id.*

⁵²⁸ OEWG mobile phones guidance, *supra* note 525, p. 24.

⁵²⁹ *Id.*

Unless classified as hazardous waste by the domestic legislation of the country of import, export or transit⁵³⁰, used and end-of-life mobile phones, evaluated as suitable for reuse, repair, refurbishment or upgrading, are not subject to the Basel Convention control procedure.⁵³¹ The steps to achieve environmentally sound management of electronic waste as suggested by the guideline can be costly and ineffective unless the producers are required to participate. Collection and evaluation processes operated by municipalities and funded by taxpayers give little or no incentive for producers to make changes to prevent or eliminate environmental impact from their products.

One of the main goals of the Basel Convention is to minimize the generation of hazardous waste. In the case of electronic products, producers are in the best position to minimize hazardous waste at the source by reducing or eliminating hazardous substances and substitute them with more environmentally friendly materials, changing their products design for longer lifespan and safer recycling. The environmentally sound management mainly focuses on solving the problem at the end rather than correcting its causes.

On the contrary, the Extended Producer Responsibility principle, also adopted a cradle-to-grave approach but on a larger scale (from the production to disposal), places the responsibility on producers for the management of their end-of-life

⁵³⁰ Basel Convention, *supra* note 133, art. 1(2).

⁵³¹ Basel Convention, *supra* note 133, art. 1(1) and Annex IX entry B 1110.

products, no matter what the conditions are. Producers have much more incentive to correct the environmental problems associated with their products or prevent it from happening at all. The question of when a product becomes waste or whether they are suitable for reuse, refurbishment, or upgrading is not relevant when applying the EPR principle.

The application of the concept of EPR to used electronic products not only prevents an illegal traffic and e-waste dumping, but also ensures an environmentally sound management of those products. Even if the transboundary movement of used electronic products is destined for reuse, repair, refurbishment, or upgrading, the EPR principle makes certain that the producers are responsible for their products when they reach the end-of-life condition. In the case of products or waste exported outside of country of origin, the application of the concept of extended producer responsibility does not necessarily mean physically transporting wastes back to the actual producers. Rather, the producers, who create the polluting products, bear full responsibility where the products become waste. Take-back must take place in the country of consumption or where the products become waste to minimize the transboundary movement.

Extended Producer Responsibility principle has been successfully implemented in many countries around the world, particularly to the electronic waste management system, due to the unique characteristics of electronic products. Replacing the hazardous waste control system for the transboundary movement of e-

waste with the Extended Producer Responsibility policy principle will close the loophole for illegal trade as well as enhance the main purposes of the Basel Convention, namely, to minimize the generation of hazardous waste and ensure environmentally sound management of hazardous waste.

VIII. Conclusion

Concerns over the impact to human health and the environment from an improper management of end-of-life electronic products or e-waste have increased as the quantity of e-waste skyrocketed while there is no proper and effective e-waste management policy in place. Waste prevention and reduction is preferable to the traditional end-of-pipe treatment. The concept of Extended Producer Responsibility focuses on the prevention of waste and shifts the responsibility for the management of end-of-life products, whether individually or collectively or both, from taxpayer and municipalities to the producer as an illustration of the Polluter-Pays principle. Under the Polluter-Pays principle, the producer is deemed a polluter because he/she has the most knowledge and control over the product design, toxic contents put in a product, and the best practice in the recycling, recovery, or disposal of the product. The underlying objective of the reallocation of waste management responsibility to the producer is the change and improvement of product design by eliminating or using less hazardous substance and design to extend product's life and suitable for proper recycling process.

Although the EPR approach has limitations and is not without challenges, it is an important supplemental measure to deter and prevent some of environmental problems left in the wake of the Basel Convention. Part of the challenge is that EPR also establishes a change in behavior both of consumers and manufacturers. EPR theory uses market-incentive approach as an incentive to change manufacturers' behavior. When producers are responsible for the recycling and disposal of their own products, they need to make changes in the production in order to stay competitive in the market. The European Union and Japan have passed comprehensive EPR legislation for electrical and electronic equipment, confirming that it is possible to employ the concept of EPR into a practicable policy. Although opponents claim that WEEE Directive would restrain innovation, be difficult to enforce, and create trade-distorting and anti-competitive effects, effectively implemented EPR theory provides incentives for manufacturers to improve products and systems concerning the life cycle of products, such as the establishment of effective collection, an environmentally sound treatment of collected products, and an increase in reuse and recycling.

CONCLUSION AND RECOMMENDATION

I. Conclusion

Hazardous waste trade, like any other trade in goods, has been making profits for importers and exporters for many decades, whether the trade was conducted on a local, national, regional, or international level. Interestingly, trade in hazardous waste was driven by many factors in addition to the exchange of products for money. In a traditional sense, waste refers to a non-valuable, undesirable object. However, “one person’s trash is another person’s treasure” and because hazardous waste contains substances or materials that are reusable as secondary raw materials, a significant portion of the economy in those countries lacking these substances actually rely on hazardous waste from other countries in order to improve their industrial sector.

In addition, when developed countries became aware of the quantity and potential threat from hazardous waste disposal in landfills, policy-makers realized that it was time to forbid and control such practices, compelling waste managers to find different options to dispose of hazardous waste. Waste managers were faced with a lack of proper disposal sites, more stringent policies to comply, and higher management costs to compete with others in the same business. The number of landfills did not meet the demand of waste disposal while the waste generation continued to grow. An alternative option for the waste managers emerged when they learned that available landfill sites existed in developing countries and recycling

practices could be carried out at a much lower cost due to cheaper labor and much more lenient policy. A new business of hazardous waste exporting emerged and continued to expand. What hazardous waste exporters and importers did not take into account was the impact this waste could cause to human health and the environment in developing countries.

The hazardous waste trade without proper control or damage prevention measures has caused numerous tragedies leaving local communities impoverished and the environment, in certain areas, in nearly irreparable condition. These disastrous incidents have led to an attempt to put an end to the hazardous waste trade among nations, particularly trade from developed countries to developing countries. In order to regulate interactions among States in the international community, States must rely on international law – treaty, custom, or general principles of law. A treaty is the most common source of international law because of States' express consent to comply with a treaty's provisions.

The international community's awareness of environmental and common resources degradation led to a number of international environmental conferences. States came together at these conferences to discuss the existing environmental issues, to explore the possible solutions, as well as to establish common principles or cooperation standards to monitor States' practice and prevent any problems in the future. Some of the principles created at these environmental conferences have developed over time into customary international law. For example, Principle 21 of

the Stockholm Declaration, which reappeared almost exactly 20 years later as Principle 2 of the Rio Declaration, declares that States may exercise their sovereign right to exploit their own resources pursuant to their environmental policies and that States also have the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or areas beyond their national jurisdiction. Other principles from these international environmental conferences, regardless of their legally binding status, have played important roles in forming the basis or foundation in the negotiations of international environmental agreements. For example, the Principle of Pollution Prevention, the Precautionary Principle, the Polluter-Pays Principle, the Principle of Common but Differentiated Responsibilities, the Principle of Prior Informed Consent, and Principle of Sustainable Development, etc.

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal was created in response to many catastrophic episodes of unregulated trade and management of hazardous waste. It aims at regulating hazardous waste trade using a control procedure in order to minimize and encourage the disposal as close to the source, minimizing unnecessary movements, and ensuring the environmentally sound management of hazardous waste. After the implementation of the Basel Convention, the tragedy as a result of improper transboundary movement and management of hazardous waste has significantly decreased. Almost every country in the world is a party to the Basel Convention, except Afghanistan, Haiti, and the United States. Given the amount of hazardous

waste that the US generates and exports, there are countless transactions conducted outside the control of the Basel Convention. Thus, as long as the US refuses to participate and take responsibility, the goal of minimizing hazardous waste and transboundary movement of hazardous waste is far from being achieved.

As the world progresses into the digital era, a new challenge regarding waste management has appeared in a different form of hazardous waste – electronic waste – comprised of much more complex characteristics than traditional hazardous waste. Electronic products manufacturing has dramatically increased to meet the demand of consumers, while consumers enjoy these accommodating devices with little or no knowledge of the hidden threat to the environment inside these products.

One dimension of the problem is that advancement in technology has made it possible for manufacturers to be able to produce more and better products with greater speed so as to entice consumers to buy new and better models at alarming rates. Whereas electronic goods had often been considered either a luxury or a necessity, now products are so commonplace and so available that they are consumed merely because they are available. The problem is not only that with the rise of desirable and available electronics resulting in an ever-increasing amount of electronic waste, but also how to monitor the safety of disposal of this waste.

Electronic products contain not only hazardous substances but also valuable materials, which make electronic waste more appealing to waste managers. In

addition, electronic waste can be recycled, reused, refurbished or upgraded. The electronic waste trade has become more popular in developing countries because the general population's ability to buy new products is limited either because the products are typically prohibitively expensive to buy new or because they are not readily available. This has made way for a highly active second-hand market. Just like other hazardous waste, the treatment of electronic waste at the end of its life (whether by recycling, material recovery or disposal) requires special facilities and technologies.

Even though the Basel Convention did not aim at controlling electronic waste when it was created, language has been added to ensure electronic waste in its scope as the problems regarding this type of waste has evolved. However, the Basel Convention makes a distinction between used products and waste, exempting used electronic products destined for reuse, repair, refurbishment or upgrading. The consequence of such a distinction is that any shipment of used electronic products labeled for reuse need not follow the control procedure outlined in the Basel Convention even though such products will ultimately become waste.

Also, the Basel Convention includes repair as a part of direct reuse and thus exempts electronic assemblies destined for repair from its scope. The term "repair" suggests that certain parts are no longer functioning or damaged and thus might fall under the scope of the Basel Convention if the damaged parts possess Annex III characteristics. However, the Basel Convention provisions do not give any specific procedural direction, such as indicating that the non-functioning parts must be

removed from the electronic products or assemblies before trading. The Basel Convention's exception has created a major loophole for the continuing practice of toxic waste dumping in developing countries.

There is therefore a need for a new tactic to address the complexities of the electronic waste problem in light of the need many economies have for trade in used products. Although the exception provision under the Basel Convention was created out of respect for the trade of used products like any other items or goods, it inadvertently created a big loophole for exporters and importers to avoid complying with the control system.

One of the policy principles – Extended Producer Responsibility (EPR) – has received great attention from policy makers globally as a new generation of pollution prevention policy. The EPR principle addresses the lifecycle issues of products, especially the end-of-life stage by referring to the Polluter-Pays principle, where the manufacturers of electronic products are deemed the pollution generators and thus are responsible to pollution from their products. By extending the responsibilities of the manufacturers to various parts of the products' lifecycle, particularly to the take-back and treatment of their products, the manufacturers have an economic incentive to improve the environmental performance of their products and product systems through product design change. Since EPR theory applies to every stage of the product's lifecycle, retailers or distributors, products importers and exporters, and

consumers collectively share some responsibilities to ensure that the products will be returned to the producers for environmentally sound management.

The implementation of the EPR principle varies among nations but all share the same set of objectives regarding the principle itself, that is, they all aim at design improvement, effective waste collection, environmentally sound management of collected products, and higher rate of products and materials reuse and recycling.

Many European nations were among the first to apply the concept of EPR to electronic waste management. The European Union issued a Directive on Waste Electrical and Electronic Equipment, encompassing majority of electronic products, as a uniform rule for member States to achieve set targets for collection, reuse and recycling. In addition, the EU imposes a restriction on the use of certain hazardous substances in electronic equipment production as a preventative measure for keeping hazardous substances from entering the waste stream. As a result of the EPR law, products now contain less hazardous substances, have less impact on human health and the environment, and increase the rate of reuse and recycling, which enhances the possibility for closing material loops.

Japan has also developed electronic waste management policy law applying the EPR concept. However, the Japanese law divides electronic products into different categories governed by different laws, such as home appliances and information and communication technology, and are regulated under different

legislation. The Japanese system targets a narrower scope of products in separate legislation creating a simpler but effective implementation. The Japanese report a much higher rate of discarded product collection, toxic substances separation and treatment, and recycling in an environmentally sound manner.

However, the new legislation in the EU and Japan not only governs the domestically-manufactured electronic products, but also imported ones. The global influence of the EPR law on product design has been far-reaching. Manufacturers in other countries, who wish to have their products placed in the EPR regulated markets, have adjusted their product design as well as taken appropriate measures to comply with the responsibilities imposed on them.

There are some critics with regards to the concept of EPR. Some argue that it may be used as a trade barrier in international trade or an extraterritorial application of domestic law because of the impact on production and the extra responsibilities imposed on out-of-States manufacturers. The set up costs for effective collection and treatment systems of these products could be very high so that only larger manufacturers could afford and as a result, force smaller businesses out of the market. Moreover, the readiness and advancement of technology used in each country as well as the availability of substitute materials may not be on the same level.

II. Recommendation

Notwithstanding the aforementioned criticism of EPR, this dissertation considers the concept of EPR to be more beneficial than detrimental, especially in the case of end-of-life electronic products. Many developing countries rely on used electronic products from developed countries so that their people can have access to these products. However, some waste traders also use this opportunity to smuggle non-functioning products or products with very short remaining lifespan into developing countries to avoid waste management responsibility. Although the Basel Convention aims at controlling and eliminating the practice of hazardous waste dumping, the exception for used products destined for reuse, repair, refurbishment, and upgrading has left open an excuse for waste traders to take advantage of vulnerable people in developing countries.

To close this loophole completely by imposing the same control procedure as required for other hazardous waste could jeopardize the opportunity for developing countries to gain access to low-cost electronic products. However, the current practice of allowing such trade without proper regulations would also put developing countries at risk of being a dumping ground of electronic waste. The application of EPR policy principle to the used and end-of-life electronic products will ensure a proper management when these products become waste while allowing the trade in second-hand products to continue.

An adoption of the concept of EPR into the Basel Convention for the management of electronic waste will help develop a global electronic waste management policy that party-States could then incorporate into their national laws. Although an amendment to existing international law, like the Basel Convention, may take a very long time, the inclusion of EPR principle on a smaller scale (whether that is on the local, regional or national level) could help gain a broader momentum among collective or more global agreements.

Furthermore, there are other important efforts that need to be undertaken in addition to the passing of EPR legislation, namely, educating consumers and increasing consumers' awareness of the hidden hazards in electronic products. This development of awareness as well as the knowledge of proper disposal and management is as important as extending the producer responsibility. Increasing consumer awareness is essential in making sure the newly formed policies would be effective. Regardless of how many EPR laws are in force, it is largely up to the consumers to deposit the materials to the proper collection site.

Therefore, in order to ensure the effectiveness of EPR legislation, there needs to be cooperation on the consumers' behalf as well. It is within the States' power to incorporate the concept of EPR into their national law by learning from existing models such as those in the EU countries and Japan, and every State will need to educate consumers in order for the legislation to be effective. States can create a policy covering a vast variety of electronic products or begin with the most

problematic ones such as computers and mobile phones at the same time launch campaigns to better inform consumers as to the importance of electronic recycling. However, regardless of the range and method of incorporation, it is important for States to apply the EPR concept to their electronic waste management regimes in order to protect their populations' health and the environment, and to educate consumers about their role in this important change in attitude toward electronic goods.

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