Funded by the European Union

RCREEE
Regional Center for Renewable Energy and Energy Efficiency
المركز الإقليمي للطاقة المتجددة وكفاءة الطاقة

Mitigation Enabling Energy Transition in the MEDiterranean region

Challenges and solutions for scrapped appliances supply chain

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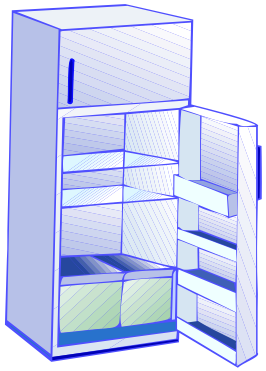
Beirut

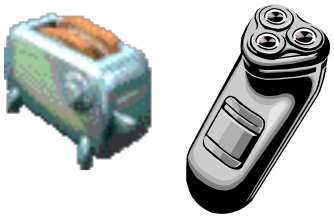
28 February 2024

E-Waste from which appliances?

1. Large household appliances

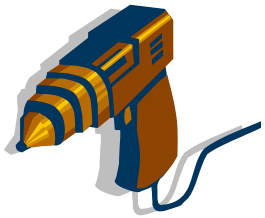


2. Small household appliances



3. IT & Telecoms equipment

6. Electrical & electronic tools

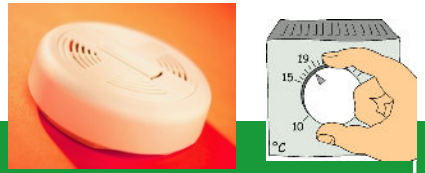


7. Toys

8. Medical equipment systems

10. Automatic dispensers

9. Monitoring & control equipment



5. Lighting equipment

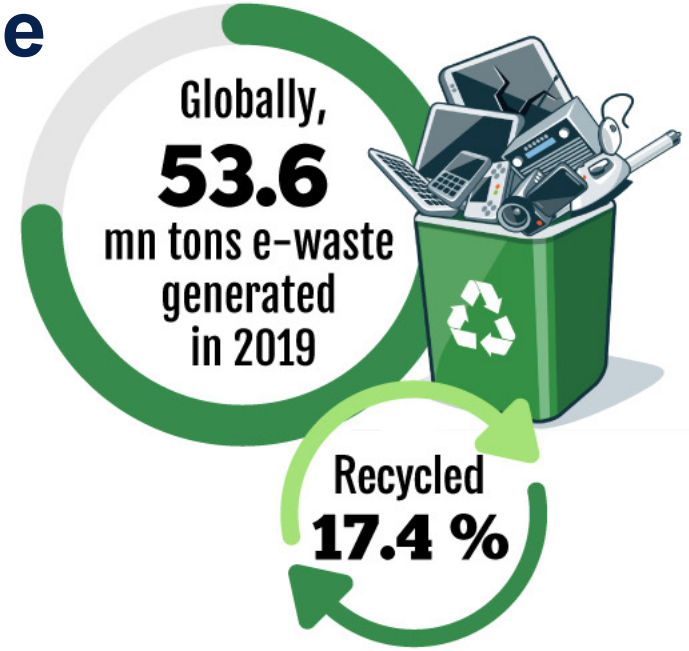
4. Consumer equipment

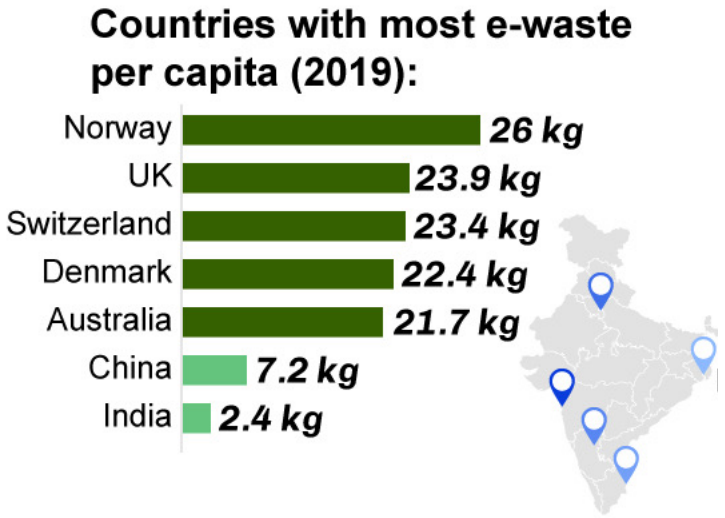
Source: WeeeForum

• WEEE generation volume

*Since 2010, e-waste generation has increased in the Arab States by **61 %** – to 2.8 Mt in 2019.*

*The collection rate of e-waste is **0.1 %** in 2019.*





• WEEE generation volume

53.6 Mt
GLOBAL E-WASTE GENERATED IN 2019

E-WASTE IS A FAST-GROWING AND TOXIC WASTE STREAM

CONTAINING BOTH VALUABLE MATERIALS
for instance:

Gold

Plastic

$57 Billion USD
Value of raw materials in e-waste

17%
Documented to be collected and recycled in an environmentally sound manner by depolluting it and recycling the valuable materials

AND TOXIC SUBSTANCES
for instance:

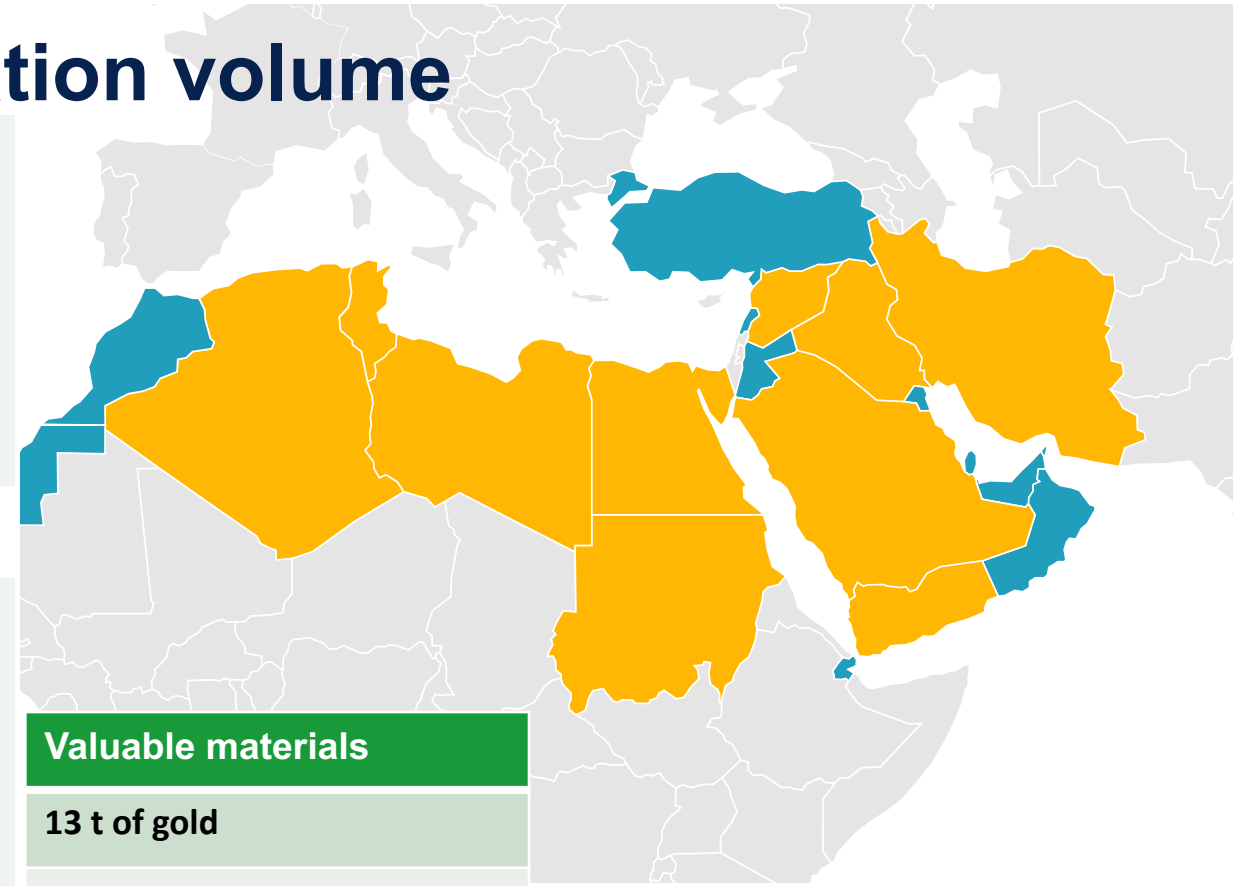
Greenhouse gas emissions (CO_2)

Brominated Flame Retardants (BFR)

Lead

Mercury

83%
Undocumented, most likely landfilled or treated with inferior standards



Valuable materials
13 t of gold
0.47 t rare earth metals
1.05 Mt of iron
96 kt of copper
167 kt of aluminium
0.7 kt of cobalt

$3 BILLION

• WEEE generation volume

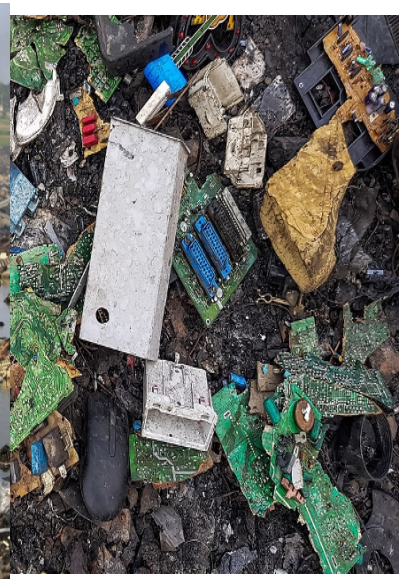
- *Shorter lifespan (Planned obsolescence, cheap/counterfeited equipment)*
- *Rapid changes in technology, new type of equipment's*
- *GDP growth (Urbanization)*
- *Falling prices*
- *Absence of circular economy concept*

• Inefficient recovery of precious materials

Material	Occurrence in E-waste	Health and Environmental Impact
Beryllium (OECD 2003, Taylor et al. 2003)	copper-beryllium alloys, springs, relays and connections;	• beryllium sensitization/chronic beryllium disease • **human carcinogens** • released as beryllium oxide dust or fume during high temperature metal processing
Cadmium	Contacts, switches, nickel-cadmium (Ni-Cd) batteries, printer inks and toners	• persistent and mobile in aquatic environments (ATSDR 2000) • **damage to the kidneys and bone toxicity**, released if plastic is burned or during high temperature metal processing
Lead	Circuit boards/ cathode ray tubes CTR (1 – 3 kg per CRT);	• Risk for small children and fetuses • **Damage to the nervous system, red blood cells, kidneys and potential increases in high blood pressure;** • Incineration can result in release to the air
Mercury	Lighting devices that illuminate flat screen displays, switches and relays	• **Impacts the central nervous system** • Land filling and incineration of flat panel displays results in the release to the environment
PCBs (polychlorinated biphenyls)	Insulating fluids for transformers and capacitors, flame-retardant plasticizers	• **Suppression of the immune system, liver damage, cancer promotion, damage to the nervous system** • Damage to reproductive systems

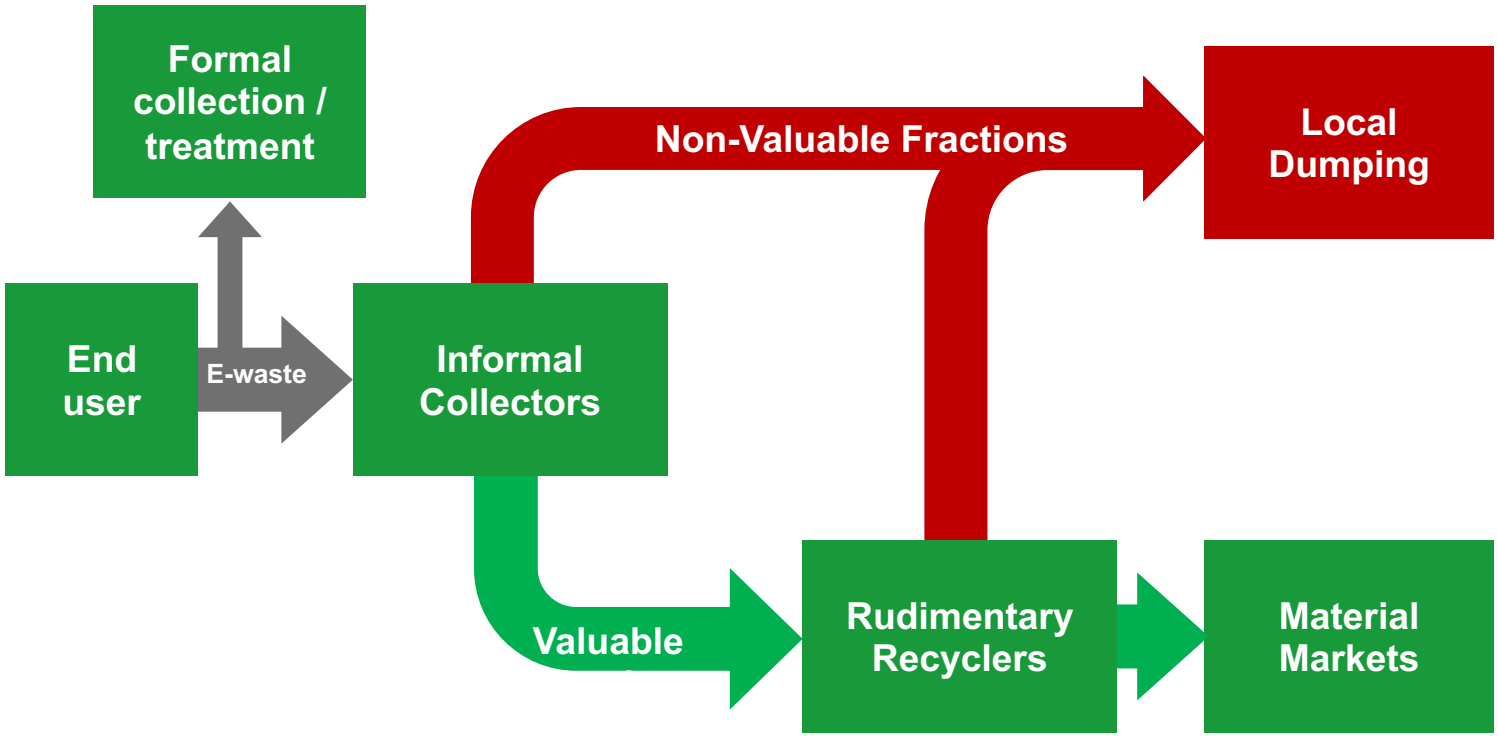
• Environmental and social challenge

- Waste Resources
- Polluting soil, water and air
- Human Health Consequences
- Lacking technologies
- Lacking Legislative Framework
- Preventing fair local business
- Survival Imperative



Source: Dr. Federico Magalini
Brescia PhD Course

The problematic informal sector



Rudimentary recyclers exist in many countries; they focus on valuable fractions in e-waste and dump non-valuable fractions.

Some formal and approved recyclers may already exist but volumes are often low.

Source: Alliance for e-waste solutions in Africa 2014

Challenge or opportunity?

Opportunity cost of improper e-waste management

Social cost: informal recycling as a subsistence activity creates

- direct social cost of low income from low quality fractions due to inefficient, sub-standard and hazardous processes
- indirect social cost of poor health, child labour, intermittent income, smoke, smell

Environmental cost: air, water and soil pollution from

- emissions that degrade soil, water and air resulting in contamination in the food chain
- Inefficient recycling processes result in unrecoverable material losses and need for more primary resources

Economic cost: under developed industrial recycling resulting in

- lost intrinsic value of e-waste by the formal economy, and thus a net loss in tax revenues for the government
- low investment in installing recycling infrastructure

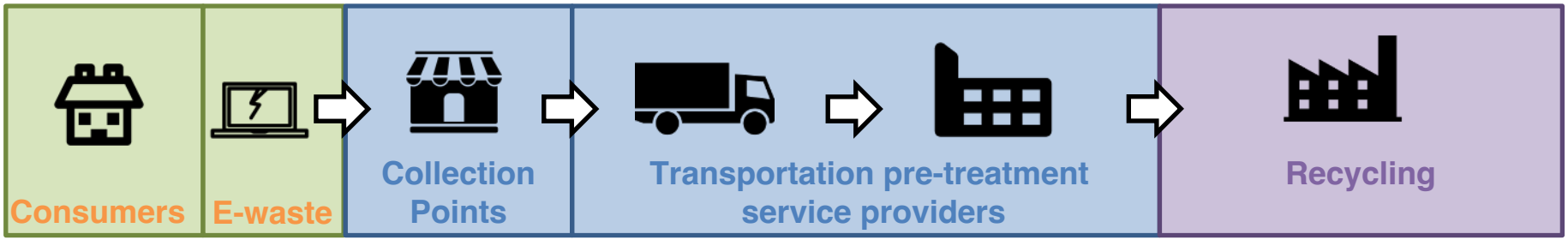
Opportunity of proper e-waste management

Social gain: formalised recycling creates
- large number of green jobs at all skill levels
- better social status as entrepreneurs & employees rather than subsistence actors
- better health and lower occupational hazards through proper use of tools and technologies
- higher and more regular incomes for workers who have more job security

Environmental gain: air, water and soil pollution avoided results in
- secondary raw material gained (such as gold, copper, steel, aluminum) otherwise lost in landfills or inefficient processes
- avoided remediation costs of contaminated sites
- feedstock to other industries eg. steel, aluminum, plastic and encourages green industrial development

Economic cost: developed industrial recycling resulting in
- improves government finances through higher taxes and lower costs for municipal bodies for waste disposal
- attracts investment and technology

E-waste management – an engine for green growth



- Inculcates responsible consumer behaviour that is applicable for other consumer goods as well
- Less waste, less pollution, better health

- Builds collection infrastructure or finances upgrades of existing infrastructure

- Drives creation of reverse logistics, transport and storage infrastructure
- Encourages investment in small and medium enterprises
- Requires skilled, semi-skilled and managerial manpower

- Triggers domestic and foreign investment/ venture capital in recycling industry

E-waste management policy and legislation

Contact us!

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Mitigation Enabling Energy Transition in the MEDiterranean region

Together We Switch to Clean Energy

For any inquires or comments, please don't hesitate to contact us

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