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StEP
SOLVING THE E-WASTE PROBLEM

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Ruediger Kuehr of the United Nations University's StEP Secretariat, Bonn, and other spokespersons are available for advance phone interviews March 5 -6, 2007. Please call or email to schedule a time. High-res images for media download are online at http://files.step-initiative.org/browse.php?sess=0&parent=157&expand=1&fileid=0

UN, Industry, Others Partner to Create World Standards For E-Scrap Recycling, Harvest of Valuable Components

Growing Need for Elements in High-Tech Scrap – Often Incinerated in Poor Countries
Annual E-Scrap Today Would Fill Line of Dump Trucks Spanning Half The Globe

Standardizing recycling processes globally to harvest valuable components in electrical and electronic scrap (E-scrap), extending the life of products and markets for their reuse, and harmonizing world legislative and policy approaches to e-scrap are prime goals of a new global public-private initiative called ***Solving the E-Waste Problem*** (StEP).

Major high-tech manufacturers, including Hewlett-Packard, Microsoft, Dell, Ericsson, Philips and Cisco Systems, join UN, governmental, NGO and academic institutions, along with recycling / refurbishing companies as charter members of the initiative, officially launched March 7.

Valuable resources in every scrapped product with a battery or plug — computers, TVs, radios, wired and wireless phones, MP3 players, navigation-systems, microwave ovens, coffee makers, toasters, hair-dryers, to name but a few — are being trashed in rising volumes worldwide. Worse, items charitably sent to developing countries for re-use often ultimately remain unused for a host of reasons, or are shipped by unscrupulous recyclers for illegal disposal. And, too often, e-scrap in developing countries is incinerated, not only wasting needed resources but adding toxic chemicals to the environment, both local and global.

"There's more than gold in those mountains of high-tech scrap," says Ruediger Kuehr of the United Nations University, which will host the StEP Secretariat in Bonn. "This partnership is committed to salvaging these increasingly precious resources and preventing them from fouling the environment."

In addition to well-known precious metals such as gold, palladium and silver, unique and indispensable metals have become increasingly important in electronics. Among them: Indium, a by-product of zinc mining used in more than 1 billion products per year, including flat-screen monitors and mobile phones.

In the last five years, indium's price has increased six-fold, making it more expensive than silver. Though known mine reserves are limited, indium recycling is so far taking place in only a few plants in Belgium, Japan and the U.S. Japan recovers roughly half its indium needs through recycling.

The market value of other important minor metals used in electronics such as bismuth (used in lead-free solders) has doubled since 2005 while ruthenium (used in resistors and hard disk drives) has increased by a factor of seven since early 2006.

"The large price spikes for all these special elements that rely on production of metals like zinc, copper, lead or platinum underline that supply security at affordable prices cannot be guaranteed indefinitely unless efficient recycling loops are established to recover them from old products," says Mr. Kuehr.

"This recycling of trace elements requires hi-tech processes but it is vital to do it. For manufacturers, improving the e-scrap recycling process is essential to ongoing production and repair operations."

Unqualified or unscrupulous treatment of e-scrap is still usual in many transition and developing countries. The inappropriate handling leads to:

- Emissions of highly toxic dioxins, furans and polycyclic aromatic hydrocarbons (PAHs), caused by burning PVC plastic and wire insulation;

- Soil and water contamination from chemicals such as: brominated flame retardants (used in circuit boards and plastic computer cases, connectors and cables); PCBs (in transformers and capacitors); and lead, mercury, cadmium, zinc, chromium and other heavy metals (in monitors and other devices). Studies show rapidly increasing concentrations of these heavy metals in humans; in sufficient dosages, they can cause neuro-developmental disorders and possibly cancer.

- Waste of valuable resources that could be efficiently recovered for a new product life-cycle.

In many industrializing and developing countries, growing numbers of people earn a living from recycling and salvaging electronic waste. In most cases, though, this is done through so-called "backyard practices," often taking place under the most primitive circumstances, exposing workers to extensive health dangers.

A global guide to dismantling e-scrap and maximizing the recovery and controlling recovered substances is a major StEP objective. A large-scale project to help e.g. China safely dismantle and dispose of its domestic e-scrap is also in the works. Maximizing resource re-utilization will help meet soaring demand in that country and India for increasingly scarce elements.

Inter-related StEP task forces will help shape government policies worldwide and address issues related to re-design and product life expectancy, re-use and re-cycling, and help build relevant capacity in developing nations.

The StEP initiative is the offspring of UNU, the UN Environment Programme (UNEP) and the UN Conference on Trade and Development (UNCTAD). Other prominent charter partners include the U.S. Environmental Protection Agency, the Massachusetts Institute of Technology (MIT), University of California at Berkeley, the Chinese Academy of Sciences, Technical University Vienna (Austria), French National Institute of Telecommunication (France), Technical University Delft (Netherlands), University of Melbourne (Australia), State Secretary of Economics and EMPA (Switzerland), Regional Environmental Centre (Hungary), the Korea Institute of Geoscience & Mineral Resources, and Umicore Precious Metal Refining (Belgium).

"Companies involved in StEP will benefit through globally standardized, safe and environmentally-proven processes for disposal, reduction or reuse and recycling of e-scrap," says UN Under Secretary-General and UNU Rector Hans van Ginkel. "Consumers will benefit through knowing what to do with their obsolete machines, less pollution and longer lasting electronic equipment. Member manufacturers will work to design products more easily upgradeable because we all agree buying an entirely new product is wasteful when what's really wanted are upgraded components."

The StEP logo will signal to consumers that e-scrap processes associated with a company's products conform to agreed international standards and guidelines.

OECD figures show global trade of information and communication technologies (ICT) amounted to €1.33 trillion in 2004, 7.7 per cent of gross world product. Trade of ICT goods accounts for roughly 4 per cent of America's GDP, and 5 per cent and 7 per cent, respectively, of Japan's and Germany's GDP.

E-scrap is one of the fastest growing components of the global waste stream and, arguably, one of the most troublesome. The European Environmental Agency calculates that the volume of e-scrap is now rising roughly three times faster than other forms of municipal waste. The total annual global volume of e-scrap is soon expected to reach roughly 40 million metric tons — enough to fill a line of dump trucks stretching half way around the world.

Rapid product innovations and replacement, especially in ITC and office equipment — the migration from analog to digital technologies and to flat-screen TVs and monitors, for example — is fueling an increase of e-waste, says Mr. Kuehr.

In 2004, one-half of German households were equipped with a personal computer, a figure that jumped to three-quarters by the end of 2006. The same 75 per cent rate also applies to households in Japan (compared with just .07 per cent in Niger, 1.2 per cent in India, 2.3 per cent in Bolivia and 4.1 per cent in China). The sale of electronic products market is expected to continue growing in developing markets and industrialized ones, where there is a rising tendency to own more than one computer, telephone etc.

"The efficient, cost-effective and environmentally-sound recovery of metals from complex electronic components requires large-scale, hi-tech processes," says Hugo Morel, Executive Vice President of Umicore Precious Metals Services, a StEP member specialized in such

processes. "As well, the collection, sorting, dismantling and pre-processing of electronic devices require trained labor and offers many job opportunities worldwide.

"We strongly support the StEP initiative as a way to foster cooperation among stakeholders, develop needed infrastructure at a global scale, optimize interfaces between manual, mechanical and metallurgical recycling and recovery processes, and minimize the environmental burden created by E-scrap."

Improved re-use and recycling would also lessen the environmental impacts caused producing new electronic equipment in the first place. In this context proper recycling at the end of reuse life-time must be ensured.

A 2004 UNU book, *"Computers and the Environment,"* co-authored by Mr. Kuehr, found the average 24-kg (53-lb) desktop computer with monitor requires at least 10 times its weight in fossil fuels and chemicals to manufacture. This is much more materials-intensive than for the manufacture of an automobile or refrigerator, which only require 1–2 times their weight in fossil fuels.

Manufacturing a desktop computer and 17-inch CRT monitor uses at least 240 kg (530 lbs) of fossil fuels, 22 kg (50 lbs) of chemicals and 1,500 kg (3,330 lbs) of water — a total of 1.8 tonnes (1.9 English tons) of materials — roughly the weight of a sports utility vehicle (SUV) or a rhinoceros.

"There is a clear need and opportunity now to address the resources, health and environmental concerns being created by a surging increase in electronic waste," says Prof. van Ginkel. "We hope that the StEP initiative will point the way for governments, companies and consumers alike to reverse this growing international problem."

"Collectively, the role of consumers is enormously important to the world environment, whether purchasing, using or disposing of electronic equipment," adds Itaru Yasui, UNU Vice-Rector (Environment and Sustainable Development). "Buying refurbished equipment, selling or donating unwanted equipment and finally recycling as a last step are among the choices we hope consumers will make more often. The StEP initiative is designed to make those choices easier."

Klaus Hieronymi, Environmental Business Manager Hewlett-Packard Europe, Middle East and Africa says: "Through its Take Back and other programs, HP this year will mark the achievement of having recycled 1 billion pounds (450,000 metric tonnes) of information technology equipment since 1986. And we look for ways wherever possible to recover even more retired materials.

"HP has joined StEP to help countries work through the many legal, scientific and practical issues involved in managing e-waste, treatment standards, and innovative design to maximize re-use and recycling. The cooperation of universities, NGO's, producers, government agencies and UN institutions under the leadership of the United Nations University is a perfect set-up to ensure that basic solutions, workable in countries around the globe, will be developed."

"Ericsson is in the process of implementing globally an Ecology Management Provision to handle all electronic waste resulting from customer operations and also that generated internally within the company," says Mr. Per Jomer, Ericsson Vice President, Group Strategy. "This provision is an integral part of Ericsson's environmental management system. The EU

WEEE Directive has been used as one of the guiding principles in establishing the provision, although the scope of Ericsson's program is global and therefore includes all products, for all markets. Ericsson believes that StEP will make a valuable contribution to industry, in particular in establishing global best practices for evaluating recycling, waste treatment and asset management businesses."

In addition to UNU, UNEP and UNCTAD, charter members of the StEP initiative are:

Private-sector:
- AER Worldwide (USA)
- Cisco Systems (USA)
- Dataserv Ltd. (UK)
- Dell (USA)
- Earth Protection Services (USA)
- Ericsson (Sweden)
- Flection (Netherlands)
- Hewlett Packard (USA)
- MicroPro (Ireland)
- Microsoft (USA)
- Philips CE (Netherlands)
- Promtionteam Wetzlar (Germany)
- Rifer Environmental (USA)
- SIMS-MIREC (Netherlands)
- Taizhou Chiho Tiande (China)
- Umicore Precious Metal Refining (Belgium)

Government:
- German Technical Cooperation, GTZ (Germany)
- Swiss State Secretariat of Economics, SECO (Switzerland)
- Minnesota Pollution Control Agency (USA)
- United States Environmental Protection Agency, US-EPA (USA)

Academic and research:
- Chinese Academy of Sciences, Research Center for Eco-Environmental Sciences (China)
- Federal Laboratories for Materials Testing and Research, EMPA (Switzerland)
- Fraunhofer Institute for Reliability and Microintegration, FHG-IZM (Germany)
- French National Institute of Telecommunication, INT (France)
- GAIKER Foundation (Spain)
- Korea Institute of Geoscience & Mineral Resources, KIGAM (South Korea)
- Massachusetts Institute of Technology (MIT), Material Systems Laboratory (USA)
- Regional Environmental Centre for Central and Eastern Europe, REC (Hungary)
- Technical University Vienna (Austria)
- Technical University Delft (Netherlands)
- University of California, Berkeley, Consortium on Green Design and Manufacturing (USA)
- University of Melbourne, Faculty of Engineering (Australia)

NGOs:
- INFORM (USA)
- Öko-Institut (Germany)
- 3P Consortium for Sustainable Management (Germany)

Other members:
- AEA Technology, AEAT (United Kingdom)
- Japan External Trade Organization – Institute for Developing Economics, JETRO-IDE (Japan)
- Rifer Environmental (USA)
- Micro Industries Development Assistance & Services, MIDAS (Bangladesh)
- Thai Electrical and Electronic Institute; EEI (Thailand)