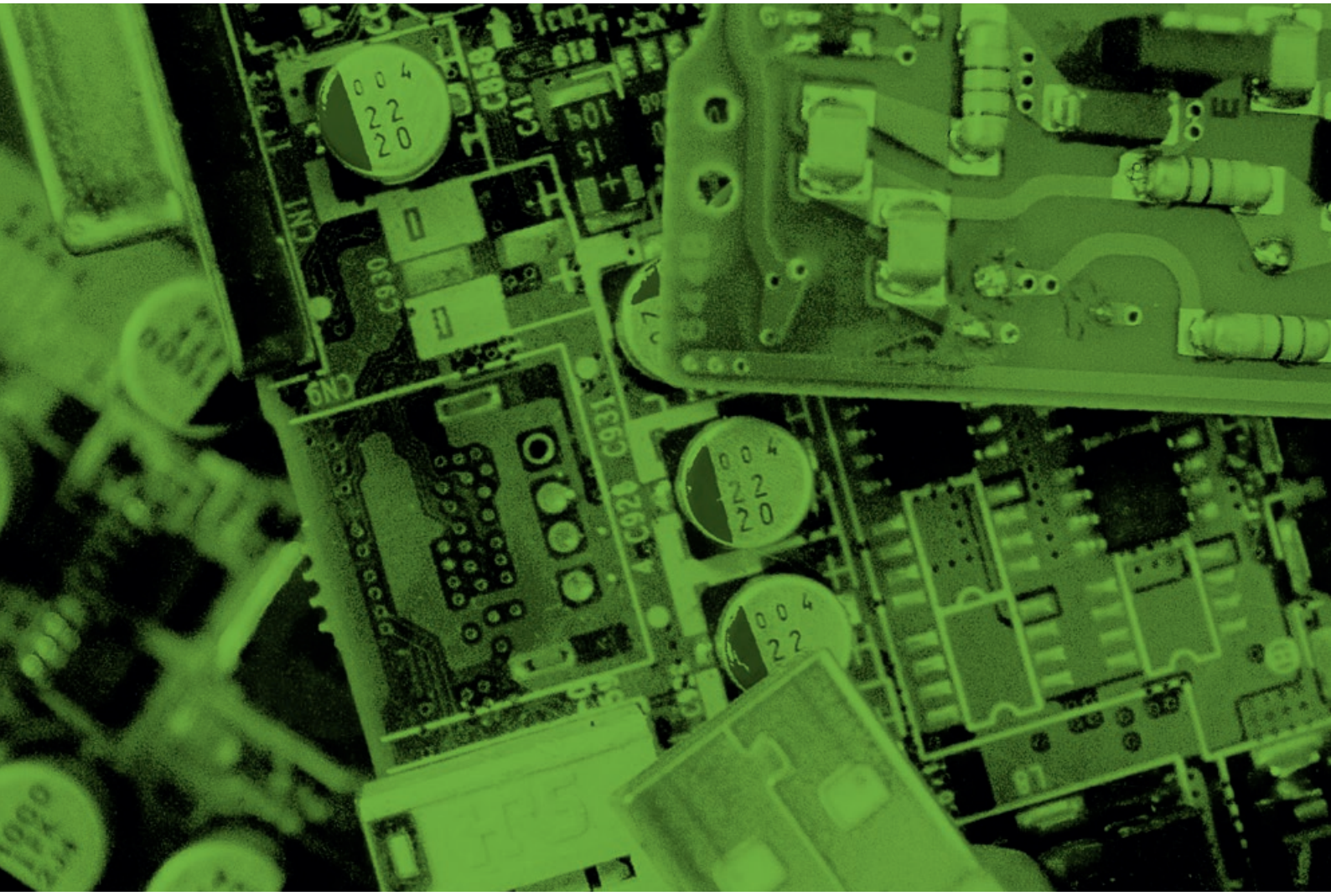
step

solving the e-waste problem



ANNUAL REPORT

2013/2014

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THE PREFACE

In 2013/14, the global discussion around e-waste increasingly focused on the Earth's limited resources and the necessity to use them sustainably while minimizing impacts on the environment – in short: resource efficiency. "Resource efficiency" has become one of the catchwords, along with "circular economy", used in conjunction with the global e-waste discussion.

The predictions developed in the 1972 study "Limits of Growth" by the Club of Rome have already proved rather accurate, and circular economies represent one of many strategic approaches towards sustainability (such as industrial ecology, factor X, zero waste/emissions, cradle to cradle, the natural step, etc.) that have originated over the past 25 years. The public and political interest around these issues represent a sincere concern for mankind's impact on the future of this planet, which includes our manufacturing, consumption and disposal of electrical and electronic equipment. Present practices are unsustainable, putting future production, and therefore technological innovations, at risk if we do not succeed in closing loops of the return and recycling of electrical and electronic equipment and making the most of the limited resources we have. This is also essential for responding to the growing hunger for electronic gadgets in newly industrializing countries that lack the necessary policies, systems and infrastructures for an appropriate management of e-waste.

For the e-waste domain, this response means substantially increasing return and recycling rates with the real-utopian target of 100 per cent. More and more components should be designed for reuse without further investments of resources and energy. Therefore, design considerations are just as essential as policy considerations when setting up the overall framework and building capacities in developing a satisfactory and appropriate response.

In 2013/14, Step went through its biggest rebranding and reorganization since its formal launch in 2007. This is in response to the worldwide growth of interest in Step's work and expertise and also to better meet Step's vision, mission and objectives. These efforts are meant to ensure quicker and more germane contributions towards a sustainable solution to the e-waste problem. Consequently, the Step General Assembly, representing all members of Step, will prioritize Step's work by identifying key projects from now on. Additionally, the interdisciplinary character of Step's activities resulted in the suspension of Task Force work, though Step still sees the need to address solutions in policy, redesign, reuse, recycling and capacity-building for coming to solutions.

This Annual Report not only serves as an introduction to our new wording and adjusted approach, but also to our accomplishments and milestones. It shall not serve simply as a report on progress made, but also as an invitation to join us. Step needs you – and the world needs Step.

Stockholm / Bonn January 2015

Per Doefnaes,
Ericsson
& Chair Step Steering
Committe

Ruediger Kuehr,
United Nations University
& Executive Secretary
Step Initiative

ABOUT THE **STEP INITIATIVE**

Step is an international initiative committed to solving the world's waste electrical and electronic e-waste problem. By providing a forum for discussion among stakeholders, Step actively shares information, seeks answers and implements possible solutions.

As a growing body whose members are drawn from industry, governments, NGOs, environmental groups and academia, Step's activities include developing and implementing e-waste strategies on a local, regional and global level.

Solutions to the e-waste problem are being sought throughout the equipment lifecycle, from design, raw materials and manufacturing, to obsolescence, disposal and recycling.

By pooling scientific information and stakeholder experiences, Step's members can identify practical and effective responses, backed by cross-sector consensus.

THE SHARED EXPERTISE AND COMMON VISION OF STEP'S MEMBERS FOCUS ON THE FOLLOWING KEY AREAS:

1. Reducing the materials used in manufacturing
2. Reusing equipment or components when practical
3. Refurbishing when possible
4. Recovering materials from obsolete equipment
5. Recycling the biggest possible level of materials
6. Developing policy recommendations for sustainable solutions
7. Administer trainings for key stakeholder groups

STEP'S OBJECTIVES:

1. RESEARCH AND PILOTING

Overcoming the e-waste problem requires knowledge, leadership and action. By conducting and sharing scientific research, Step is helping to shape effective policy-making. Research is also key to reducing – or replacing – resources used in manufacturing. By fostering the generation of problem-solving ideas, Step can support their implementation and analyse their effect.

2. STRATEGY AND GOAL-SETTING

While the overall goal is the elimination of e-waste as a problem, there are realities to be embraced along the way. Targets, goals and strategies must take into account the varying circumstances of different jurisdictions and markets. A key strategic goal is to empower proactive initiatives in the marketplace through expanded membership and to secure a robust funding base to support activity.

3. TRAINING AND DEVELOPMENT

Step's global overview of e-waste issues makes it the obvious provider of training on e-waste issues. For the past five years the Step E-waste Academy has brought together diverse groups of participants and trained them on key issues with the ultimate goal of expanding the E-waste Academy.

4. COMMUNICATION AND BRANDING

Brand communication and awareness is vital, both among Step's members and throughout the industry as a whole. One of Step's priorities is to ensure that members, prospective members and legislators are all made aware of the nature and scale of the problem, its development opportunities and how Step is contributing to solving the e-waste problem.

THE MEMBERSHIP

Membership of Step is no less than an opportunity to shape the future. By now, more than 60 members have joined Step and are actively searching for proven, practical solutions to the world's growing e-waste problem. Step membership means collaborating with global stakeholders in a neutral, unique expert forum.

BENEFITS OF STEP MEMBERSHIP INCLUDE:

- As leaders in the area, Step is continually expanding international understanding of e-waste and related issues.
- Step's multi-stakeholder structure facilitates implementation of effective e-waste policies.
- Step is a level and open platform for solutions-based discussions. By facilitating discussion and collaboration, Step encourages innovation in the sector.
- Step supports its members on e-waste and related problems, providing objective analysis and research and unparalleled access to e-waste data and information.
- Step membership is a clear indication that an organization takes its social obligations seriously.
- Step membership is a way of taking part in change and influencing the future of a market, a field of interest and a business enterprise.

HOW TO APPLY FOR STEP MEMBERSHIP:

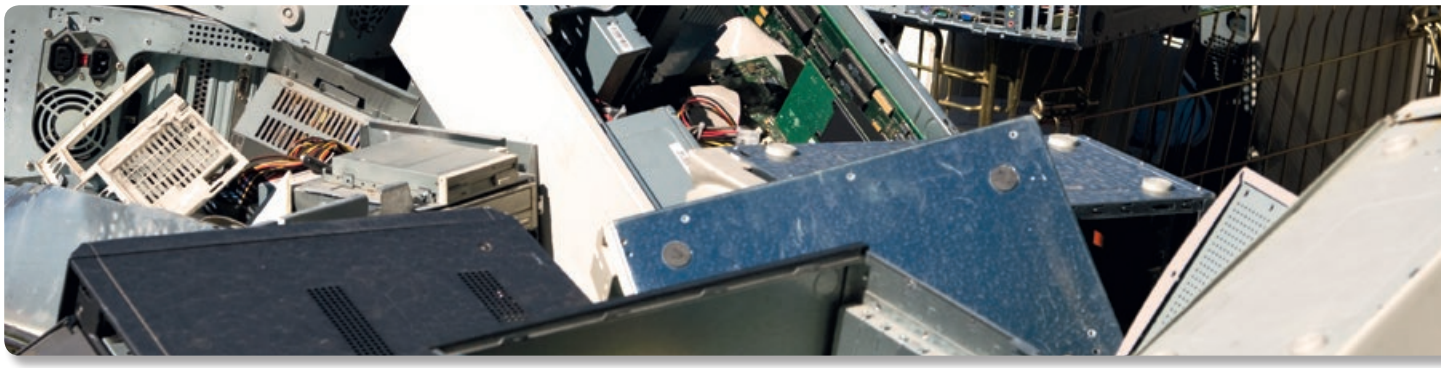
1. Contact the Step Secretariat
2. Fill out an application form
3. Sign the Step Memorandum of Understanding
4. The membership application is reviewed by the Step Steering Committee and voted upon by all Step members

Step relies solely on member contributions and successful project acquisitions. The members' annual monetary contribution is based on the type of organization and their size.

In exceptional cases, when a Step member is not in the position to make the annual monetary contribution, the case will be reviewed by the Step Steering Committee, which may ultimately decide to waive the annual contribution for that year. However, because of Step's unique funding scenario, waivers must be justified and are not intended to be a permanent solution. In the case that a waiver is granted, this member must contribute to the overall progress of the Step Initiative through in-kind contributions; this can be via content related contributions to a project or any other service.

STEP'S CORE PRINCIPLES:

1: Step views the e-waste issue holistically, focusing on its social, environmental and economic impact – locally, regionally, globally.
2: Step follows the lifecycle of equipment, and its component materials, from sourcing natural resources, through distribution and usage, to disposal.
3: Step's research and pilot projects are 'steps' to e-waste solutions.
4: Step vigorously condemns illegal activities that exacerbate e-waste issues, such as illegal shipments, recycling practices and disposal methods that are hazardous to people and the environment.
5: Step encourages and supports best-practice reuse and recycling worldwide.



ANNUAL CONTRIBUTIONS:

TYPE OF ORGANIZATION	ANNUAL MEMBERSHIP CONTRIBUTION
Large companies	EUR 12,000
Medium-sized companies	EUR 6,000
Small companies	EUR 1,200
All other members	EUR 1,200

THE STEP **MEMBERS**

STEP MEMBERS

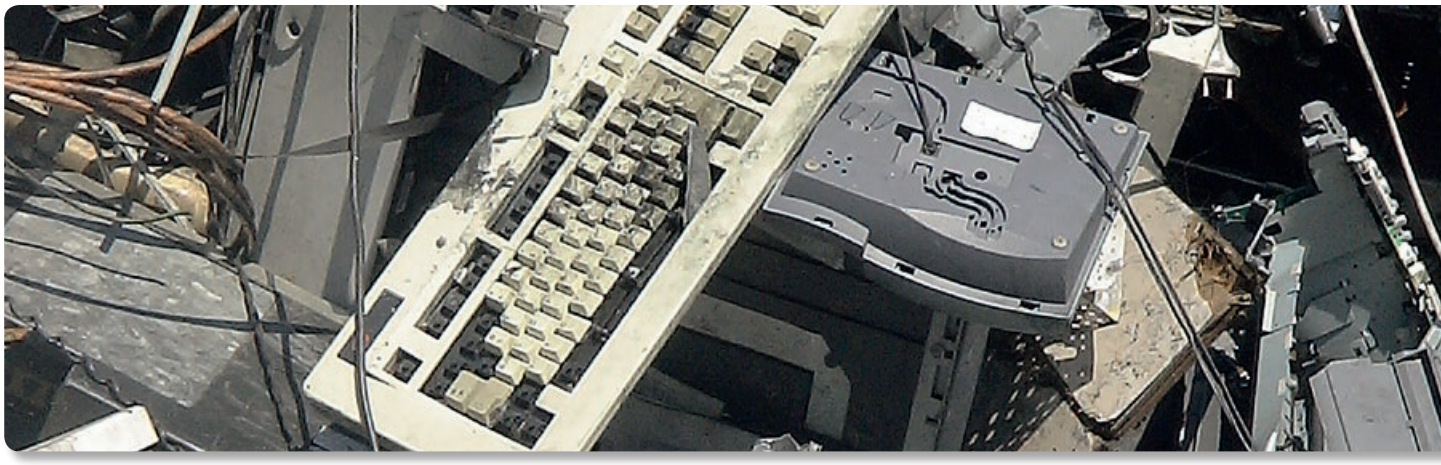
(as of 15. Dec. 2014)

(1) Secretariat of the Pacific Regional Environment Programme (SPREP)
(2) Durabilit
(3) Reverse Logistics Group Americas (RLGA), USA
(4) Hewlett Packard (HP), USA
(5) Cisco Systems Inc.
(6) Sustainability Consortium
(7) Dell
(9) Kevoy Community Development Institute (KCDI)
(10) National Center for Electronics Recycling (NCER)
(11) United States Environmental Protection Agency, USA
(12) Massachusetts Institute of Technology (MIT) - Materials Systems Laboratory
(13) Memorial University
(14) Ministry of the Environment Japan, Office Waste Disposal Management, Department of Waste Management and Recycling
(15) University of Limerick, Ireland
(16) Compliance and Risks
(17) MicroPro
(18) Datec Technolgies Ltd.
(19) University of Northampton (UoN), The Centre for Sustainable Wastes Management
(20) Dataserv Group Holdings Ltd.
(21) BIO Intelligence Service S.A.S.
(22) University of Southern Denmark, Department of Chemical Engineering, Biotechnology and Environmental Technology
(24) United Nations Environment Programme / Division of Technology, Industry and Economics (UNEP/DTIE)
(25) Secretariat of the Basel Convention
(26) WEEE Help
(27) State Secretariat of Economic Affairs (SECO), Switzerland
(28) Empa - Swiss Federal Laboratories for Materials Science and Technology
(29) Austrian Society for Systems Engineering and Automation (SAT)
(30) Umicore Precious Metal Refining, Belgium
(32) Arrow Electronics
(33) Delft University of Technology, Netherlands

(34) Philips Consumer Lifestyle Sustainability Center
(35) Sims Recycling Solutions
(36) Institute for Applied Ecology (Öko-Institut), Germany
(37) Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
(38) Blueprint ERE
(39) Plataforma RELAC
(40) Technische Universität Braunschweig, Institute of Machine Tools and Production Technology
(41) Fraunhofer Institute for Reliability and Microintegration (FHG/IZM), Germany
(42) Ericsson
(43) Microsoft Mobile
(44) WorldLoop
(45) Basel Convention Coordination Centre for Training and Technology Transfer for the African Region (BCCC-Africa), University of Ibadan, Nigeria
(46) Centre for Environment and Development for the Arab Region and Europe (CEDARE)
(47) Basel Convention Regional Centre for Asia and the Pacific (BCRC China)
(48) Dismantling and Recycling Centre Vienna (D.R.Z)
(49) Chiho-Tiande (HK) Limited
(51) United Nations University (UNU)
(52) United Nations Industrial Development Organisation (UNIDO)
(54) Griffith University, Australia
(55) Renewable Recyclers
(56) ITU
(58) Basel Convention Regional Centre for Central America and Mexico (BCRC-CAM)
(59) Fecaclub UNESCO
(60) Technische Universität Berlin, Institut für Technischen Umweltschutz, Fachgebiet Abfallwirtschaft (Chair of Solid Waste Management)

ASSOCIATE MEMBERS:

(8) Vertmonde cia. Ltd.
(23) Enda Europe
(31) Global e-Sustainability Initiative (GeSI)



THE ORGANISATION

The Step initiative came about when several UN organizations, which were increasingly aware of the growing global e-waste problem, saw the need for a neutral, international body to seek practical answers that would be supported by manufacturers, recyclers and legislators alike. Step, which became active in 2007, is coordinated by the United Nations University (UNU), the think-tank and research arm of the United Nations that hosts the Step Secretariat. The Secretariat is headed by the Executive Secretary, who serves as the chief academic project and administrative officer.

An international Steering Committee, comprised of members from all key stakeholder groups, oversees progress of the five core areas: Policy, Redesign, Reuse, Recycle and Capacity Building. Steering Committee members are elected by all Step members for a two-year term.

The annual General Assembly comprises all Step members and is the collective decision-making body of the Step initiative. The General Assembly physically congregates annually. An additional virtual General Assembly takes place mid-term to provide updates to the members on interim results and activities and discuss outstanding issues. Regional Focal Points serve as a link between the Step Secretariat and Step members' activities and issues in their corresponding regions and vice-versa.

STEERING COMMITTEE:

Stephanie Adrian, United States Environmental Protection Agency

Jean Cox-Kearns, Dell

Per Doefnaes, Ericsson

Jinhui Li, Basel Convention Regional Centre for Asia and the Pacific and Tsinghua University, China

Jason Linnell, National Center for Electronics Recycling

Duncan McCann, WEEE Help

Rolf Widmer, Swiss Federal Laboratories for Materials Testing and Research

Ex-officio: Ruediger Kuehr, United Nations University

FORMER MEMBERS:

Smail Alhilali, United Nations Industrial Development Organization

Hossam Allam, Centre for Environment and Development for the Arab Region and Europe

Christina Meskers, Umicore Precious Metals Refining

THE STEP REGIONAL FOCAL POINTS ARE:

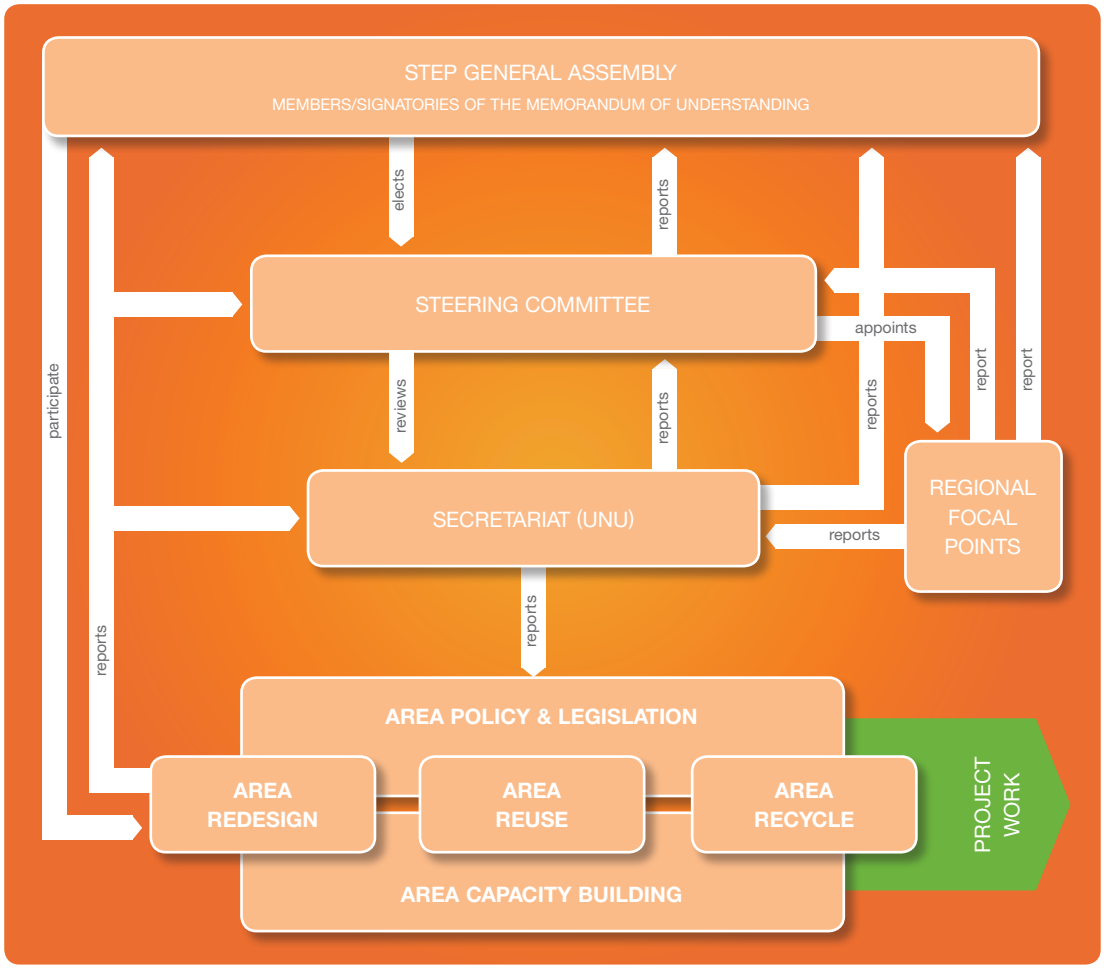
1. NORTH AMERICA:
Carole Mars, the Sustainability Consortium, USA

2. MIDDLE EAST AND NORTH AFRICA:
Hossam Allam, Centre for Environment and Development for the Arab Region and Europe (CEDARE), Egypt

3. EAST ASIA:
Jinhui Li, Basel Convention Regional Centre for Asia and the Pacific (BCRC China), and Tsinghua University, China

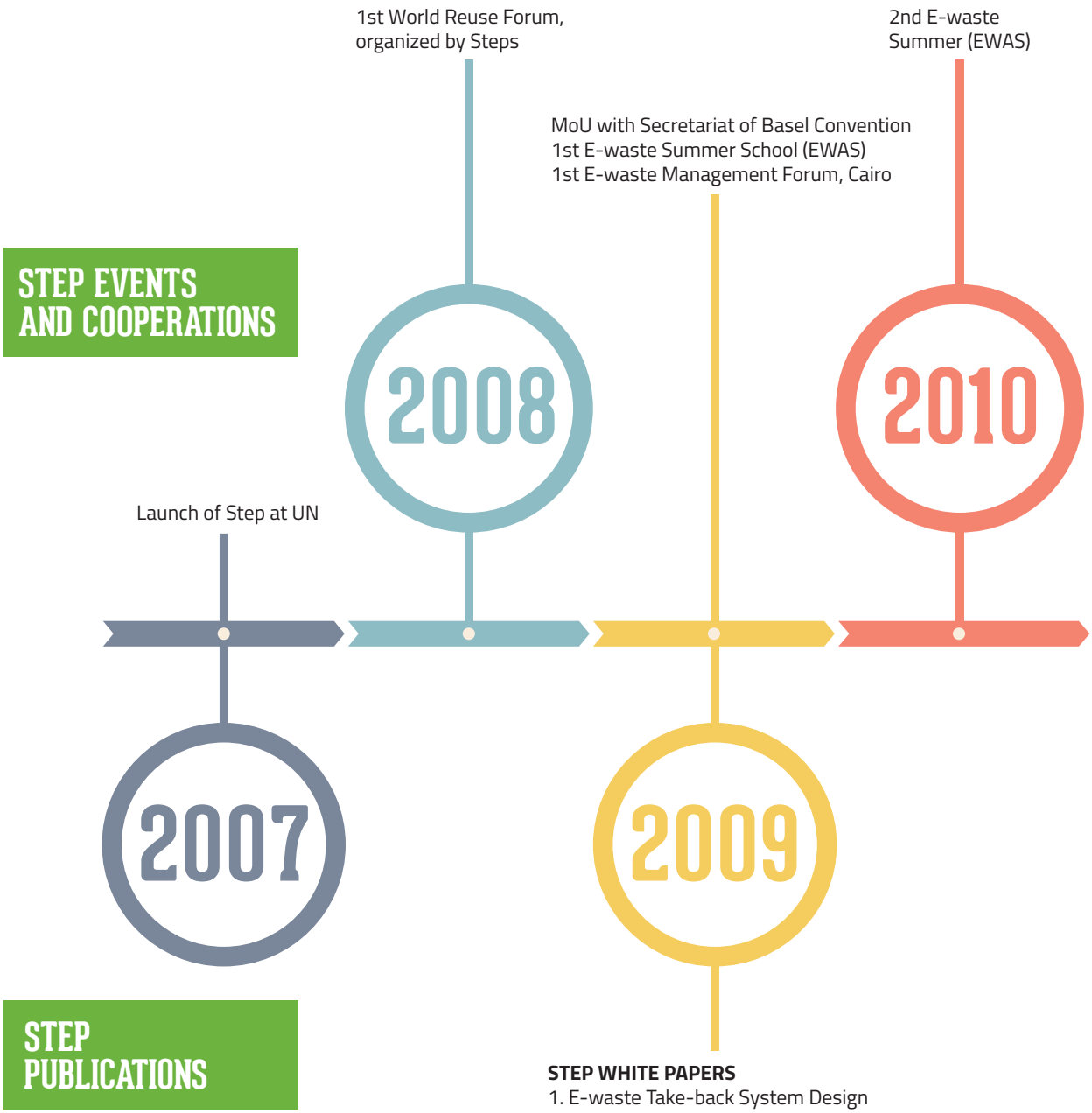
4. SOUTH PACIFIC:
Sunil Herat, Griffith University, Australia

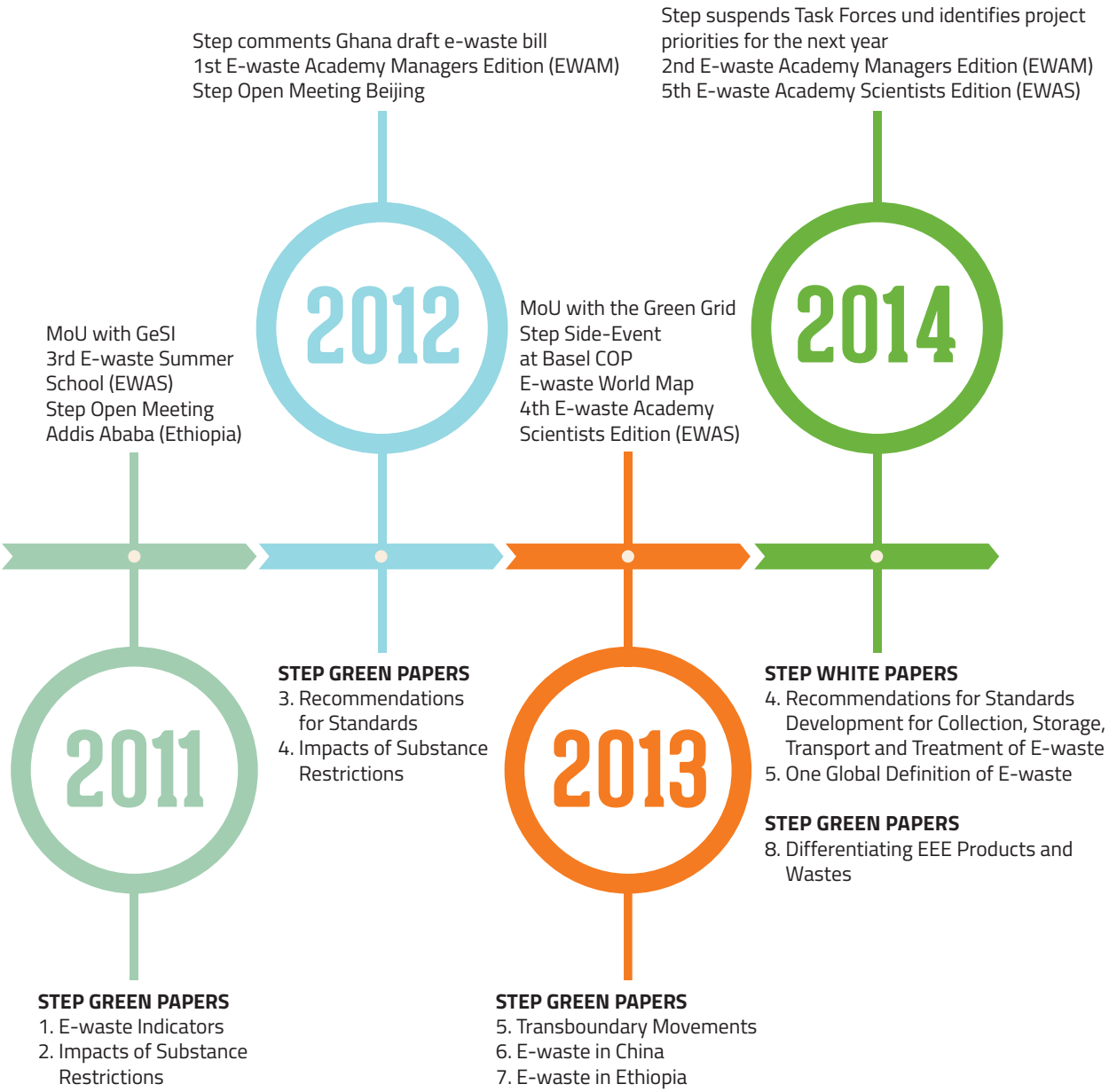
STEP ORGANIGRAM:



step
solving the e-waste problem

MILESTONES 2007-2014




2011
MoU with GeSI
3rd E-waste Summer School (EWAS)
Step Open Meeting
Addis Ababa (Ethiopia)
STEP GREEN PAPERS
1. E-waste Indicators
2. Impacts of Substance Restrictions
2012
Step comments Ghana draft e-waste bill
1st E-waste Academy Managers Edition (EWAM)
Step Open Meeting Beijing
STEP GREEN PAPERS
3. Recommendations for Standards
4. Impacts of Substance Restrictions
2013
MoU with the Green Grid
Step Side-Event at Basel COP
E-waste World Map
4th E-waste Academy Scientists Edition (EWAS)
STEP GREEN PAPERS
5. Transboundary Movements
6. E-waste in China
7. E-waste in Ethiopia
2014
Step suspends Task Forces und identifies project priorities for the next year
2nd E-waste Academy Managers Edition (EWAM)
5th E-waste Academy Scientists Edition (EWAS)
STEP WHITE PAPERS
4. Recommendations for Standards Development for Collection, Storage, Transport and Treatment of E-waste
5. One Global Definition of E-waste
STEP GREEN PAPERS
8. Differentiating EEE Products and Wastes

WORK FOCUS

Step takes a life-cycle approach to the global e-waste dilemma looking at the areas policy, redesign, reuse, recycle and capacity building. For 2014 and 2015, Step members have agreed to work on six projects which are introduced below in addition to remaining Task Force work. Each project is led by two Step members, usually one representative from industry and one non-industry actor.

1. RECOMMENDATIONS ON COLLECTION AND RECYCLING SCHEMES IN DEVELOPING AND EMERGING COUNTRIES

Many governments around the world are developing e-waste legislation and policies, but these are often based on experiences from the developed world, overlooking the challenges of the developing world. Without collection and recycling solutions applicable to the developing world, countries run the risk of enacting policies that fail to deliver results. This project seeks to provide options for governments interested in implementing collection and recycling solutions based on case studies from the developing world.

Group members will review existing e-waste collection and recycling schemes in developing countries and synthesize the critical success factors. Based on this analysis, recommendations will be created for new e-waste collection and recycling options in the developing world.

The group plans to deliver the following results by 2015:

- Overview of existing collection and recycling solutions
- List of critical success factors for collection and recycling schemes
- Recommendations on collection and recycling solutions depending on country/ infrastructure
- Recommendations for consideration in the development of model legislation

2. DEVELOPING LEGISLATIVE PRINCIPLES FOR E-WASTE IN DEVELOPING AND EMERGING COUNTRIES

The outcomes of the work of the above project will inform the development of legislative principles in the second project. This project will allow governments to review principles and find ways of integrating those into their legislations and policies. Therefore, this project intends to develop legislative principles, based on developed countries' experiences and developing countries' realities, which Step would share with these countries.

The group plans to deliver the following results by 2015:

- Step White Paper “Legislative principles towards solutions of the e-waste problem”

3. TRANSBOUNDARY MOVEMENTS OF E-WASTE

Beyond omissions in corresponding legal frameworks, a lack of understanding and harmonisation and widely varying interpretations, there are also other non-policy conditions hampering e-waste solutions. This work will undertake a comprehensive mapping of the “whole narrative” of e-products and various forms of transboundary movements of e-waste from a neutral and academic perspective. The outcome should support a less polarized international debate, a modernised public perception of the e-waste problem, improved communication between stakeholders, better rules and improved harmonisation.

The group plans to deliver the following results by 2015:

- Overview of existing policies and of international implementation activities around transboundary movements
- Comprehensive view on what hinders or aids the successful implementation of related policies in practice
- Evidence-based recommendations for all international stakeholders

4. THE “E-WASTE TRAINING MATERIALS” TOOLKIT

With the Step toolkit called “E-waste Training Materials”, the Step community intends to support different target groups involved in e-waste management in their daily work by providing manuals and handbooks adapted to their needs in length and wording. This project will contribute to the implementation of environmentally sound e-waste management on a global level through the establishment and promotion of tools for efficient e-waste recycling operations and capacity building. The tools will be target group-specific and take into account local circumstances.

The group plans to deliver the following results by 2015:

- Methodology for developing a national e-waste management strategy
- Guide for e-waste country assessment methodology
- Collection handbook
- Dismantling guide
- Business calculation tool
- Downstream handbook

In addition to the above four projects, two other work priorities were agreed upon. The roadmaps for these two additional projects still need to be worked out. Step will address this in the coming year.

(Source: Umicore)

The two additional projects that Step has agreed to work on are:

5. DEVELOPMENT OF A STANDARD CURRICULUM FOR THE E-WASTE ACADEMY.

A capacity development programme addressing young scientists in one component and policy-makers and small- and medium-sized enterprises in a second component. The E-Waste Academy-Scientists Edition (EWAS) is a pioneering concept in the research and education on e-waste management, looking at the e-waste issue in its entirety, rather than through the lens of a specific academic discipline. The concept's mission is to provide the foremost platform for young scientists involved in e-waste related research to share their knowledge, interact with experts and develop collaborative partnerships.

The E-waste Academy Managers Edition (EWAM) focuses on the practical implementation of these science-based solutions, particularly in policy development and e-waste system design. Targeted at policymakers and government officials as well as small and medium-sized enterprises (mostly recyclers, refurbishers and collectors), it provides a neutral platform that stimulates fruitful discussion among policymakers and SME operators while simultaneously facilitating exchange of best practices and expert feedback.

Since 2009, five editions of the EWAS and two editions of the EWAM took place making this programme a huge success. This project will investigate the development of standard curricula for both EWAS and EWAM.

6. HUMAN SYSTEM INTERACTIONS

The goal of this project is to better understand the drivers behind reuse and recycling followed by as relevant to the variety of contexts in which collection takes place collection. The work included in this project will focus initially on the point where a device is no longer useful to its current owner i.e. end-of-usefulness. This contrasts to end-of-first use, in the sense that many devices may be on their second or third use phase, since they have been passed among users or resold on the secondary market. Regardless of how the device ended up with its current owner or how many previous owners a device had, the current owner still makes decisions about where the device goes next. Expected outcomes of this work will be a report on system dynamics and why people use a system the way they do and tailored recommendations on how to improve the systems at hand.

BUDGET & **PROJECTS**

In 2013/14, Step was directly involved in 30 projects, all of them recognized as formal projects, which implies that interim and final results are reviewed by the full Step membership. The total budget for these activities was EUR 2.65 million[1]. The budget for the Step Secretariat was roughly EUR 250,000 in 2013/14 to coordinate Step, seed certain activities, acquire projects funds and cover personnel costs, travel, etc. A large share of Step's budget is directly handled by individual members within certain projects and not via Step's Secretariat.

FORMER TASK FORCE PROJECTS IN FINALIZATION:

AREA: POLICY
White Paper: Transboundary Movements of Discarded Electrical and Electronic Equipment
Green Paper: E-waste in China: A country report
White Paper: One Global Definition of E-waste
White Paper: E-waste Prevention, Take-back System Design and Policy Approaches
Green Paper: Differentiating EEE Products and Wastes

AREA: REDESIGN
Reuse of EEE consumer products: A potential end-of-life strategy for CRM'S
Redesign of a flat panel television for improved disassembly

AREA: REUSE
Implement best management practices for used electronics in West Africa
Support of a sustainable e-waste management system in Ethiopia
Green Paper: E-waste Country Study Ethiopia
Re-Evaluate Project
Reuse Potential Project
Reuse Dataset Project
The Effect of Waste Legislation on Transboundary Movements EEE Destined for Reuse

AREA: RECYCLE
Tracking the flows of used electronics from the US to developing countries
Calculation Tool for E-waste Dismantling Facilities: An Update
White Paper: Standards for Collection, Storage, Transport and Treatment of e-waste
CRT Recycling in Developing Countries
PhD Thesis on Material Flows

AREA: CAPACITY BUILDING
Step ADDRESS: Quantification Activities
Step E-waste Academy (EWA)
i. E-waste Academy – Scientists Edition EWAS 2013 & 2014
ii. E-waste Academy – Managers Edition EWAM 2013

PROJECTS IN STEP'S FOCUS IN 2014/2015
Project: Standard Curriculum EWAS & EWAM
Project: Elaborating a Step-toolkit "E-waste Training Materials"
Project: Recommendations on collection and recycling schemes in developing and emerging countries.
Project: Social Dimensions
Project: Developing legislative principles for e-waste in developing and emerging countries.
Project: Transboundary Movement of e-waste

E-Waste World-Map
Support in the development of events such as e.g. ITU-T, EGG, E-waste Forum etc.

30 STEP Projects in 2013/2014 – TOTAL BUDGET: 2,650,502.00 EUR[1]

[1] A large share of Step's budget is directly handled by individual members within certain projects and not via Step's Secretariat.

STEP IS GREATFUL FOR THE INVALUBALE CONTRIBUTIONS OF ITS RECENT TASK FORCE CO-COORDINATORS:

POLICY:

Duncan McCann, WEEE Help

Jonathan Perry, Dell

REDESIGN:

David Peck, Delft University of Technology

Karsten Schischke, Fraunhofer IZM

REUSE:

John Dickenson, Reverse Logistics Group Americas

Colin Fitzpatrick, University of Limerick

RECYCLE:

Jason Linnell, National Center for Electronics Recycling

Laura Reyes, Datec Technologies

Mathias Schluep, Swiss Federal Laboratories for Materials Testing and Research

CAPACITY BUILDING:

Mireille Heijnen, Hewlett-Packard

Claudia Luepschen, UNU

REMAINING TASK FORCE PROJECTS:

In addition to the six priority projects for 2014/2015 as introduced above, the following displays remaining projects of the former Task Forces or publications in process.

1. WHITE PAPER: TRANSBOUNDARY MOVEMENTS OF DISCARDED ELECTRICAL AND ELECTRONIC EQUIPMENT

The global trade and traffic in used and end-of-life electronics has become a serious matter of concern over the past decade. Building on primary archival and ethnographic research, as well as secondary sources, such as recent studies and reports on global flows, this green paper describes, quantifies and analyses the global trajectory of discarded electrical and electronic equipment (EEE).

In addition, the paper reviews the key international, regional and national regulations and guidelines that govern the transboundary flows of this ma-terial stream. Finally, the paper describes and analyses the drivers of export, as well as the various loopholes and leakages that facilitate the global flow of used and end-of-life electronics.

2. GREEN PAPER: E-WASTE IN CHINA – A COUNTRY REPORT

As one of the world's largest exporters of EEE and importers of e-waste worldwide, China plays a key role in the social, economic, environmental and material lifecycle of much of the world's EEE. As a result of increased Chinese and worldwide consumption and turnover of EEE, China is now facing serious e-waste problems from both growing domestic generation and foreign imports.

This report presents a comprehensive review of the existent e-waste problems, e-waste flows, the state of the informal and formal e-waste collection and recycling sectors, legislative progress and various stakeholders related to e-waste issues in China. This report facilitates the development of future activities of Step and its members in China.

3. WHITE PAPER: ONE GLOBAL DEFINITION OF E-WASTE

The definition of e-waste is essential to Step as an organization, as well as its activities and its contributions to the worldwide solution of the e-waste problem. There is global inconsistency in the understanding and application of the term "e-waste" in both legislation and everyday use. This has resulted in many definitions contained within e-waste regulations, policies and guidelines. The intent of this paper is to provide a non-legal definition of the term and clarity about how the term should be used.

4. WHITE PAPER: E-WASTE PREVENTION, TAKE-BACK SYSTEM DESIGN AND POLICY APPROACHES

This paper gives the reader the opportunity to understand the wide variety of policy options that have been implemented around the world in response to the e-waste problem. It also draws some conclusions both in terms of the nature of responses and in terms of potential policy recommendations. It seeks to present a variety of policy options on a large scale or in pilot tests in both developed and developing countries. The authors have tried to identify the pros and cons of each policy option, as there is no one-size-fits-all solution for e-waste policy, and what works under some conditions may be wholly inappropriate in others.

5. GREEN PAPER: DIFFERENTIATING EEE PRODUCTS AND WASTES

The accelerated generation of e-waste and persistent trafficking of this high-risk waste stream towards developing countries present urgent environmental governance challenges on a global level. Nations have jointly committed themselves to prohibiting transboundary movements of e-waste that pose a risk to human and environmental health when inappropriately treated, notably, through the Basel Convention. However, implementation and enforcement of the multilateral environmental treaty with respect to e-waste has been problematic due to definitional ambiguities

between used EEE and e-waste. This paper discusses the provisions of the Basel Convention that concern e-waste, and it further examines the potential impact of the Draft technical guidelines on transboundary movements of e-waste and used electrical and electronic equipment, in particuar regarding the distinction between waste and non-waste under the Basel Convention.

6. REUSE OF EEE PRODUCTS – A POTENTIAL STRATEGY FOR CRITICAL RAW MATERIALS

Several late reports indicate a current pressure on the European list of Critical Raw Materials (CRM's) which constitute the basis for a large amount of electrical and electronic equipment consumer products. Those CRM's could consequently be restricted by future European legislation, thereby impacting industrial designers' work. In line with the concept of circular economy, as widely introduced by the Ellen MacArthur Foundation, "reuse" is considered as a major option which will lead to a nearly perfect material loop.

As one of the key design principles for the reuse of EEE consumer products concerns material identification, the elements constituting the case study device were listed and compared with the CRM's list established by the European Union. Project results showed that many valuable materials could be reused after use-stage and that the adoption of a reuse strategy could be interesting for countless business sectors in terms of parts, components and material recovery. In case the "reuse" option is not possible (for instance because the product is too damaged), this strategy also becomes useful for other End-of-Life options such as remanufacturing or recycling.

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As a common characteristic to all the above mentioned challenges Europe has to face, time seems to be the most difficult issue to tackle. Time is essential in the manufacturing supply chain as CRM's shortages would be dramatic for the European economy. In addition, time is important in the assembly and disassembly processes as those operations are directly related to costs. Furthermore, time is crucial for our resources, social models and business activities. Time can however be optimized by different design decisions at early design stages which will define the End-of-Life of thousands of billions of consumer products, representing potential material supplies for the future generations. If the needed time to disassemble a product is optimized, there is a great chance companies will pay more attention to the potential of WEEE consumer products in terms of material waste, thereby closing the material loop and proposing a solution to the e-waste problem.

7. MASTER THESIS: REDESIGN OF A FLAT PANEL TELEVISION FOR IMPROVED DISASSEMBLY

The European Commission has developed the "Europe 2020" strategy, and one of its flagship programs is resource efficiency. One of the implications of this strategy is that directives will have to be updated. One of these directives is the eco-design directive. Since the directive currently only focuses on energy-efficiency, a study is underway to investigate if material resource efficiency requirements could be incorporated in the directive and its implementing measures. This will have influence on how products have to be designed. The main challenge for this thesis was to find out how regulation and legislation might possibly change and to find out which implications this has on the design of flat panel televisions.

8. IMPLEMENT BEST MANAGEMENT PRACTICES FOR USED ELECTRONICS IN WEST AFRICA

Under United States Environmental Protection Agency (US-EPA) funding, Step works with stakeholders to develop an e-waste management pilot system for developing and transition countries. Initial focus was originally on West Africa, though the focus has moved to Ethiopia in East Africa. This activity includes a number of components such as: (1) quantification, including tracking and categorisation of equipment sources, destinations, and types of e-waste, inventory individual incidents and document (anecdotal) evidence, market situation and categorisation in developing countries (demand); (2) e-waste pathways, including economic and/or trading mechanisms, stakeholder analysis and behavior or drivers of individual actors; (3) impacts, including type of processing and disposal (formal, informal, dumping, etc.), environmental impacts, pollution levels, economic losses, gains, and social impacts and EHS; and (4) looking forward, including policy recommendations, training and awareness rising and implementation consequences.

9. SUPPORT OF A SUSTAINABLE E-WASTE MANAGEMENT SYSTEM IN ETHIOPIA

Recognising the growth of the ICT sector in Ethiopia, the Ethiopian government and international partners collaborated to develop an e-waste management strategy for the country. Through this Step pilot project, Ethiopia will be better prepared to effectively handle the increase in e-waste volume that it is expected to face in the near future. This project, which is funded under the Global Environmental Facility (GEF) Trust Fund, builds on existing initiatives in Ethiopia and consolidates the recently-established multi-stakeholder partnership–known as the Ethiopian E-waste Management Working Group–in order to develop necessary policies and legislation to successfully implement an e-waste management strategy in Ethiopia.

10. GREEN PAPER: E-WASTE COUNTRY STUDY ETHIOPIA

Step and the US-EPA have established a formal partnership focusing on the development of a sound e-waste management system for Ethiopia. In service of this goal, a study was carried out by Öko-Institut and PAN-Ethiopia in order to generate reliable data on e-waste volumes and current management practices and options, as well as to investigate possibilities for improved e-waste management and other relevant aspects. The results of this project are summarized in this Green Paper.

11. REUSE POTENTIAL

In order to assess where reuse activities have been generally successful or become part of the larger societal context, this project uses a variety of indicators to examine if certain countries or states have a considerable supply of goods available for refurbishment and whether or not there is a high demand for refurbished goods. Focus countries include the UK, Belgium and the US state of Illinois. Results will be worked into a Step publication.

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EWAM 2014 participants disassembling e-waste.

12. REUSE DATASET

Lifetime extension through reuse is frequently advocated as a viable area in which PCs can reduce their overall environmental impact in the immediate future. However, in spite of the emergence of a number of reuse operating models, there are still many barriers preventing the greater adoption of widespread or formal reuse infrastructures. This project sought to examine if the data available from the Self-Monitoring and Reporting Technology (S.M.A.R.T.) installed on the hard disk drives of end-of-life computers can provide reliable data for better informed reuse decisions. Results will be worked into a Step publication.

13. THE EFFECT OF WASTE LEGISLATION ON TRANSBOUNDARY MOVEMENTS OF ELECTRONICS DESTINED FOR REUSE

This report evaluates current transboundary shipment legislation and its influence on the movement of used EEE destined for reuse and refurbishment, especially addressing the electronic refurbishment industries' point of view. It does so by examining: current international transboundary shipment and e-waste legislation; case study experiences from electronic industry stakeholders based on survey and interviews; and various models and practices adopted by reuse organisations to handle the proliferation of EEE.

14. TRACKING THE FLOWS OF USED ELECTRONICS FROM THE US TO DEVELOPING COUNTRIES

Despite growing interest and concern surrounding transboundary movements of used EEE around the world, there is a dearth of data on their movements. Although a multitude of different data sources exist, coherent sets of information on used EEE and their movement are lacking due to inherent challenges in obtaining such information. This analysis provides insights on the quantities of used EEE generated and collected in the United States as well as those exported from the United States.

15. CALCULATION TOOL FOR E-WASTE DISMANTLING & RECYCLING FACILITIES

This project developed an integrative business model supporting sustainable e-waste preprocessing and recycling in developing countries. The model incorporated the results generated from the Step established Best of 2 Worlds (Bo2W) philosophy by emphasizing the environmental and economic relevance of proper manual dismantling. Additionally, the business model tool contains a user-friendly calculation methodology tool which uses core data required for a relevant and self-sustaining e-waste business model.

16. WHITE PAPER: STANDARDS FOR COLLECTION, STORAGE, TRANSPORT AND TREATMENT OF E-WASTE

As compared to other waste streams, e-waste is highly complex. High quality end-of-life (EoL) standards can be one contribution to protect the environment and the health and safety of people from the severe consequences of improper EEE EoL management. These standards can also save valuable resources found in electronics. The goal of this paper is to be a guide for the implementation of EoL standards, taking into account best practices and best available technologies.

17. OPEN LOOP RECYCLING AND DISPOSAL OPTIONS FOR LEADED GLASS FROM CATHODE RAY TUBES

Cathode ray tubes (CRTs) display technology is being phased out and replaced by new screen technologies such as liquid crystal displays. As a result, the recycling of CRTs to CRTs (closed loop recycling) has collapsed, as the amount of CRTs being discarded increases and the materials can no longer be recycled in the production of new CRTs. The discarded CRTs should then be recycled into other products (open loop recycling), stored, or disposed of. In this contribution, we evaluate eight open loop recycling options and two disposal options for CRT leaded glass, with regard to technical, economic, health, and environmental criteria by means of a method based on multi-criteria decision analysis (MCDA). The evaluation method and results can help waste managers decide among different open loop recycling alternatives, especially in developing countries.

18. PHD THESIS ON MATERIAL FLOWS

This PhD Thesis at Empa and ETH Zurich will develop a methodology to dynamically model the spatial distribution of anthropogenic critical metals stocks and flows. The thesis will contribute to the objectives of Step through the provision of knowledge on the quantity and location of relevant products in use, as well as the quantity, location and pathways of input and output flows. This knowledge provides a basis to develop appropriate reverse supply chains and recycling systems.

19. STEP ADDRESS: QUANTIFICATION ACTIVITIES & E-WASTE WORLD-MAP

The Annual Digital Dynamic Reporting of the E-waste Status (ADDRESS) is an overarching methodology that facilitates the quantification of

EWAM participants dismanteling e-waste (Source: UNU).

the size of the e-waste problem. Ongoing Step member activities have substantially contributed to the e-waste data needed for the ADDRESS strategy. Current and future ADDRESS results on e-waste amounts contribute to the Step E-waste World-Map. This novel e-waste world map provides comparable, country-level data on the amount of EEE put on the market and the resulting amount of e-waste generated in most countries around the world. In order to ensure comparability of data across countries, the map's source data has been assembled according to a common definition of EEE, as well as of e-waste. The data will be updated regularly to incorporate additional data (e.g., imports and exports) and enable up-to-date comparisons. Additionally, as a supplement to the primary data, this e-waste world map also provides links to relevant e-waste rules, regulations, policies and other useful resources.

20. E-WASTE ACADEMY

The E-Waste Academy (EWA) is a pioneering concept in e-waste research and management capacity-building to foster multi-stakeholder partnerships and establish opportunities for continued collaboration on e-waste research, policy and management. EWA provides tailored and targeted training and capacity building for different stakeholder groups.

20.1 E-waste Academy – Scientists Edition (EWAS)

The former Step E-waste Summer School, now renamed the E-waste Academy – Scientists Edition (EWAS), brings together young e-waste researchers from around the world, trying to solve the e-waste problem from different disciplinary perspectives. Both in 2013 and 2014, two more successful editions were realised. With the support of SWICO Recycling, EMPA, Dell, Philips, and Umicore , the fourth edition took place in December 2013 in Geneva, Switzerland, hosted by the Secretariat of the Basel Convention. In 2014, EWAS was organized by UNU and the Shanghai Second Polytechnic University in Shanghai between 1–7 November 2014, hosted by the Basel Convention Regional Centre China with support from the Shanghai Cooperative Centre for WEEE Recycling, Empa, Seco and Philips.

20.2 E-waste Academy – Managers Edition (EWAM)

The E-Waste Academy – Managers Edition (EWAM) is targeted at policymakers and government officials as well as small and medium-sized enterprises (collectors, refurbishers, recyclers) and focuses on the practical implementation of science-based solutions, particularly in policy development and e-waste system design.

The 2014 EWAM occured in March/April in El Salvador at the Basel Convention Regional Centre in Central America & Mexico:
https://www.youtube.com/watch?v=vvBOybGjwU0

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IN THE **MEDIA**

In 2013/14 Step work was covered in 28 languages and published at 1,000+ online news sites across 85 countries:

THE STEP INITIATIVE:

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