UNITED NATIONS ENVIRONMENT PROGRAM

Study Guide for Zurich Model United Nations

Written by Sarah Alam El Din and Sophia Johanna Schlosser

May 4th to 7th, 2017

Zurich, Switzerland

CONTENTS

Submission Deadline 3
Your Chairs 4
Introduction to UNEP 6
Topic A – The Potential of ICT to improve resource efficiency 7
Introduction 7
Potential for exploiting win-wins in resource efficiency and energy savings 9
Questions a Resolution must answer 13
Further Readings 13
Topic B: Detoxifying our Societies – Improving the handling and disposal of chemicals and waste 14
Introduction 14
Scope and Background Information 14
Chemical Waste 16
Nuclear Waste 19

Essential readings 22
References 23
Other useful tips 24
Resolution 24

SUBMISSION DEADLINE

Delegates are requested to submit a position paper
A guide on how to write a position paper is available on
http://zumun.ch/preparation/

* * *

Saturday 29th of April 2017

* * *

unep@zumun.ch

YOUR CHAIRS

Honorable Delegates,

It is our utmost pleasure to welcome you to the third session of Zurich Model United Nations (ZuMUN) and the United Nations Environment Program. We are excited to meet all of you, and spend 4 days of intense debate and great social events together. During your time in Zurich, we will strive to provide you with the best experience possible.

Both topics of the UNEP are of great significance for the global community. We are excited to hear a broad range of inputs on these pressing issues, and hope that all of you will live the MUN spirit of collaboration and dedication in order to reach a strong resolution on the topics.

This study guide will hopefully support you in your research and preparation for the conference.

It is however strongly encouraged for you to go beyond the content of this guide - find out about your country's position and learn all you can about the matters at hand. The better prepared you are, the more fun you will have debating with your colleagues at ZuMUN!

In case you have any questions about the conference, please do not hesitate to contact us!

We wish you all the best in your preparations and look forward to seeing you at the conference!

Sincerely,

Sophia Johanna Schlosser and Sarah Alam El Din

Sophia Johanna Schlosser

Sophia Johanna Schlosser is a bachelor student in Communications and Political Science at the University of Zurich and is honoured to be co-chairing the Human Rights Council of ZuMUN2017.

Her involvement with the UZH MUN Team startet in September 2013 and she has been a member of the MUN UZH executive board for two consecutive years.Moreover, she has been involved in numerous MUN conferences in Brussels, Riga&Stockolm, Washington DC, Seoul, Rome and has also been a member of the Organizing Committee of ZuMUN 2015 and a Chair at ZuMUN2016.

Aside from Model UN, she is also engaged in a political youth organization, Young European Swiss. In her spare time she takes every opportunity to travel around the world and also really enjoys music, playing the violin, painting and learning new languages.

Sarah Alam El Din

Being a part of MUN at a high school level has allowed Sarah to grow her passion for MUN even further during her Bachelor's degree in Sociology. She is a student at the University of Vienna and is always keen to grow her skills and knowledge.

Seeing MUN as a place to be introduced to people from many places around the world and share their passion together is a big reason of why she values the existence of these simulations.

In her free time Sarah tends to get on a plane or train to explore new places while always making sure to have a stack of books in her luggage to also discover.

INTRODUCTION TO UNEP

With the United Nations Environment Program the governing of natural resources is at the core of the program1. They were brought to life in June 1972 at the United Nations Conference on the Human Environment. It is governed by the (XXV11) Institutional and Financial Arrangements for International Environmental Co-operation 2. The declaration defines the promotion of international co-operation and guidance regarding the environment as main functions (having several more main functions in place in the Agreement). Thereby the UNEP has come into place and has been operating ever since.

TOPIC A – THE POTENTIAL OF ICT TO IMPROVE RESOURCE EFFICIENCY

Introduction

Over the past two decades, information communication technologies (ICTs) have evolved dramatically in transforming societies, cultures and economies. The world has witnessed changes brought about by the rapid advancement of technologies in the ICT ecosystem such as the social media, big data and the Internet of Things.

Information and Communications Technology (ICTs) refer to mediums that provide access to information through telecommunications. They include the internet, wireless networks, mobile phones, and other means of communication. Mobile technologies and broadband connectivity, already pervasive in developed countries, is being rapidly deployed in developing countries and emergingmarkets. These technologies have brought great financial and social advances and have helped the development of society. For example, cyberspace presents an increased number of opportunities through its capacity to transmit information worldwide and to manage a vast collection of processes at great speed.

Moreover, ICTs have been a significant tool for educational purposes. Indeed, through these technologies, images and layouts can be used as teaching methods, thus resulting in the enhancement of students' retentive memory, while professors can easily explain complicated instructions and guarantee students´ comprehension.

With regard to national economy, ICTs can provide a boost to already existing enterprises and industries such as shipping and manufacturing, as well as a motive for the creation of new industries. System analysts, programmers, web designers and people working in secondary industries such as technology training and recruitment all owe their employment to ICTs. With the development of ICTs, productivity, quality and accuracy can be increased, by speeding up time-consuming activities and by reducing human errors and faults.[1]

Indeed, it is not surprising that the United Nations 2030 Agenda for sustainable development has embraced the spread of ICTs and global interconnectedness as having great potential to accelerate human progress, to bridge the digital divide and to develop knowledge societies. Governments worldwide are now cognizant of the power of ICTs and e-government for the advancement and transformation of the public sector landscape. While none of the SDGs is specifically about ICTs, several targets make references to ICTs and technology. The 2030 Agenda for Sustainable Development also recognizes that "The spread of information and communication technology and global interconnectedness has great potential to accelerate human progress, to bridge the digital divide and to develop

[1] UN Public Administration and Development Management - ICT for Development

knowledge societies". ITU has made a concerted effort to highlight the role that ICTs will play in achieving the SDGs.[2]

In this connection, a UN Task Force on ICT as well as a Division of the Public Administration and Development Management (DPADM) on ICTs were created. Latter Division supports e-government development for responsive, efficient, effective and equitable delivery of public service to all people, building public trust and ensuring transparency, participation and collaboration in the development process.[3]

Information and communications technology (ICT) products include hundreds and even thousands of various components, many of which are highly relevant to resource and energy intensity. However, not all products and components have the same potential for increasing resource efficiency or generating energy savings. Various components and subcomponents, such as integrated circuits (IC) and printed circuit boards (PCB), are used in practically all ICT and thus have strong potential for improving the environmental performance of a large range of products.[4]

The ICT supply chain requires a diverse array of important metals to create a product, including gold, silver, platinum group metals, indium, tantalum, and gallium. A mobile phone, for instance, can consist of 43 different elements.

Extracting and processing these elements is associated with major material requirements, appropriation of land and consumption of energy, and can cause severe environmental impacts. For instance, in many places around the world, gold and silver mining incurs high ecological and social costs. Broad-scale excavation of rock, energy- intensive comminution, cyanide leaching and amalgamation with mercury are just a few typical causes of the far-reaching impacts on humans and the environment. Manufacturing certain ICT device components demands high amounts of energy and materials. For example, manufacturing a notebook's mainboard consumes approximately 70 kg CO2e, representing almost 50% of the overall emissions from the production phase. Manufacturing a computer's display, chassis and battery also demand high amounts of energy.[5]

However, ICTs can also enable savings of raw materials and energy through improving the efficient operation of other technical systems (Sustainability by ICT). Using ICT for automated monitoring and control of technical systems, such as self-learning controls for heating or cooling systems in buildings, can provide substantial technical efficiency improvements in infrastructures. Virtualization, i.e. the replacement of material goods with electronic media or online services, bears a large dematerialization potential. The study further illustrates the dematerialization potential of e-book readers to replace paper books. They conclude that

[2] ITU: ICTs, news services and transformation of the Post

[3] ITU: ICTs, news services and transformation of the Post

[4] ITU: ICTs, news services and transformation of the Post

[5] ITU: ICTs, news services and transformation of the Post

one electronic reader comes with a larger carbon footprint than one book on paper; however, after having read more than 35 e-books, the trend reverses and the e-book's dematerialization of paper becomes actual carbon footprint reduction.[6]

ICT can make an important contribution to mitigating climate change in many sectors of production and consumption. Estimates of mitigation potentials cited most frequently by experts and in technical literature anticipate that intelligent deployment of ICT solutions could deliver emissions reductions totaling around 7.8 billion t CO2e worldwide in the year 2020. However, ICT is also a source of emissions, amounting to 830 million t CO2e worldwide in 2007. These emissions are expected to rise to 1.4 billion t CO2e by 2020.[7]

Potential for exploiting win-wins in resource efficiency and energy savings

At his point, two case studies which were analyzed in detail in the ICT chapter of the Technical Report of the European Commission on the *Energy Saving Potential of Increasing Resource Efficiency* are presented.

Thin clients and zero clients

Substituting networked ICT services for user premises equipment, such as locally operated desktop PCs, entails better use of ICT hardware. the Report states that the energy density of data-centre hardware has increased substantially in the last decade. Moreover, the capacity utilisation of high performance servers has increased largely due to virtualisation and more accurate load management. Such measures at the same time are economically attractive (lower costs for hardware investment and maintenance) and bear improvement potential with regard to the energy and resource efficiency. Savings potentials stem from a higher degree of hardware utilisation. It is assumed that centralised computing services exploit the available ICT capacities to a substantially higher degree than local computers, which are often in idle mode (e.g. at night or during work breaks). When existing hardware is used more intensively, natural resources are subsequently more efficiently used, resulting in better energy efficiency in the ICT use- phase.

Virtualising computing services can also postpone ICT hardware obsolescence because cloud services are provided by means of centralised data centres that are usually better maintained and easier to be updated than local ICT equipment. High performance computing (HPC) data centres can be operated with renewable energy and combined heat and power (CHP) technology. This lowers the greenhouse gas emissions for computing in comparison to local ICT equipment running on national power mixes, which often contain larger shares of fossil energy (at least for the time being).

Large data centres can be geographically placed in regions with natural cooling potential to reduce the energy consumption of cooling. This offers advantages as compared to decen-

[6] UN: Public Administration and Development Management - ICT for Development

[7] Technical Report on the Potential of ICT to Improve Resource Efficiency

tral cooling systems for user end devices and small server stations, which run often far from the energetically optimal operating condition. [8]

Barriers to exploiting the win-wins

The following barriers to increasing resource efficiency and exploiting energy-saving potentials were identified based on the case study: [9]

- The potentially longer-lasting service life of thin and zero clients cannot be fully exploited due to the premature obsolescence of certain hardware components (such as SSD) or increasing incompatibility of software (e.g. operation system (OS), drivers, file formats);
- The increasing use of cloud services (e.g. internet of things) may lead to rebound effects from massive growth in data transmissions via the internet. Rebound effects can occur in cases where a technology triggers the consumption of larger amounts of a service so that the energy demand for providing the service grows faster that the improvements in energy efficiency. This may occur as well if user premises devices (i.e. PCs) are replaced by TC/ZC systems or cloud services. The increasing data traffic via the Internet and generally larger volumes of data stored and transmitted can trigger further growth in global ICT infrastructures;
- Access networks and data centres are usually planned with capacity reserves (extra hardware) in order to hedge for demand peaks and as a backup for possible interruptions. Oversizing the hardware capacity is common for server infrastructure and data centres and less so for end-user PCs. Thus, the extra hardware has to be added to the balance sheet on energy and resource impacts of TC/ZC systems. This may diminish the theoretically expected gains in CED saving potential;
- Data security in the cloud requires end-to-end encryption. This necessitates extra computing time and hardware (e.g. special crypto-chips), which entails additional energy and resource consumption. Moreover, the need to encrypt sensitive information may necessitate larger data volumes to be transmitted via networks.

Policy measures to address these barriers

Various policy measures exist to address the identified barriers to achieving energy and resource savings. The technical opportunities behind the policy measures are further detailed in the *Technical Report* accompanying this document.[10]

- More research and (life cycle) assessments addressing networked computing are necessary to develop a clearer and more up-to-date understanding of resource and energy impacts. Specifically, the resource- and energy-efficiency of cloud services should be examined using Life Cycle Assessments (LCA);

[8] Technical Report on the Potential of ICT to Improve Resource Efficiency

[9] Technical Report on the Potential of ICT to Improve Resource Efficiency

[10] Technical Report on the Potential of ICT to Improve Resource Efficiency

- Further investigation into the implications of software and algorithms on resource- and energy- efficiency in ICT infrastructures is needed. This lacking knowledge hampers decision-making for innovation strategies; and
- Need for internationally harmonised metrics to measure and monitor the energy efficiency of large ICT networks and data centres.

Recycling plastics from WEEE

Recycling WEEE plastic waste entails both environmental and economic advantages simultaneously. Disposal costs can be lowered by reducing the amounts of plastic waste entering incineration plants and landfills. Simultaneously, if plastic waste is fed back into the cycle of raw materials in the economy, the environmental burden of waste disposal is reduced while greenhouse gas emissions and environmental pollutants from waste incineration processed are lowered. These indirect effects of recycling help reduce the amount of raw materials extracted from nature.[11]

The CED savings potential from ICT-WEEE plastic recycling for the EU28, shown in the ICT chapter of the *Technical Report,* is expected to be approximately 1 500 TJ by 2020, provided that the recycling targets in the WEEE Directive are achieved. In order to facilitate the recyclability of plastics contained in ICT products, it is crucial to purposely remove the various polymer materials and composites from new ICT designs. Moreover, the content of contaminants, such as brominated flame retardants, should be reduced.

Barriers to exploiting the win-wins

The following barriers to increasing resource efficiency and exploiting energy-saving potentials were identified based on the case study. Certain barriers are particular to recycling plastics from WEEE:[12]

- Increasingly using more heterogeneous plastic grades in ICT products hinders reaching the recycling targets prescribed in the WEEE Directive because heterogeneous assemblies of different plastics are hard to separate with economically feasible technologies;
- An increase in bio-based plastics and filler materials worsens the problem to separate plastics because these materials have similar densities to recyclable plastics;
- Technology for bio-plastic recycling is still immature and there is currently no market for such materials;
- The presence of unrecognizable flame retardants (FR) in plastic components compromises the quality of plastics recycled from ICT products. Using FR in modern ICT products is no longer a

[11] Technical Report on the Potential of ICT to Improve Resource Efficiency

[12] Technical Report on the Potential of ICT to Improve Resource Efficiency

- realistic technical necessity because new power technologies in modern devices do not heat the devices as much as previously and thus the ignition likelihood is much lower. Nevertheless, existing laws and standards based on an outmoded technologies (e.g. CE label) require that FR be used;
- The lack of coherence between the eco-design directive and the WEEE directive hampers the full implementation of extended producer responsibility in the design stage of new ICT products. Unlike the WEEE directive, the eco-design directive fails to set legally binding design targets for recycling quotas. ICT producers are therefore not obliged to demonstrate the recyclability of their new products.

Policy measures to address these barriers

Various policy measures exist to address the identified barriers to achieving energy and resource savings. The technical opportunities behind the policy measures are further detailed in the *Technical Report* accompanying this document.

- Plastic recycling is still an insufficiently exploited potential for increased resource efficiency in the EU. While the recycling industry has developed advanced technologies for separating different plastic materials and grades the technology cannot yet live up to its full potential due to the insufficient availability of homogenous and contamination-free feedstock. Economically viable plastic recycling depends on source separation and pre-sorting of recyclable plastic waste. This, however, remains a severe bottleneck in the reverse logistics of WEEE recycling systems. To this end, the coherence between the eco-design directive and the WEEE directive should be improved. The eco-design directive should set legally binding design targets that match the recycling quotas determined in the WEEE directive. Moreover, the eco-design directive may impose incentives for ICT producers to demonstrate the recyclability of their new products;[13]
- Policy strategies, notably the EU action plan for the Circular Economy71, promote the proliferation of high-grade plastic recycling from WEEE by means of quality standards for secondary raw materials as well as voluntary certification schemes for treatment facilities (e.g. plastics in electronic waste). The Commission's strategy on plastics in the circular economy aims at reducing the presence of hazardous substances in polymer products as a precondition for recycling them in high quality secondary raw materials.[14]

[13] UN: Public Administration and Development Management - ICT for Development

[14] UN: Public Administration and Development Management - ICT for Development

Questions a Resolution must answer

- In general, what actions can the UNEP take in order to support the implementation of ICTs in order to improve resource efficiency?
- When considering the 2030 Agenda for for sustainable development, how could ICTs and UNEP help achieving some of the goals?
- Identify strategic partnerships between nations, regions, or potentially other bodies of the UN or other Organizations

Further Readings

We hope this study guide supports you in your research and preparation for the conference. However, we strongly encourage you to go beyond the content of this guide and find out about your country's position and learn all you can about the issue at hand.

- United Nations ICT Task Force Memberships: http://www.un.org/webcast/ict/members.htm
- UN: Public Administration and Development Management - ICT for Development: https://publicadministration.un.org/en/ict4d
- United Nations 2013 Agenda on Sustainable development: https://sustainabledevelopment.un.org/post2015/transformingourworld
- United Nations Environmental Program – Evaluation Office: http://web.unep.org/evaluation/keywords/ict
- ITU: ICTs, news services and transformation of the Post: https://www.itu.int/ITU-D/tech/rural_telecom/Rural_Publications/dcc_livreUitEn.pdf
- European Commission: Technical Report on the Potential of ICT to Improve Resource Efficiency: http://ec.europa.eu/environment/enveco/resource_efficiency/pdf/final_report.pdf

TOPIC B: DETOXIFYING OUR SOCIETIES – IMPROVING THE HANDLING AND DISPOSAL OF CHEMICALS AND WASTE

Introduction

The UNEP holds a division on Chemical Waste in Geneva. Their focus lies in the UN Environment activities concerning chemical issues and being the driving force in initializing global action on environmentally sound management of hazardous chemicals[15]. This is being implemented through a direct workflow with the respective countries. Especially using clean production, use and disposal of chemicals is of importance when assessing the safety in handling these substances. Partnerships with governments, international and non-governmental organizations are key to attaining the Sustainable Development Goals of 2020 for the UNEP.

Concerning this topic, an assessment on how the differences in geographical location, GDP, land area and other variables may have an impact on the creation of unusable land through toxic waste. Certain countries may be affected more than others due to different circumstances.

Scope and Background Information

Toxic waste, also called hazardous waste, is waste posing a potential harm to humans or the environment and may appear in a variety of forms[16]. During the 60's and 70's there has been an increase of awareness in toxic waste and thereby initiating the process of regulation creation[17]. Events which have had a huge impact include but are not limited to Love Canal of the Niagara Falls[18], Chernobyl nuclear disaster 1986, Bhopal gas leak in 1984[19], Daishi-Fukushima 2011[20].

Do note that a disaster is defined as an event creating disruptions to the usual functioning of society while a catastrophe is to be seen as a "mega disaster" also implying a great loss of human lives, property and a need for great expenditure to recover to its previous state[21].

The International Register of Potentially Toxic Chemicals database is being managed by the UNEP for collecting data on international hazardous waste management, also specified in

[15] (UNEnvironment)

[16] (EnvironmentalProtectionAgency, 2017)

[17] (UniversityofColoradoBoulder, 2017)

[18] (JacobHamblin, 2016)

[19] (BioMed Central)

[20] (FrancisAdeola)

[21] (FrancisAdeola)

the Basel Convention. The Bamako Convention of 1998 by the African Union underlines the prohibition of importing hazardous waste.

Hazardous waste management is mostly handled by dedicated companies such as Veolia Environment, Suez Environment, Waste Management, Republic Service and Remondis (ordered by 2015 revenue)[22]. Due to the urge of continuous profit maximization and the so called "not-in-my-backyard" syndrome an increase of exporting toxic waste from developed to developing countries has been observed[23]. This has brought the Basel Convention to life[24]. This pollution derives from different points introduced below.

"Nonpoint source pollution cannot be traced to a specific spot. Point sources include wastewater treatment plants, overflows from combined sanitary and storm sewers, and industry discharges. Nonpoint sources include runoffs from urban, agriculture, and mining areas. Point and nonpoint sources have caused a wide range of water quality problems and the deterioration of the ecological state in rivers" [25]

Absorption of chemicals, called Bioconcentration, takes places in organisms such as fish while in their environment[26]. This concentration has increased steadily. Pathogen pollution creates health problems due to the contamination of the water supply, fish and estuaries[27]. The water supply plays an important role in this topic since crops, land and humans come into direct contact with it.

A vast amount of chemicals in agriculture are water-soluble nitrates and phosphates due to the frequent usage to speed up the growing process[28]. A fallacy occurring is the use of chemicals in order to eradicate unwanted organisms living within their crops which in turn cause the slow endangering of crops, birds and the increase of deathly illnesses of humans[29].

From this continuous soil degradation, a decrease in soil quality occurs, eventually making the land infertile and unable to use for agriculture.

There have been several efforts observed to minimize the long term effects.

Do look at other conventions such as the Stockholm Convention to know more about international agreements on toxic substances and waste

---

[22] (Veoila)

[23] (Fang Liping, 2009)

[24] (Convention, 2011)

[25] (JohnGulliver, 2012)

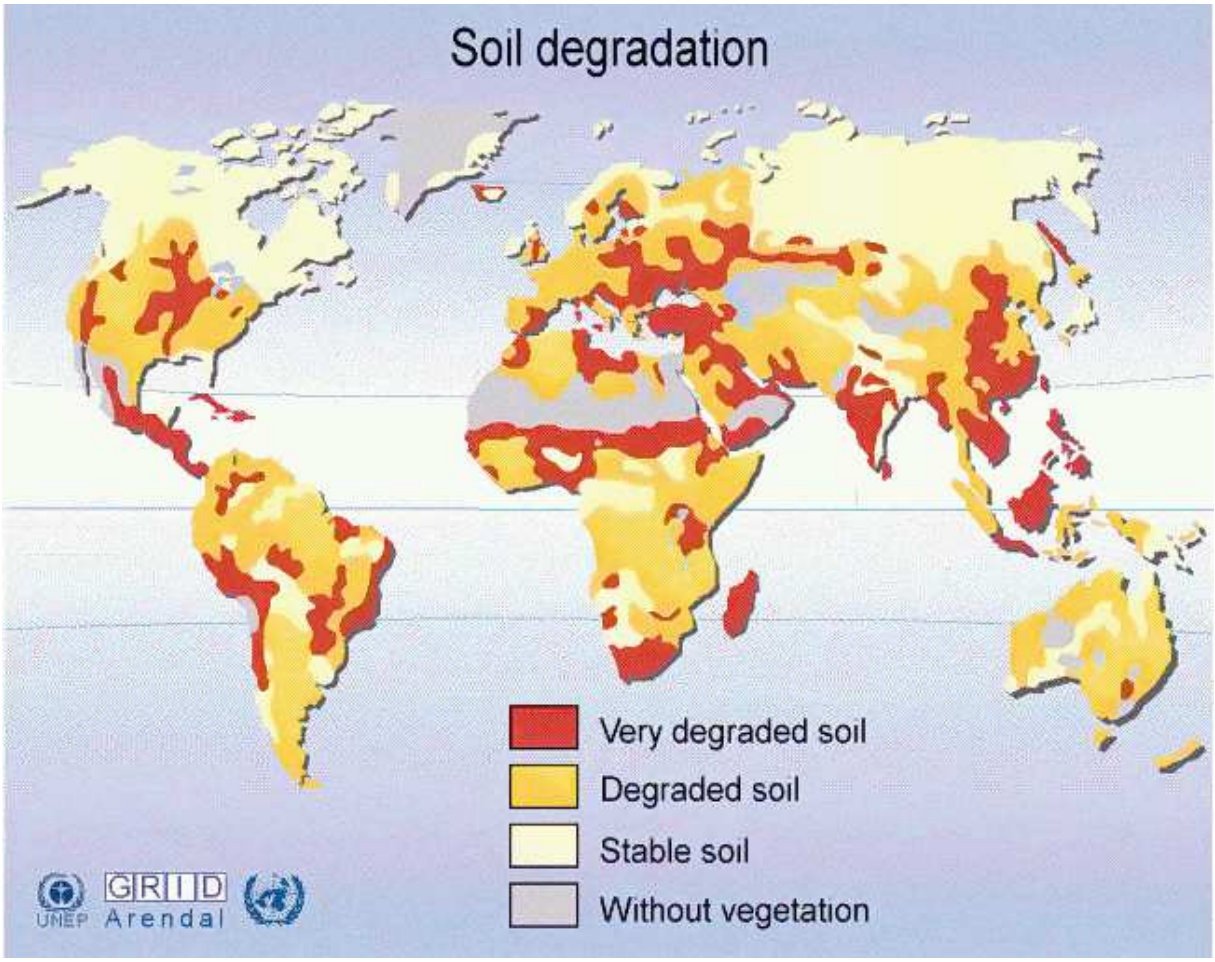
[26] (JohnGulliver, 2012)

[27] (JohnGulliver, 2012)

[28] (Joseph, 2005)

[29] (Joseph, 2005)

Actions taken after the Stockholm convention for a country such as Japan can be read here: http://www.un.org/esa/dsd/dsd_aofw_ni/ni_pdfs/NationalReports/japan/Waste_Management.pdf. It will provide a general understanding of how and what changes were adapted and the hurdles to be overcome.



Graph 1: Degraded soil in 1997[30] Previous action taken

Chemical Waste

The sound management of chemicals and wastes is an important component of UNDP's efforts to achieve sustainable, inclusive and resilient human development and the Sustainable Development Goals (SDGs). [31]

Chemicals are critical to the manufacture of many products and protection of human health, and an important contributor to the GDP and employment. However, without good man-

[30] (UNEP, 1997)

[31] UNDP – Chemicals and waste management (2017)

agement practices, chemicals and their hazardous wastes can pose significant risks to human health and the environment. The health related effects range from acute poisoning to long term effects, such as cancers, birth defects, neurological disorders, and hormone-disruption[32]. This can especially affect the poorest members of the global community. In particular in urban areas and among minority populations, people are often exposed to hazardous chemicals and associated waters in their jobs or because they reside in these polluted areas. In rural areas, most chemical exposure and environmental pollution is linked to the misuse of agricultural chemicals and pollution brought by waterways, impacting the natural resources upon which these communities depend. [33]

Chemicals are an integral part of everyday life with over 100,000 different substances in use. Industries producing and using these substances have an enormous impact on employment, trade and economic growth worldwide. There is hardly any industry where chemical substances are not implicated and there is no single economic sector where chemicals do not play an important role.

Environmental effects range from effects on sensitive species / ecosystems, to large scale issues such as eutrophication of water bodies and stratospheric ozone depletion. Chemicals contamination is wide spread both on land and in water. People are exposed through occupational activities as well as in daily life through intake of contaminated drinking water, ingestion of contaminated food (e.g. fish contaminated with mercury, Dichlorodiphenyltrichloroethane and/or polychlorinated biphenyls), inhalation of polluted air (outdoor as well as indoor), and through direct skin contact.

UNDP's expertise covers management of chemicals harmful to human and environmental health, including Persistent Organic Pollutants (POPs), Ozone Depleting Substances (ODS), Mercury, Lead, and other heavy metals. UNDP helps countries strengthen their waste management systems, including waste prevention, reuse/recycling, treatment and disposal. Safe and effective treatment of hazardous medical waste (e.g. from the Ebola crisis in West Africa) through innovative technologies is also underway. [34]

Meanwhile, the continued growth pattern of global production, trade and use of chemicals exerts an increasing chemicals management burden on the developing countries and those with economies in transition that have the least capacities to deal with such complex challenges. By 2020, developing countries are expected to lead the world in growth rate for high volume industrial chemicals, increasing their share of world chemicals production to 31 %. Chemical consumption in developing countries is likewise growing much faster than in developed countries and could account for a third of global consumption by 2020. Sustainable use of chemicals is an issue that needs urgent attention in these countries not to en-

[32] UNEP Chemicals and Waste Division

[33] UNDP – Chemicals and waste management (2017)

[34] UNDP – Chemicals and waste management (2017)

danger ecosystems, environmental resources, and the livelihoods and health of future generations.[35]

While chemicals are major contributors to national economies, they require sound management throughout their life cycle. Otherwise, in addition to the benefits, they will pose significant risks to human health and the environment and result in significant costs to national economies. There is an established link between the condition of poverty and increased risks of exposure to toxic and hazardous chemicals, as they affect predominantly the poor who routinely face unacceptable high risk of poisoning because of their occupation, living location and lack of knowledge of proper chemicals management.

The global economy is also seeing a rapid increase in generation of hazardous wastes. Although most of the conventional hazardous wastes are produced in industrial and manufacturing operations, significant amounts are also generated in non-industrial sectors, including sludge from waste water treatment plants, waste oils, and waste batteries. Hazardous wastes not only pose risks and hazards because of their nature but also have the potential to contaminate large quantities of otherwise non-hazardous wastes if allowed to get mixed. Thus proper segregation, treatment and disposal of hazardous wastes are of paramount importance.

The United Nations Environment Program has created a Chemicals and Waste subprogramme, which assists countries and regions in managing chemical substances and waste:[36]

- Persistent, bioaccumulative and toxic substances (PBTs);
- Chemicals that are carcinogens or mutagens or that adversely affect the reproductive, endocrine, immune, or nervous systems;
- Chemicals that have immediate hazards (acutely toxic, explosives, corrosives);
- Chemicals of global concern such as persistent organic pollutants (POPs), greenhouse gases and ozone-depleting substances (ODS);
- Healthcare wastes;
- E-wastes

An interactive map of UNDP portfolio on chemicals and waste management can be found through this link:

http://www.undp.org/content/undp/en/home/ourwork/sustainable-development/natural-capital-and-the-environment/chemicals-and-waste-management.html

[35] UNEP Chemicals and Waste Division

[36] UNEP Chemicals and Waste Division

Nuclear Waste

Key Terms

Radioactive Waste: Radioactive waste arises from various sources, such as nuclear power generation and other nuclear fuel cycle related activities, radioisotope production and use for applications in medicine, agriculture, industry and research. The indicator provides a measure of both the current status of radioactive waste management at any point in time and the progress made over time towards the overall sustainability of radioactive waste management.[37]

Exempt waste: radioactive waste to be disposed as usual waste (very low concentration of radioactivity)[38]

Low- and Intermediate-Level Waste (LILW): Paper, clothing and laboratory equipment which has come into contact with radioactive components including radioactive soil and building materials. This waste can be buried near-surface as there is only a low concentration of radionuclides.

High-level Waste (HLW): Fuel from a reactor or residue produced once fuel is processed is relevant here. A high amount of heat is generated by this and cooling is necessary. This type of waste is turned from liquid to solid as soon as possible.[39]

Activity: This indicates the time of decay and emission of radiation. The higher the activity, the more harmful it is.

Half-life: The time taken for the activity to become half as active as it was at its beginning. If the half-life is fairly short the substance poses no danger in the waste-disposal process.

Transuranic waste (TRU): Specific waste produced by nuclear weapons.

History

Given the outreach of waste production, nuclear waste has played a significant role after its development years of 1895 – 1945[40]. During the last several years of its development, the biggest focus was on the usage and improvement of nuclear bombs. In the year 1949 a seminar on radioactive waste was conducted by the Atomic Energy Commission (AEC) in which the importance of waste management of nuclear waste was unappreciated. It was not seen to be a threat to fear but rather an unimportance to overlook[41]. The Atomic Energy Act

[37] (UNEP, 2015)

[38] (UNEP, 2015)

[39] (Nuclear Waste: Is everything under control, 2007)

[40] (http://www.world-nuclear.org/information-library/current-and-future-generation/outline-history-of-nuclear-energy.aspx, 2016)

[41] (Alley, 2013)

of 1954 granted rights such as building large reactors next to cities to provide them with energy. By the year 1955 there has been an agreement signed with the National Academy of Sciences (NAS) to start studying the problems radioactive waste may pose, in America specifically[42]. By 1969 some concerns have started to arise in waste burials of nuclear waste. In 1981 Britain's policy made storing nuclear waste above ground for 50 years before burying it mandatory till the geological repository has been decided on in 2006. Testing potential damages with this type of waste was usually limited to salt in most countries such as in Germany till in 1979 positive results have been found by a laboratory and the search for a waste-management center has been initiated[43]. By the 1980s civil society has started large protests in many countries in order to stop nuclear plant construction and to push for shutdowns[44].

Current Situation

Nuclear Energy provides a vast amount of power and energy sources, does however also pose a threat to safety due to the explosive power of the substance. On average 17% of the worldwide electricity is provided through nuclear power, making it quite a contributor of today's living standard[45].

As of now there is no solution to the nuclear waste produced and therefore no new reactors are to be built[46]. The hazardousness of nuclear waste is to remain for thousands of years and the effects and dangers it may pose for future generations is unclear[47]. There have been attempts made such as the Yucca Mountain repository to dispose of this waste. Since there is no way to remove the radioactivity of such substances, unease exists amongst governments, since the waste management facilities need to remain within the radiation guidelines which often cannot be achieved. Thereby the license is removed and the facility cannot proceed such as with the example mentioned above[48].Waste often derives from the milling or uranium which consists of sand-like material. As of the year 2006 40-50.000 tonnes of uranium were produced annually[49].

---

[42] (Alley, 2013)

[43] (Alley, 2013)

[44] (Alley, 2013)

[45] (Nuclear Waste: Is everything under control, 2007)

[46] (Radioactive Wastes - Myths and Realities, 2017)

[47] (Radioactive Wastes - Myths and Realities, 2017)

[48] (Farrugia, 2011)

[49] (Nuclear Waste: Is everything under control, 2007)

A UNEP report[50] on nuclear waste points out several important points to be aware of:

"One light-water 1000 MW reactor produces about 100m of LILW and offloads about 30 tonnes of spent fuel each year. If this spent fuel is destined for direct disposal it comprises about 50 m²."

"Sea disposal

In the early days, low- and intermediate-level wastes were dumped at a number of sites under the guidelines and definitions adopted by the 1972 London Convention."

The Fukushima nuclear disaster in 2011 is one of many incidents which has shown that natural causes such as earthquakes can be the cause of disastrous outcomes if a nuclear plant is damaged. Given this incident it has underlined that the whole world can carry the aftermath of such events such as by the contamination of ground water[51]. Another very significant occurrence has been the Chernobyl nuclear disaster in the year of 1986. Other examples to also be looked through are 1945 Hiroshima, 1969 Lucens reactor and 1997 Tokaimura.

Proposed solutions[52]

Dr. Mohammed Al Baradeis, Director of the UNs International Atomic Energy Agency (IAEA) has pledged for ensuring international co-operation to solve this situation.

- South Australian proposal (2016):
    - facility for the disposal of international used nuclear fuel and intermediate-level waste should be established
    - develop a world-class waste disposal facility
    - cautious and conservative approach
    - 120-year project
    - alternative to national project
- ARIUS and Europe – ERDO (2002):
    - successor to the Pangea proposal
    - regional and international facilities for storage and disposal of all types of long-lived nuclear wastes
    - shared radioactive waste management approaches and facilities
    - Membership is open
- ARIUS and the Gulf (2012):

[50] (Nuclear Waste: Is everything under control, 2007)

[51] (Brown, 2015)

[52] (UNEP, 2015)

  - Among GCC countries there is potential for a lot of co-operation in this area
  - regional repository in the Middle East $4 billion cost
- Fuel Leasing
  - utility leases its fabricated fuel from a supplier, probably in another country, and after it has been used that supplier takes it back
  - mainly for Russian-built nuclear power plants
- Russia:
  - 20 members
  - fuel repository 7000 km east of Moscow

Future steps

Given the points above there is a need to discuss this topic further in order to avoid further disasters, contain the damage done, ensure the right way of disposal, find a consensus on how to go forward with disposal and look at regulations to avoid uneven responsibility distribution. Since the potential consequences of nuclear waste are not known till now discussions may also include the damage reduction for future generations. It is essential for all world powers to work together on this topic in order to avoid disastrous outcomes in the near or far future.

Essential readings

If for any reason you are unable to access one or more of these links do feel free to get in contact with us on providing you with the excerpt of the respective journal, book or article for educational purposes.

- Do look at the Environmental (Protection) Agency of your country and the previous actions, hazardous waste occurrences, potential dangers and best practices
- This journal article will provide a very useful insight into the potential problems of hazardous waste disposal including essential information on the role of the United Nations in the process. Volume 172, Issue 1, 15 December 2009, Pages 138–146:

  https://www.journals.elsevier.com/journal-of-hazardous-materials
- Here you will find thorough information on international environmental law, essential to knowing the already existing rules and regulations in place by the United Nations, other inter- national bodies and states. This may be a very helpful asset for the conference to make use of:

  http://guides.ll.georgetown.edu/c.php?g=273374&p=1824796
- This website has a lot of useful graphs and articles concerning the environment and its situation throughout the years. It directly collaborates with UNEP, especially on the subject of our topic: http://www.grida.no/graphicslib

- Hazardous waste disposal guide covering really useful points on the topic: http://www.offices.research.northwestern.edu/ors/forms/purpleguide.pdf
- Indicators of Sustainable Development: Guidelines and Methodologies: http://www.un.org/esa/sustdev/natlinfo/indicators/guidelines.pdf
- UN Sustainability recommendations for respective country or region
- UNEP – Chemicals and Waste Division: http://web.unep.org/chemicalsandwaste/
- UNDP – Chemicals and waste management (2017):

  http://www.undp.org/content/undp/en/home/ourwork/sustainable-development/natural-capital-and-the-environment/chemicals-and-waste-management.html

References

- Alley. (2013). Too Hot to Touch: The Problem of High-Level Nuclear Waste. New York: Cambridge University Press.
- BioMed Central. Retrieved on 01.02 2017 von Environmental Health: https://ehjournal.biomedcentral.com/articles/10.1186/1476-069X-4-6
- Brown, M. (2015). Arrival of the Fukushima radioactivity plume in North American continental waters. Proceedings of the National Academy of Sciences , 112(5), 1310.
- Convention, S. o. (2011). Basel Convention. Retrieved on 03.02.2017 von http://www.basel.int/
- Environmental Protection Agency. (05. 01 2017). Environmental Protection Agency. Retrieved on 01. 02 2017 von Learn the Basics of Hazardous Waste : https://www.epa.gov/hw/learn-basics-hazardous-waste
- Fang Liping, H. K. (2009). A conflict model for the international hazardous waste disposal dispute. Journal of Hazardous Materials, 138-146.
- Farrugia, Y. E. (2011). Nuclear Waste : Disposal and Liability Issues. New York: Nova Science Publishers, Inc.http://www.world-nuclear.org/information-library/current-and-future-generation/outline-history-of-nuclear-energy.aspx . (2016). Retrieved 03 28, 2017, from World Nuclear Association.
- FrancisAdeola. GoogleBooks. Retrieved on 02. 02 2017 von Industrial Disasters, Toxic Waste, and Community Impact: Health and Effects and: https://books.google.at/books?id=ibZKBAAAQBAJ&pg=PA1&lpg=PA1&dq=toxic+waste+disasters&source=bl&ots=Bgc4DAebal&sig=ZytemjGbXTFl2VZJMEHvf8TM0aM&hl=en&sa=X&ved=0ahUKEwjbxMu-4ojSAhUDtBQKHUx1D9w4ChDoAQgfMAE#v=onepage&q=toxic%20waste%20disasters&f=false
- JacobHamblin. (15. 07 2016). A toxic timeline. Science Mag, 353, 226.
- JohnGulliver. (2012). Transport and Fate of Chemicals in the Environment. New York: Springer.
- Joseph, B. (2005). Environmental Studies. New Delhi: Tata McGraw-Hill Publishing Company.
- Nuclear Waste: Is everything under control. (2007, February). Retrieved 03 28, 2017, from Major and minor nuclear testing sites: http://www.grid.unep.ch/products/3_Reports/ew_nuclear.en.pdf
- Radioactive Wastes - Myths and Realities. (2017, February). Retrieved March 28, 2011

OTHER USEFUL TIPS

- Make sure to use valid sources such as your national agencies or other official organizations. Information retrieved from Wikipedia or similar sites do not have credibility and hence cannot be used in MUN.
- Know your information. If facts are given be sure to have the sources at hand or your point will not be seen as valid.
- Be aware of your countries position, who may agree or disagree with the action the country represented wants or does not want to have implemented & which other countries may agree with that position
- Do not have personal opinions on a topic mix with a countries position. Remember it is essential to always speak in the name of the country and hence represent the countries ideas and ideals regardless of what one thinks of those points personally.
- If you are unsure about anything concerning the topic or conference make sure to know that we, chairs, are always available for any assistance and guidance

RESOLUTION

- For the days of our conference all delegates will work towards passing a resolution on either topic.
- Look at potential actions the UNEP can and should take to include in the Resolution.
- Consider if certain regions should take different actions than some other regions and why.
- Which actors are involved and how can their actions be controlled or checked more effectively?
- Goal 12 of the Sustainable development goals 2030 should be taken into consideration while drafting a resolution.