



UNITED NATIONS  
UNIVERSITY



**StEP**

SOLVING THE E-WASTE PROBLEM

# **StEP – Solving the E-Waste Problem**

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## ■ Volumes:

- Increasing sales of electronics, decreasing lifetimes
- ~40M tons e-waste generated worldwide
- EU-27 in 2005: ~8.5M tons generated, only 2.5M tons recycled

## ■ Dangers:

- Soil & water contamination from chemical disposal
- Toxic emissions from burning of materials
- Inefficient recovery of precious metals and other valuable components
- Low energy efficiency

## E-Waste - A Significant Challenge... (2)



### ■ Exports:

- As donations/2nd hand, often illegal
- Mainly to Asia (China, India, Pakistan, Vietnam), Africa (Nigeria & neighbouring Western Africa, Northern Africa), Eastern Europe
- Reuse/repair of some devices, but low recycling probability at final end-of-life
- Backyard recycling with low yields and high environmental & health impacts



# China, E-waste Site



# China, Manual Dismantling



© Empa,  
Switzerland

# China, Open Burning



# India, Acid Washing



# India, Burnt E-waste



**Solving the E-waste Problem (StEP) Initiative** was created to...

- Initiate and facilitate environmentally, economically & socially sound approaches to reduce e-waste flows and handle them in a sustainable way around the globe



- (1) Functions as a **network of actors** who share experiences and best practices
- (1) Carries out **research and development projects**
- (2) **Diffuses** experiences, best practices and recommendations

1. StEP's work is founded on **scientific assessments** including **social, environmental and economic** aspects
2. StEP conducts research on the **entire life-cycle** of electronic and electrical equipment
3. StEP's research and pilot projects are meant to contribute to the **solution of e-waste problems**
4. StEP **condemns all illegal activities** related to e-waste including illegal shipments
5. StEP seeks to foster **safe and eco/energy-efficient reuse and recycling practices** around the globe in a socially responsible manner

# Membership Overview (Febr. 2009)



## International Organisations

- Center for Environment and Development for the Arab Region and Europe (CEDARE)
- Global Digital Solidarity Fund (DSF)
- United Nations Conference on Trade and Development (UNCTAD)
- United Nations Environment Programme (UNEP)
- United Nations Industrial Development Organisation (UNIDO)
- United Nations University (UNU)

## Industry

- AER Worldwide
- Cisco Systems Ltd.
- Dataserv Ltd.
- Datec Technologies
- Dell
- Ericsson
- Flection
- GOAB mbH
- Hewlett Packard (HP)
- MicroPro
- Microsoft
- National Center for Electronics Recycling
- Nokia
- Philips Consumer Lifestyle
- Promotionteam Wetzlar
- Sims Recycling Solutions
- Taizhou Chiho Tiande
- Umicore Precious Metal Refining
- Wellington Green

## Governmental and Development Cooperation

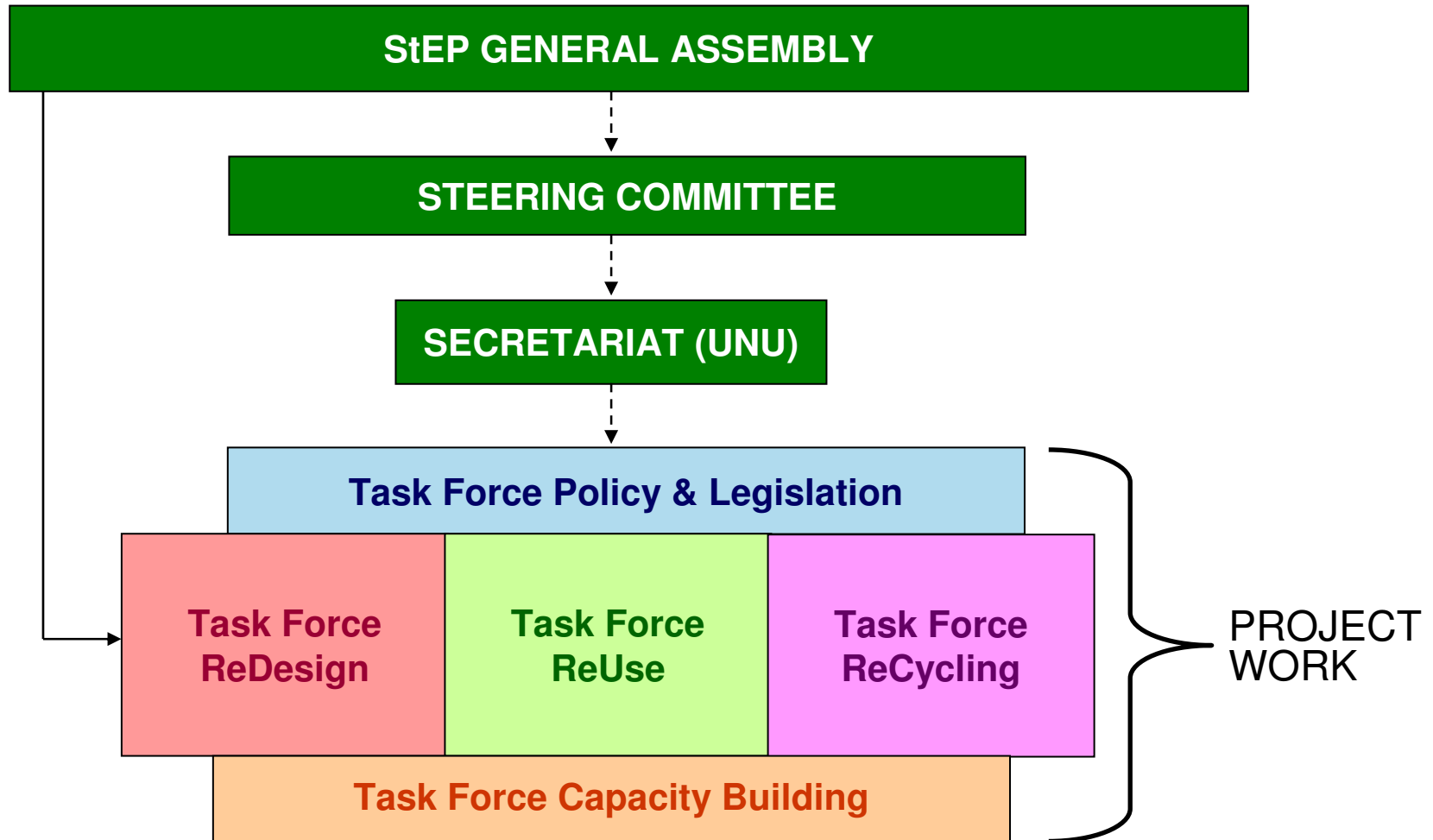
- German Technical Cooperation (GTZ)
- Swiss State Secretariat of Economics (SECO)
- United States Environmental Protection Agency (US-EPA)
- Waste\*
- Enda Europe\*

## Academia & Research

- Austrian Society for Systems Engineering and Automation (SAT)
- Chinese Academy of Sciences (CAS)
- Delft University of Technology
- GAIKER Foundation
- Griffith University
- Institute for Applied Ecology (Öko-Institut)
- Federal Laboratory for Materials Testing and Research (EMPA)
- Fraunhofer Institute for Reliability and Microintegration (IZM)
- Korea Institute of Geoscience & Mineral Resources (KIGAM)
- Massachusetts Institute of Technology (MIT)
- Regional Environmental Centre for Central and Eastern Europe (REC)
- Rifer Environmental
- Technical University of Braunschweig
- TELECOM & Management Sud Paris
- Thai Electrical and Electronic Institute
- University of Melbourne
- University of Limerick
- 3P Consortium for Sustainable Management

\* Associated Member

# StEP Organisational Chart



- **Task Force Policy** ...analyzes the status of existing policy approaches on e-waste & elaborates policy recommendations for future developments...
- **Task Force ReDesign** ... dedicated to product design aspects to reduce negative impacts of the entire life cycle of electronics...
- **Task Force ReUse** ... defines globally consistent “re-use” practices, principles, and standards...
- **Task Force ReCycle** ... overall aim is to enhance global recycling infrastructures and technologies to realise a sustainable e-waste recycling...
- **Task Force Capacity Building** ... aims at increasing public, scientific and business awareness and disseminating the results of TFs 1-4...

- **Objectives:**

- To harmonize action on e-waste activities
- To make StEP and UNU work visible to the 170 countries (parties)
- To provide science based but applied recommendations for international policy making
- To jointly perform research & development projects and capacity building



# Project Sample: Recycling & Auditing Guidance



- **Objective:**

- Developing, supporting, implementing and executing auditing standards for e-waste refurbishment and recycling

- **Rationale:**

- The growing need for ensuring environmentally sound practices in (post) industrialized and transition/developing countries



For a list of all StEP projects see [www.step-initiative.org/projects/](http://www.step-initiative.org/projects/)

# Project Sample: Common Re-use Definitions



- **Objective:**

- Elaborate StEP-agreed definitions of re-use, refurbishment and other related topics



- Lay down a common understanding of key terms
- Create one “dictionary” of key definitions for establishing a global standard for communication and problem solutions and fostering re-use

- **Rationale:**

- No global standard for communication, mixed definitions of key terms became barriers for solutions

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- **Objective:**

- Analysis of the current situation regarding waste management in Ghana, Nigeria and Senegal (political as well as technical aspects)
- Identifying and summarizing the best European practices in technology development, policy implementation and organization of systems
- Formulation and implementation of policies and technological solutions tailored to the local and regional conditions in the targeted countries

- **Rationale:**

- Lack of a functional waste management system brings perennial garbage as well as resource problems
- Africa has become the largest recipient of hazardous waste from Europe and the USA

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# Project Sample: Re-Use in Bangladesh



- **Objective:**

- To tackle the growing e-waste problem in Bangladesh through the development of a feasible and environmentally sound model for the local reuse market

- 3-step-approach:

- (1) Preparatory conference

- (2) Market study

- (3) Public-Private-Partnership Program

- **Rationale:**

- Bangladesh indicates a rapid economic growth in an emerging market, increasing amounts of locally produced e-waste and increasing demand for reused electrical and electronic products

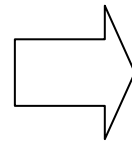
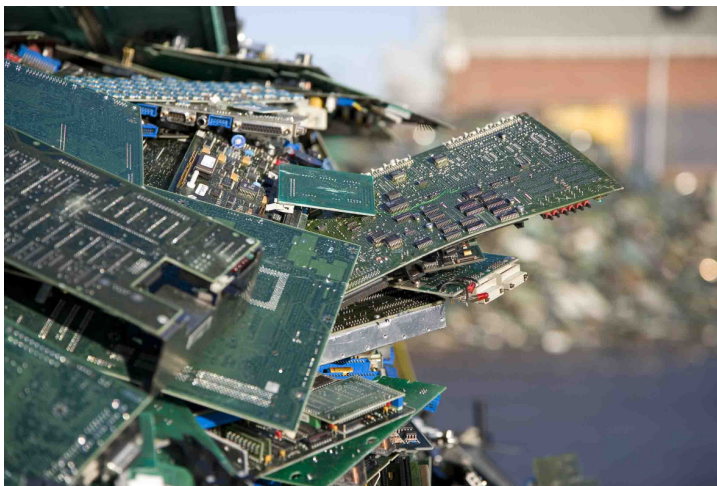
- Equipment is largely refurbished and recycled in semiformal/informal sector

**For a list of all StEP projects see [www.step-initiative.org/projects/](http://www.step-initiative.org/projects/)**

# Project Sample: From E-Waste to Resources



- **Objective:**
  - Development of recommendations for the sustainable transfer of appropriate recycling technologies
- **Rational:**
  - Sustainable Innovation, understood as the shift of sustainable technologies, products and services to the market, requires a market creation concept and one common global agenda



For a list of all StEP projects see [www.step-initiative.org/projects/](http://www.step-initiative.org/projects/)

# Project Idea: E-Waste Shipments



- **Objective:**
  - Assessing e-waste shipments from EU27 to Eastern Europe
  
- **Rational:**
  - UNU's study supporting the 2008 Review of the WEEE Directive identified rather low reported collection rates, but observed substantial shipments to Eastern Europe. This flow is rather unexplored so far and needs further analysis

For a list of all StEP projects see [www.step-initiative.org/projects/](http://www.step-initiative.org/projects/)

## StEP Secretariat

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- Extra Slides



*...analyzes the status of existing policy approaches on e-waste & elaborates policy recommendations for future developments...*

## **Task Force Policy:**

- ✓ Research study for 2008 Review of Directive 2002/96 on WEEE
- @ Research study 'Best E-waste Policies'
- @ White Paper 'Take-Back Systems and Design Guidelines'
- @ Policy Brief 'EEE & Climate Change'
- ... Etc.

✓ **completed**, @ **working phase**, \$ **acquisition phase**, ! **conceptual phase**, ? **idea phase**



*... dedicated to product design aspects to reduce negative impacts of the entire life cycle of electronics...*

## Task Force Redesign:

- ✓ DfR Case Studies Library
- @ Research study 'Wearable Computers – End-of-Life Implications'
- \$ Asia Electronics Goes Green Conference
- ... Etc.

✓ **completed**, @ **working phase**, \$ **acquisition phase**, ! **conceptual phase**, ? **idea phase**



*... defines globally consistent  
“reuse” practices, principles, and  
standards...*

## **Task Force Reuse:**

- @ White Paper ‘Towards Common Definitions for ReUse’
- @ Conference: 1st Global ReUse Forum
- \$ Research project on sustainable reuse of EEE and changing consumer behaviour
- ! Research Study ‘ReUse Market Model’
- ... Etc.

√ completed, @ working phase, \$ acquisition phase, ! conceptual phase, ? idea phase



*... overall aim is to enhance global recycling infrastructures and technologies to realise a sustainable e-waste recycling...*

## Task Force Recycling:

- ✓ Research study 'Environmental Fate of hazardous substances released from WEEE recycling'
- @ Research project 'The Best of 2 Worlds'
- @ Research project 'E-waste Management in Africa'
- ! Research study 'Web of Metals'
- ... Etc.

✓ completed, @ working phase, \$ acquisition phase, ! conceptual phase, ? idea phase



*... aims at increasing public, scientific and business awareness and disseminating the results of TFs 1 - 4...*

## **Task Force Capacity Building:**

- ✓ Manual 'How to de-manufacture a computer'
- \$ Summer School on e-waste management
- ! International expert workshop on e-waste
- ? Online E-Waste Bibliography
- ... Etc.

✓ **completed, @ working phase, \$ acquisition phase, ! conceptual phase, ? idea phase**



## The UNITED NATIONS UNIVERSITY (UNU)...

- Was established by the UN General Assembly in 1973
- Is a think tank for the UN system
- Forms a bridge between the UN and the academic world
- Serves as an international community of scholars
- Contributes to capacity development, particularly in developing countries through
- 15 research and training centres and programmes worldwide

# Introducing United Nations University... (2)

