
International Conference on Chemicals Management

Fourth session

Geneva, 28 September–2 October 2015

Item 5 (b) (iii) c of the provisional agenda*

**Implementation towards the achievement of the 2020 goal
of sound chemicals management: emerging policy issues
and other issues of concern: existing emerging policy
issues: hazardous substances within the life cycle of
electrical and electronic products**

**Emerging policy issue update on hazardous substances within
the life cycle of electrical and electronic products**

Note by the secretariat

The secretariat has the honour to circulate, for the information of participants, a report on hazardous substances within the life cycle of electrical and electronic products prepared by the United Nations Industrial Development Organization (UNIDO) in cooperation with other relevant organizations, including the International Telecommunications Union, the World Health Organization, the United Nations Environment Programme and the secretariat of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade and the Stockholm Convention on Persistent Organic Pollutants (see annex). The report provides a summary of the work carried out on this issue since the third session of the International Conference on Chemicals Management, identifies gaps remaining that need to be addressed in order to support the achievement of the 2020 goal and proposes a workplan for the period 2016–2020. The report is presented as received by the secretariat, without formal editing.

* SAICM/ICCM.4/1.

Annex

Progress report on hazardous substances within the life cycle of electrical and electronic products

I. Background

1. The use of hazardous substances within the life cycle of electrical and electronic equipment (EEE) is an issue of global concern. In a personal computer or mobile telephone up to 60 elements from the periodic table can be found, including hazardous substances like beryllium, mercury, lead, arsenic, polyvinyl chloride (PVC), brominated flame retardants (BFRs) or phthalates. These substances are used during the production process and therefore can be found in the products itself throughout the whole life cycle.
2. Besides the use of hazardous substances within the production process, their treatment at the end-of-life of EEE (e-waste) is a great concern especially in developing countries and countries with economies in transition. Often, rudimentary methods are applied to recover precious metals from e-waste. Those methods, including open burning of cables to recover copper or leaching of printed circuit boards to recover gold, silver or palladium, are very harmful the environment and human health.
3. In order to properly and sustainably address the issue of hazardous substances within the lifecycle of electrical and electronic equipment, initiatives during all stages of the life cycle of EEE from production, usage to final disposal (up-, mid- and downstream) need to be implemented.

II. Introduction

4. At the second session of the International Conference on Chemicals Management (ICCM) held in Geneva in May 2009, hazardous substances within the life-cycle of electrical and electronic products (HSLEEP) was adopted as an emerging policy issue by the Conference. UNIDO is the coordinating agency for the SAICM Emerging Policy Issue on “Hazardous substances within the life circle of e-products”.
5. The Conference in section D of resolution II/4, called for participating organizations of the Inter-Organization Programme for the Sound Management of Chemicals and the secretariats of the Basel and Stockholm Conventions to organize an international workshop to be convened in relation to electrical and electronic products, based on a life-cycle approach. The workshop was hosted by the United Nations Industrial Development Organization (UNIDO) in Vienna in cooperation with SAICM and the Basel Convention, from 29 to 31 March 2011. The workshop identified and assessed where issues relating to the sound management of chemicals arise during the lifespan of electrical and electronic products and developed a series of options and recommendations for future work. The outcome was provided to the ICCM at its third session for its consideration and possible cooperative actions.
6. At ICCM3, new activities were added to the SAICM Global Plan of Action related to this topic and a number of additional activities were highlighted for action in Resolution III/2. The Resolution specifies the work to identify, compile and create an international set of best practice resources on topics in this area, drawing on existing initiatives and opportunities, including: (a) tools that lead to progress in the development of designs that reduce and eliminate the use of hazardous chemicals in production; (b) business standards and practices for tracking and disclosing the presence of hazardous chemicals in the manufacturing, use and end-of-life stages; (c) tools and information on potential safer substitutes for chemicals of concern in product applications; (d) green purchasing strategies of businesses and governments; (e) extended producer responsibility policies of businesses and Governments; (f) provisional strategies and actions in design and manufacturing that should be implemented until elimination is possible or safer substitutes are available.
7. In this regard, UNIDO organized an international workshop in 2011 in cooperation;

III. Project activities and outcomes

8. Within the last four years activities have been focused on the downstream level. A number of UN agencies and other international organizations have been supporting developing countries and countries with economies in transition to develop sustainable e-waste management schemes taking into account the whole reverse supply chain of these products.

9. Sustainable e-waste management strategies include

(a) the development of specific e-waste policies, including a sustainable financing mechanism in order to ensure sound management of valuable and non-valuable materials

(b) the development and implementation of international standards on responsible and safe e-waste management, focusing on the entire product life cycle from eco-design to final disposal and recycling methods

(c) the set-up of a collection and take-back schemes

(d) the transfer of technologies in order to establish or up-scale dismantling and recycling facilities, including the connection to efficient and effective downstream markets on national, regional and global level

(e) building of national capacities and raise awareness among the broad public

10. For the set-up of a collection scheme, UNEP International Environmental Technology Centre (IETC) developed the E-waste Manual Volume III on Take-back System in 2013

(<http://www.unep.org/ietc/InformationResources/Publications/E-wasteManual3/tabid/130121/>). This manual aims to build the capacity of practitioners and decision makers to guide and assist them in understanding, planning, designing and implementing WEEE/e-waste take-back schemes for use by cities or other localized areas or for use at a nation-wide level. The manual describes various components of Policy Framework, including regulatory systems and collection and transport systems, along with financial aspects and case studies of schemes currently underway.

11. UNEP IETC serves as the secretariat of the Global Partnership on Waste Management (GPWM). The GPWM is an open-ended partnership for international organizations, governments, businesses, academia, local authorities and NGOs. The GPWM supports the development of work plans to facilitate the implementation of integrated waste management at national and local levels to overcome environmental, public health, social and economic issues inflicted by waste and its impact. The GPWM has seven focal areas of work: 1) Waste and Climate Change; 2) Waste Agricultural Biomass; 3) Integrated Solid Waste Management; 4) E-waste Management; 5) Marine Litter; 6) Waste Minimization; and 7) Hazardous Waste Management, in particular mercury wastes. Through the GPWM, UNEP IETC has a mandate to work on activities related to hazardous substances in electrical and electronic equipment at its downstream.

12. Since 2009 the United Nations University (UNU) has guided the organization of E-waste Academies. So far, there exist two different editions – one addressing policy makers and representatives of small and medium sized companies (EWAM), and one young scientist (EWAS). Over the past few years, the E-waste Academy (EWA). Both have proven to be vital in building capacity on e-waste research, policy and management to foster partnerships and establish opportunities for further collaboration. The Academy views the e-waste issue in its entirety, rather than through the lens of a specific discipline of waste as the problem. The E-waste Academy addresses the need for multi-stakeholder input by providing tailored and targeted training and capacity building for different stakeholder groups.

13. With regard to international standards, the International Telecommunications Union (ITU) approved a series of international standards and recently approved two Supplements on “Life-cycle management of ICT goods” and “Guidelines for developing a sustainable e-waste management system” (2014). These complement the existing set of standards (ITU-T Recommendations) covering e-waste management, universal power supply solutions, green batteries and rare metals recycling methods. In addition, ITU published a Toolkit on end-of-life management for ICT equipment as part of the Toolkit on environmental sustainability for the ICT sector, developed by ITU-T in partnership with over 50 ICT companies and environmental organizations. The toolkit looks at securing an environmentally sustainable solution for end-of-life (EOL) management of ICT equipment, offers guidance for the recovery and recycling of materials contained in ICT equipment and discusses issues surrounding the use of conflict minerals in the context of clean supply chains.

14. The UNU hosted Step Initiative published a paper on “E-waste Prevention, Take-back System Design and Policy Approaches” in 2015. This paper explores the large variety of policy options that have been implemented around the world and it draws some conclusions about the nature of responses to the e-waste problem and potential policy recommendations.

15. The UNU also provided the necessary quantification of the e-waste challenge through its first Global E-waste Monitor 2014. The monitor aims to present the first comprehensive assessment of e-waste volumes, their corresponding impacts and management status on a global scale. The methodology used calculates the amount of e-waste generated from harmonised modelling steps and data sources. The outcomes show an unprecedented level of accuracy and harmonisation across countries and are very useful for international benchmarking. It is estimated that the total amount e-waste generated in 2014 was 41.8 million metric tonnes (Mt). It is forecasted to increase to 50 Mt of e-waste in 2018.

16. UNIDO’s activities on e-waste management focus on the establishment of sustainable recycling industries in developing countries and countries with economies in transition. UNIDO currently supports countries in East Africa (Uganda, Tanzania and Ethiopia) and South-East Asia (Cambodia). Further, a regional project in Latin America financed by the GEF is in the pipeline. 13 countries (Argentina, Bolivia, Chile, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Nicaragua, Panama, Peru, Uruguay, Venezuela) will participate in this project. The activities will focus on upscaling national e-waste treatment capacities as well as enhancing regional cooperation. In addition UNIDO currently develops regional project in West Africa, Southern Africa and South East Asia. Within the upcoming regional e-waste management projects, UNIDO will closely cooperate with the existing Stockholm and Basel Convention Centres existing in the respective regions. In order to effectively implement e-waste management projects on a global level, private-public partnerships have been developed on an international level and joint efforts have been undertaken to support governments. Partnerships within the Step Initiative and the Partnership for Action on Computing equipment (PACE) continue to evolve on a regular basis.

17. The Conference of the Parties to the Basel Convention at its twelfth meeting (COP12) adopted, on an interim basis, the technical guidelines on transboundary movements of electrical and electronic waste and used electrical and electronic equipment, in particular regarding the distinction between waste and non-waste under the Basel Convention¹. The Conference of the Parties acknowledged the need to look further into some issues under the technical guidelines and agreed to include the further elaboration of work on these issues in the work programme of the Open-ended Working Group for 2016–2017 in order to possibly prepare revised guidelines for consideration by the Conference of the Parties at its thirteenth meeting in 2017, in particular with reference to Annex V of the technical guidelines. Towards this end, Parties to the Basel Convention and other stakeholders are invited to provide further inputs as requested by the decision BC-12/5. In addition, PACE developed a report on strategies, actions and incentives to promote environmentally sound management for used and end-of-life computing equipment and a draft concept note on strengthening the use of the guidelines and reports developed by PACE at regional and national level, which were both presented to the Parties at COP12.

18. ITU, ECLAC, UNIDO, UNESCO, WHO, Basel Convention Regional Center for Latin America and WIPO – with support from UNU representatives - developed and launched in May 2015 a joint report which provides an overview of e-waste management in Latin America and provides guidance to countries on how to handle e-waste, including 10 key steps for a sustainable e-waste management. (http://www.itu.int/dms_pub/itu-t/oth/0b/11/TOB110000273301PDFS.pdf)

19. In consideration of the impact on health of vulnerable populations, WHO in collaboration with UNEP, the Secretariat of the Basel, Rotterdam and Stockholm Conventions, UNU, WHO collaborating centres and other stakeholders started an informal network of work in this area. A pilot study in Thailand was developed, looking at heavy metals levels of children living and studying near e-waste sites. Further a joint report of WHO and UNU surveyed the global expertise on e-waste and especially child health (<http://i.unu.edu/media/unu.edu/news/42911/UNU-WHO-Survey-on-E-waste-and-its-Health-Impact-on-Children.pdf>)

20. Several side-events have been organized to highlight the importance of tackling HSLEEP on up-, mid- and downstream level. Recently side-events have been organized jointly by UNEP and UNIDO at the SAICM OEWG2 meeting, AMCEN and the COP for the Basel, Stockholm and Rotterdam Convention. These side-events have contributed to exchange information on ongoing activities in the field of HSLEEP. The side-events have been attended by a large audience and active

¹ Available as document UNEP/CHW.12/5/Add.1/Rev.1.

discussions have taken place. One major concern addressed is the limited activities that have been implemented on up-stream level. Furthermore, a joint UNU-ITU- UNIDO-WIPO-ECLAC-Basel Convention side event on “1st global e-waste monitor and the specific situation in Latin America” was held during the COP for the Basel, Stockholm and Rotterdam Convention. A thematic workshop to explore the “Gender dimensions of e-waste management” took place during the World Summit on the Information Society (WSIS) Forum 2015 in May 2015.

21. In line with this, the SAICM secretariat led a survey on “Hazardous Substances within the life cycle of electrical and electronic products” in order to map existing tools regarding chemicals used in the production of electrical and electronic products in line with ICCM resolution III/2. The results from the mapping exercise suggest the need for more work on the upstream and mid-stream level of the life-cycle such as in the design and manufacturing. Business and industry engagement is crucial and investment in research and development of potential safer substitutes for chemicals of concern in electrical and electronic product in use in electronics is important. Readiness of operators to disclose information of the materials used in production will be helpful in addressing the issue.

22. Further, more than 200 public interest NGO stakeholders in 40 countries have developed and endorsed ‘The Challenge to the Global Electronics Industry’. This initiative addresses industry, governments and others involved in the life cycle of electronic products from material extraction and processing to product manufacturing, distribution, retail, use, and post-use recycling and disposal. The overarching goal is sustainable production that is safe, healthy, environmentally sound, and just. The following six key areas for change and action for electronics brands, manufacturers and their suppliers have been identified:

- (a) transparency on chemicals used and associated hazards
- (b) use of safer alternatives
- (c) worker protection
- (d) guaranteed participation of workers and community members in sound management of chemicals
- (e) protection of communities and the environment
- (f) compensation and remediation for harm to people and the environment

23. Further efforts in the time period from 2015-2020 will be put on promoting Green Purchasing, Design for Environment and tracking of substances within the production process along their life cycle. This includes procurement initiatives that favour greener products based on the toxicity of chemicals and materials used in products and manufacturing. A list of chemicals of concern to human health and the environment used in electronics production and products will facilitate these green design and procurement initiatives. Templates for meaningful worker and community right to know policies will help address findings from the SAICM Secretariat mapping exercise. Finally, to address end of life issues, take-back programs and Extended Producer Responsibility policies will be further developed and implemented.

IV. Gaps remaining and implications for the 2020 goal

24. The 2020 goal focuses on the following main points:

- (a) Development and implementation of e-waste legislations within the majority of countries, including incentives for the treatment of hazardous fractions and standards for responsible and safe EEE management, focusing on the entire product life cycle from eco-design to final disposal and recycling methods
- (b) Efficient supply chains and strengthening of circular economy on a global level
- (c) Minimization of usage of hazardous substances during the production process of EEE and increased communication regarding the use and occurrence of chemicals within EEE.

25. The activities so far have focused on providing support to developing countries and countries with economies in transition in order to set-up sustainable strategies for e-waste. As mentioned above this includes capacity building activities as well as providing guidelines for implementation.

26. The main gaps remaining regarding the implementation of the Global Action Plan focus on the upstream level. More efforts are required in order to streamline discussions with manufacturers and on one hand provide information regarding the use of hazardous substances and on the other hand enhance Design for environment.

27. Another gap remaining regarding the implementation of the Global Action Plan is the development and implementation of green purchasing standards at government level as well as in the private sector. This issue will be taken-up during the forthcoming period in order to achieve the 2020 goal.

V. Proposed Work Plans

28. All proposed actions for the period 2016-2020 are tentative and subject to discussion of the concerned stakeholders. Unless mentioned differently the activities are currently unfunded.

PROPOSED ACTIVITY AREAS (extracted from the Global Plan of Action)	PROPOSED ACTIONS 2016-2020
1. Compile and communicate lists of chemicals of concern to human health and/or the environment in e-products.	1.1 SAICM Secretariat to finalize the survey on HSLEEP and disseminate outcomes by mid of 2016 1.2 Determine how far crude recycling methods cause leakages of which substances and propose measures to be taken - <i>UNU</i>
2. Promote public and private partnerships, including on product stewardship approaches and extended producer responsibility, for the environmentally sound management of hazardous substances in e-products during production, use and at the end of life.	2.1 Step and PACE will continue their mandate and therefore further promote and enhance public-private partnerships. Through these platforms best practices and successful examples of partnerships will be shared. 2.2 Efforts are undergoing to establish “UN-E-waste” in order to better coordinate efforts undertaken by various UN agencies in the field of HSLEEP 2.3 Development of a roadmap for the ICT sector to meet the environmental sustainability goals set by ITU Membership through the Connect 2020 Agenda (Target 3.2: reduce the volume of redundant e-waste by 50% by 2020) – <i>ITU funded activity</i>
3. Analyze, assess and fill gaps in existing policies and legal institutional frameworks addressing design of e-products as applicable.	3.1 Collect information regarding existing policies and legal institutional frameworks – <i>UNU, PACE, Step, UNEP-IETC, BSR Secretariat</i>
4. Encourage approaches to green design of e-products by quantifying materials that they could recover and identifying the tools and best practices that advance design for hazardous chemical reduction, elimination and substitution. Work with retailers to raise the range of sustainable products available for consumers.	4.1 Publicly promote initiatives that are taken by manufacturers regarding green design and further develop the guide to greener electronics in order to rank producers according to their performance – <i>NGOs (e.g. Greenpeace, BAN, IPEN)</i> 4.2 Development and implementation ITU-T Recommendations on e-waste management, universal power supply solutions, green batteries and rare metals labelling and recycling methods. – <i>ITU funded activity</i>
5. Adopt policy instruments taking into account the need to ensure that they addresses the hazard and actions that support hazardous chemical reduction, elimination and substitution in electrical and electronic products. When doing so, consider the work of standardization bodies on the definition of threshold values for the maximum content of hazardous substances in products	5.1 Actively disseminate and promote existing guidance documents regarding internationally applied policy instruments – <i>UNIDO, UNU, Step, PACE, UNEP-IETC, BSR, ITU</i> 5.2 Within ongoing and up-coming projects support governments to properly address the sound treatment of hazardous substances – <i>UNIDO, UNU, BSR, UNEP-IETC, ITU</i> 5.2 Organization of capacity building activities including trainings to help governments and private sector implement e-waste management policies and standards – <i>ITU funded activity</i>

PROPOSED ACTIVITY AREAS (extracted from the Global Plan of Action)	PROPOSED ACTIONS 2016-2020
6. Promote sustainable production and pollution prevention and encourage sustainable consumption of e-products.	<p>6.1 Conduct research and development on safer chemicals substitutes, alternatives and safer production processes for e-products. – <i>UNU, WHO, UNEP-IETC</i></p> <p>6.2 Disseminate information on the overall positive effects of sustainable consumption of e-products to the environment – <i>UNU, WHO, UNEP-IETC, UNIDO, BSR, ITU</i></p> <p>6.3 Continue ongoing work with various partners to combat e-waste using Digital Object Architecture (DOA)-based technical IoT solutions to ensure cradle-to-grave traceability of WEEE – <i>ITU funded activities</i></p>
7. Prioritize the reduction of exposure; eliminate or substitute hazardous substances of concern in e-products and their production processes; and promote procurement processes that include this objective.	<p>7.1 Formulate, promote and implement health-based exposure limits for workers handling e-products that provide equal protection in the workplace and the community – <i>WHO, ILO</i></p> <p>7.2 Closely work with OEMs in order to substitute hazardous substances in the products – <i>UNU, UNIDO, ITU, UNEP-IETC</i></p> <p>7.3 Continue working on raising the awareness of the consumers regarding the practices of OEMs in terms of use of hazardous substances - <i>NGOs</i></p>
8. Identify opportunities to support the work of the Basel Convention and the Stockholm Convention in developing policies on the environmentally sound management of e-waste and the control of transboundary movements of hazardous waste.	8.1 Involve BC and SC regional centres as executing partners in ongoing and planned projects, for example the Centres are actively involved in the regional UNIDO project in Latin America – <i>UNIDO, ITU, UNEP-IETC</i>
9. Establish voluntary approaches and use of economic instruments, other incentives and extended producer responsibility, as appropriate, and e-products take-back schemes building on existing national and international activities.	9.1 Enhance collaboration to establish voluntary approaches on international level and disseminate information regarding existing models and best practices e.g. from European countries – <i>UNIDO, UNU, Step, PACE, BSR, ITU, UNEP</i>
10. Conduct pilot projects that lead to financially self-sustaining initiatives on socially, economically and environmentally sound management of e-waste without duplicating activities, including activities under the Stockholm Convention and the Basel Convention.	10.1 Continue ongoing efforts to implement pilot projects, e.g. funded by the GEF – <i>UNIDO, UNEP, WHO, ILO, ITU</i>
11. Promote awareness, information, education and communication for all relevant stakeholders along the supply chain of hazardous chemicals within the life-cycle of e-products.	<p>11.1 Organize events, workshops and conferences on a regular basis for target groups ranging from policy makers, the private sector (SMEs and OEMs), international organizations to NGOs and the broad public – <i>Step, PACE, UNIDO, UNEP, BSR, SAICM, ITU, ILO, WHO</i></p> <p>11.2 Enhance the organization of Step E-Waste Academies - <i>UNU</i></p>

ANNEX I - Resources

- UNEP (2013) E-waste Volume III - WEEE/e-waste “Take back system”;
<http://www.unep.org/ietc/InformationResources/Publications/E-wasteManual3/tabid/130121/>
- Step Initiative (2015) E-waste Prevention, Take-back System Design and Policy Approaches;
http://www.step-initiative.org/files/step-2014/Publications/Green%20and%20White%20Papers/Step%20Green%20Paper_Prevention&Take-backy%20System.pdf
- UNU (2014) The Global E-Waste Monitor; <http://i.unu.edu/media/unu.edu/news/52624/UNU-1stGlobal-E-Waste-Monitor-2014-small.pdf>
- Gestión Sostenible de Residuos de Aparatos Eléctricos y Electrónicos en América Latina
http://www.itu.int/dms_pub/itu-t/oth/0b/11/T0B110000273301PDFS.pdf
- UNU (2013) UNU & WHO Survey on E-waste and its health impacts on children
http://www.step-initiative.org/files/step/_downloads/UNU%20&%20WHO%20Survey%20on%20E-waste%20and%20its%20Health%20Impact%20on%20Children%20-%202013%20August%202013.pdf
- ITU (2012), “Toolkit on End of Life Management for ICT Equipment”;
http://www.itu.int/dms_pub/itu-t/oth/4B/04/T4B0400000B0013PDFE.pdf
- Recommendation ITU-T L.1000 “Universal power adapter and charger solution for mobile terminals and other hand-held ICT devices” (2013); <http://www.itu.int/rec/T-REC-L.1000/en>
- Recommendation ITU-T L.1001 “External universal power adapter solutions for stationary information and communication technology devices” (2012); <http://www.itu.int/rec/T-REC-L.1001/en>
- Recommendation ITU-T L.1005 “Test suites for assessment of the universal charger solution” (2014); <http://www.itu.int/rec/T-REC-L.1005/en>
- Recommendation ITU-T L.1010 “Green battery solutions for mobile phones and other hand-held information and communication technology devices” (2014); <http://www.itu.int/rec/T-REC-L.1010/en>
- Recommendation ITU-T L.1100 “Procedure for recycling rare metals in information and communication technology goods” (2012); <http://www.itu.int/rec/T-REC-L.1100/en>
- Recommendation ITU-T L.1101 “Measurement methods to characterize rare metals in information and communication technology goods” (2014); <http://www.itu.int/rec/T-REC-L.1101/en>
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