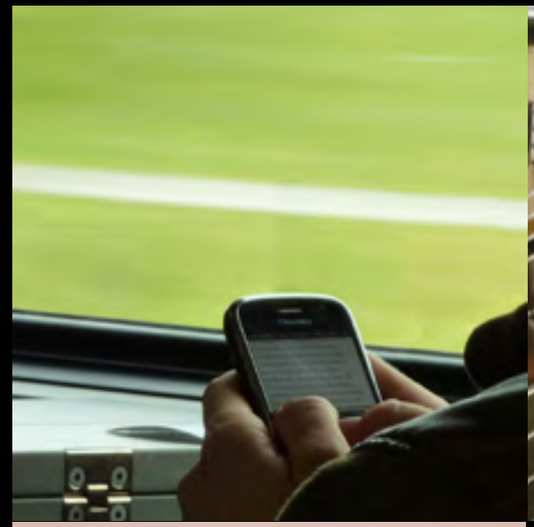
MOBILE PHONES AND THE ENVIRONMENT

IMPACT ON THE ENVIRONMENT

Mandated by the Basel Convention, the Mobile Phone Partnership Initiative (MPPI) developed guidance on the environmentally sound management of used and end-of-life mobile phones that includes such considerations as collection, processing, refurbishment, material recovery and recycling. It also provides guidance on reducing or eliminating releases to the environment from waste disposal and treatment processes.

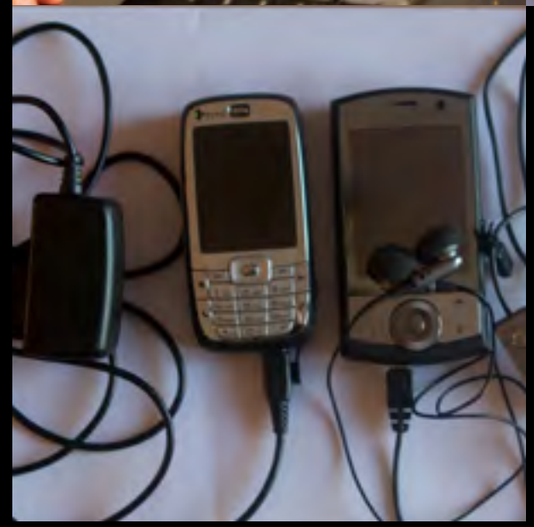
Based on the MPPI guidance, this mobile phone exhibition illustrates the challenges and opportunities of mobile phones during their life-cycle

MOBILE PHONE USES AND CONSUMERS



The use of mobile phones has grown exponentially from the first few users in the 1970s, to an estimated 6.8 billion in 2013. Sooner or later, these phones will be discarded, whole or in parts. In developed countries, this quite often takes place even before they cease to operate. According to some recent studies, the first owner will generally replace her/his mobile phone within two years.

MOBILE PHONE MATERIALS



A mobile phone is typically composed of about 40% of plastic, 32% of non-ferrous metal, 20% of glass and ceramics, 3% of ferrous metal and 5% other. Mobile phones differ from manufacturer to manufacturer and from model to model. Consequently, the substances used in any mobile phone will be somewhat different from the substances used in another.

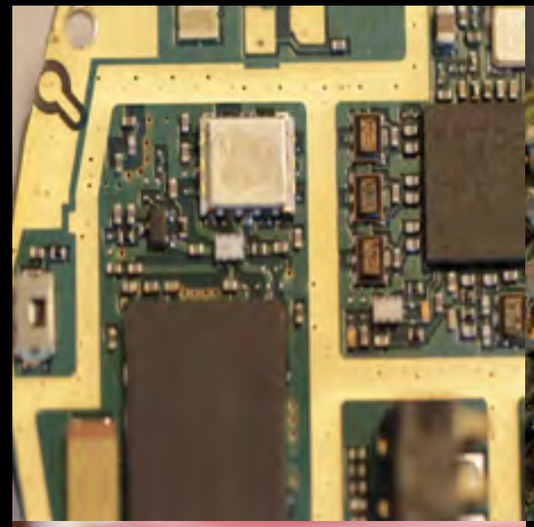
BATTERIES & CHARGERS

End-of-life batteries and any associated circuit boards or electronic assemblies containing lead-based solders are to be managed in an environmentally sound way, and in accordance with the Guideline on Material Recovery and Recycling of End-of-life Mobile Phones developed by the Mobile Phone Partnership Initiative (MPPI) under the Basel Convention (www.basel.int).

IRON

A mobile phone is made of about 3% iron that can be found in cases, frames, chargers and batteries.
Iron comes from two sources:
1) Extraction and processing (refining) of the raw material, called 'primary production'.
2) Recycling of discarded iron, called 'secondary production'
Very little scrap iron is recycled, but large quantities of scrap steel are recycled.

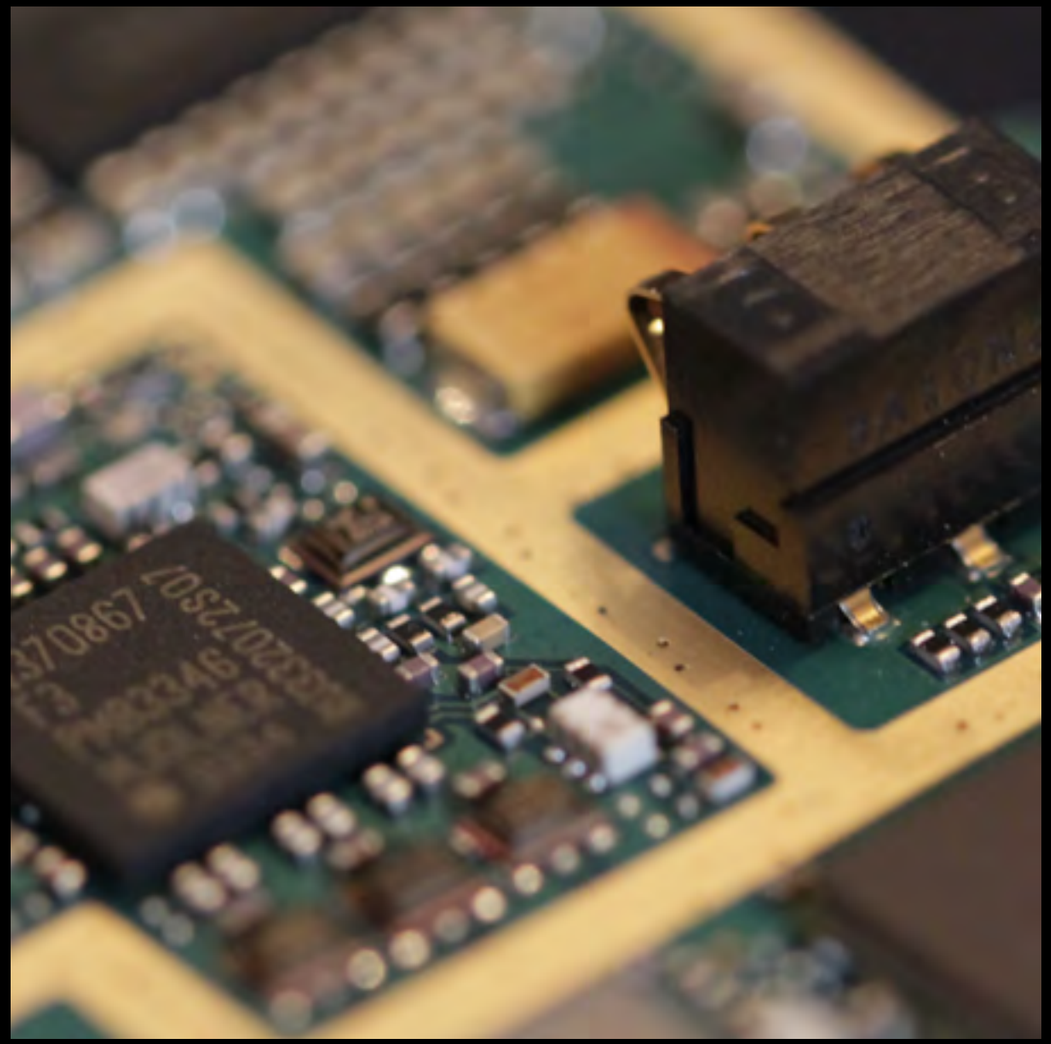
COPPER



A mobile phone contains about 16 grams of copper, e.g. in circuit boards, wires, connectors and batteries.

Copper comes from two sources:
1) Extraction and processing (refining) of the raw material, called 'primary production'.
2) Recycling of end-of-life products, called 'secondary production'

SILVER



A mobile phone contains about 0.35 grams of silver, e.g. in circuit boards and keypad. Silver is found in lead, zinc, and copper ore deposits. A full two-thirds of the silver resources in the world are found in association with these other metal ores. The remaining third is found in association with deposits of gold

GOLD

A mobile phone contains about 0.034 grams of gold, e.g. in connectors and circuit boards. Gold is chemically stable and conducts electricity, which is very important in electronics.

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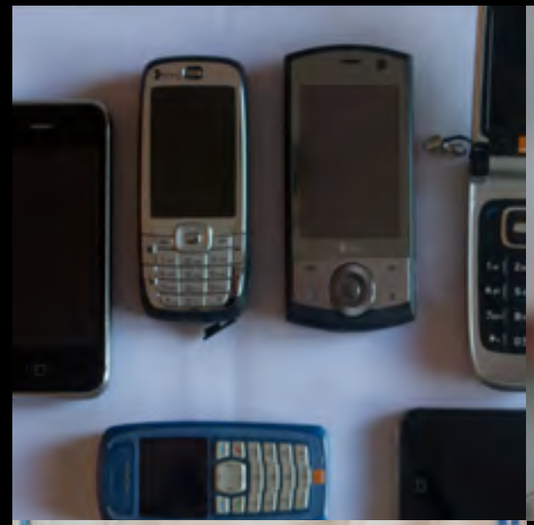
PLASTICS

Mobile phones are composed of about 40% plastic compounds. The case of a mobile phone is typically made of PC/ABS plastic, a mix of polycarbonate (PC) and acrylonitrile butadiene styrene (ABS). The case of the charging station is typically made of polycarbonate

MINERAL EXTRACTION

Minerals are everywhere around us. Minerals that are of economic value can be classified as metallic or non-metallic.
The process of extracting minerals (e.g. iron, cadmium, copper) can have a severe impact on health and the environment, and may even destroy important ecosystems. To reduce the impact, recycled metal products can be used instead, which increases the amount of time a mineral or metal remains in use, while decreasing the demand for new production.

COLLECTION AND REUSE



The environmentally sound management of the used mobile phones should include the collection of used mobile phones into a system with three goals to:

1. divert end-of-life mobile phones from waste streams destined for disposal in landfills or incinerators;
2. repair, refurbish and preserve used mobile phones in working order, so that they can be used again; and
3. channel unusable (end-of-life) mobile phones into environmentally sound material recovery and recycling.

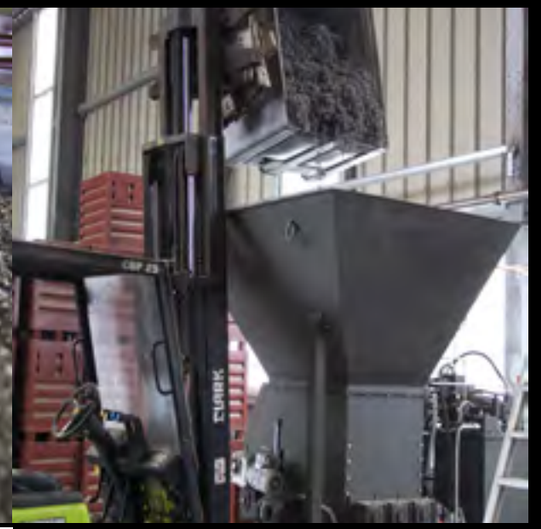
DISMANTLING

Only a small percentage of the millions of cell phones retired and discarded annually are recycled. When large numbers of cell phones become obsolete, large quantities of valuable metals end up either in storage or in landfills. The quantity of potentially recoverable metals would make a significant addition to the total recovered metals from recycling and would supplement virgin metals derived from mining.

DISMANTLING FACILITIES

Like other electronics, mobile phones contain a variety of substances that require sound handling and processing during material recovery and recycling, to prevent risks to workers, the public and the environment. Dusts may be generated during the shredding of mobile phones, during the subsequent handling of shredder outputs and during the handling and/or processing of smelter slags. Fumes may be generated during electronic components removal, metal sampling and similar processes, as well as during certain steps in plastics recycling, such as granulation.

RECYCLING PROCESS



Prior to material recovery and recycling of end-of-life mobile phones, several items need to be separated and sorted. Batteries must be removed before mechanical or pyrometallurgical processing, i.e., prior to any shredding and/or smelting. Accessories may also be sorted and separated from the mobile phone handset. The metals of economic interest and of environmental concern are primarily located in the electronic circuitry in the handset. The extracted metals – including gold, platinum, palladium and silver – are put back into productive use. 'High value' materials make up about 16% (by weight) of a typical mobile phone.

RECYCLING PRODUCTS

End-of-life mobile phones are, when collected in sufficient volume, a useful source of metals, including copper, gold, silver, and palladium, amongst others. And from an environmental point of view, the recovery and recycling of these metals has the greatest positive impact (eco-efficiency) at this time.
Eighty percent of a mobile phone can be recycled or recovered as energy. The remainder can be used in inert construction aggregates.

INFORMAL DISPOSAL

Informal activities in the e-waste recycling chain are present in many developing countries and include collection, manual dismantling, open-burning to recover metals, uncontrolled smelting and open dumping of residual fractions.

Open-burning to recover metals, such as copper, steel, and aluminium from plastics-insulated wires and other components of electrical and electronic equipment is seen as one of the most direct severe impacts of informal practices on human health and the environment due to the resulting toxic air pollutants emissions, such as dioxin and carbon monoxide

DISPOSAL

About 15-20% or up to about 4.5 million old mobile phones globally collected every year are beyond economic repair and need to be recycled. The current total mass of mobile phones to be recycled is about 600 tonnes, only about 0.001-0.003% of the estimated 20-50 million tonnes of electrical and electronic waste (e-waste) each year.
The "Guidance document on the environmentally sound management of used and end-of-life mobile phones" from the Basel Convention Mobile Phone Partnership Initiative (www.basel.int) provides information on how to manage used and end-of life mobile phones from collection to refurbishment, material recovery and recycling. This includes design improvements to introduce reuse and recycling information into product marking, and further reducing the use of hazardous substances, making reuse, refurbishment, and material recovery and recycling easier and extending the life of products.