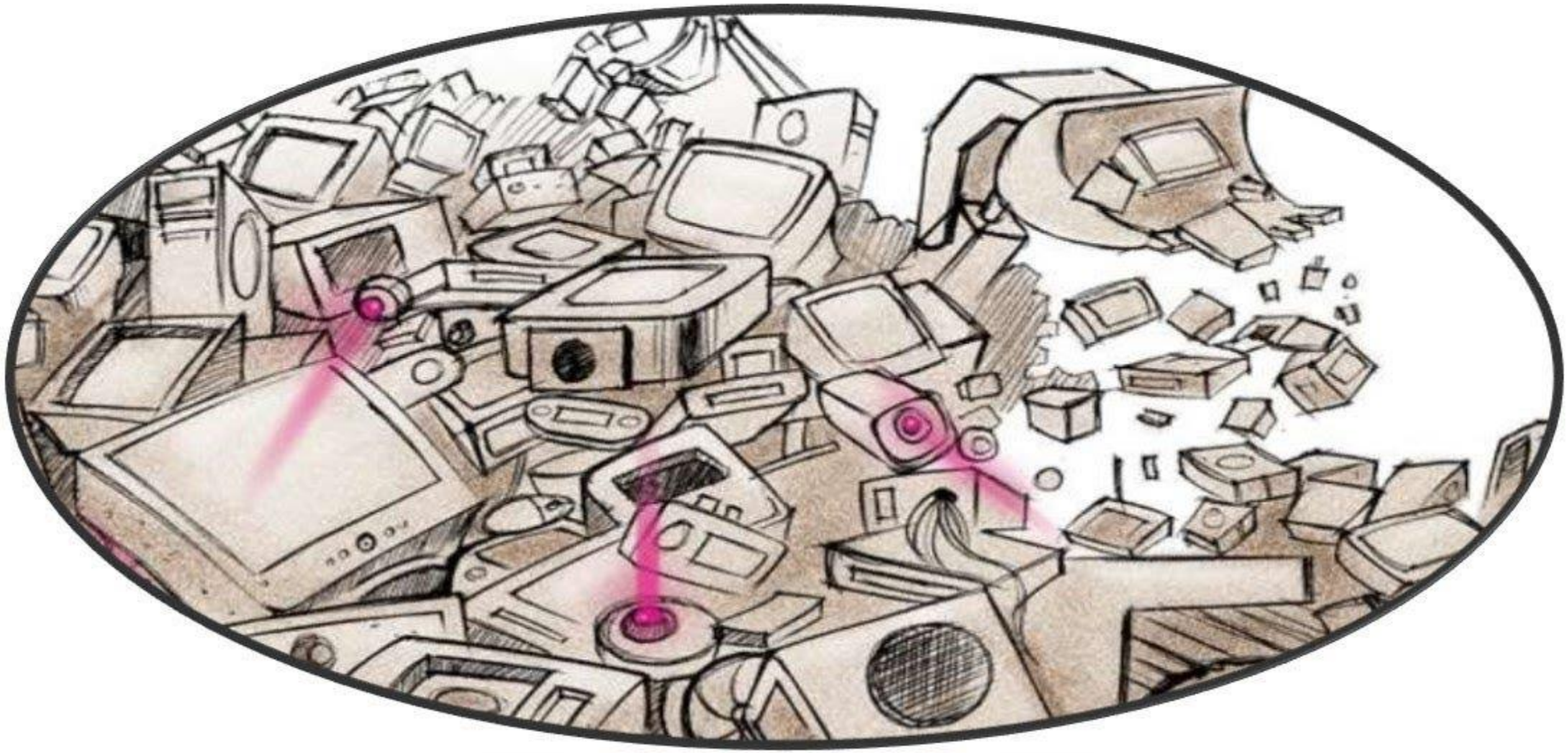
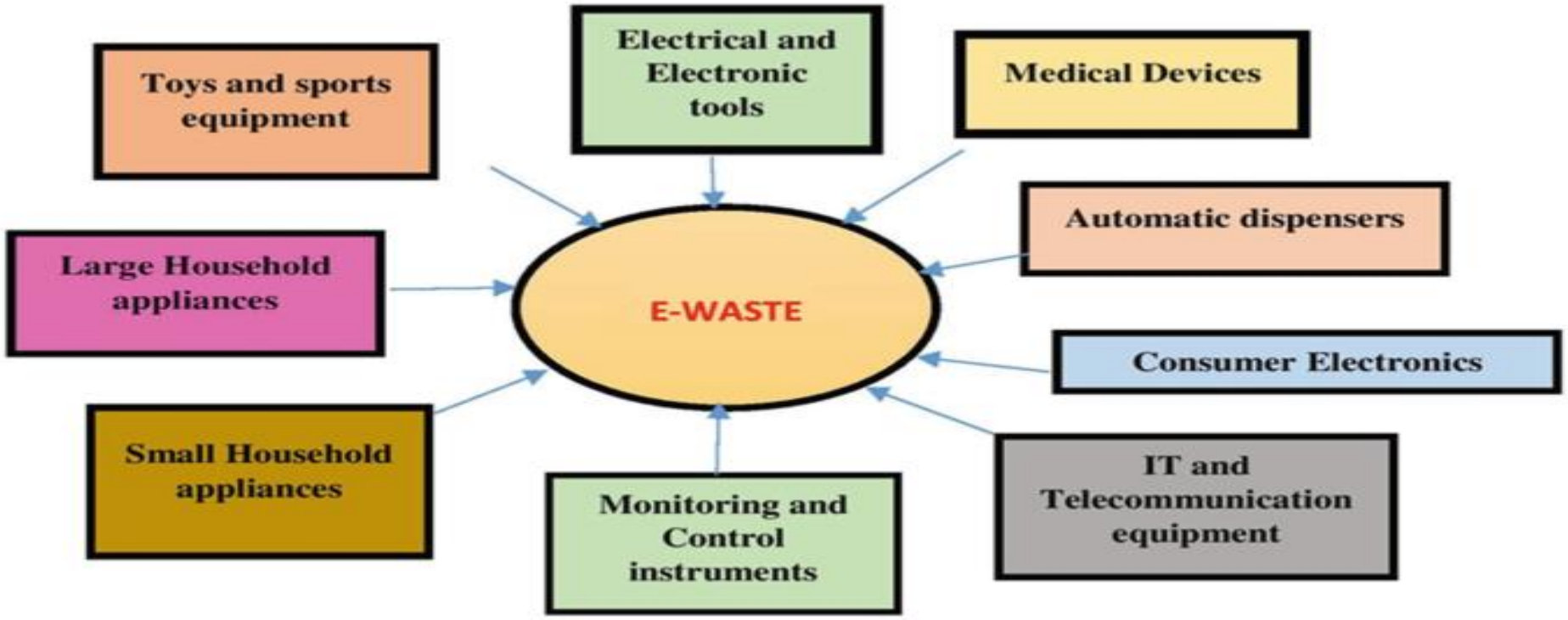
E-WASTE



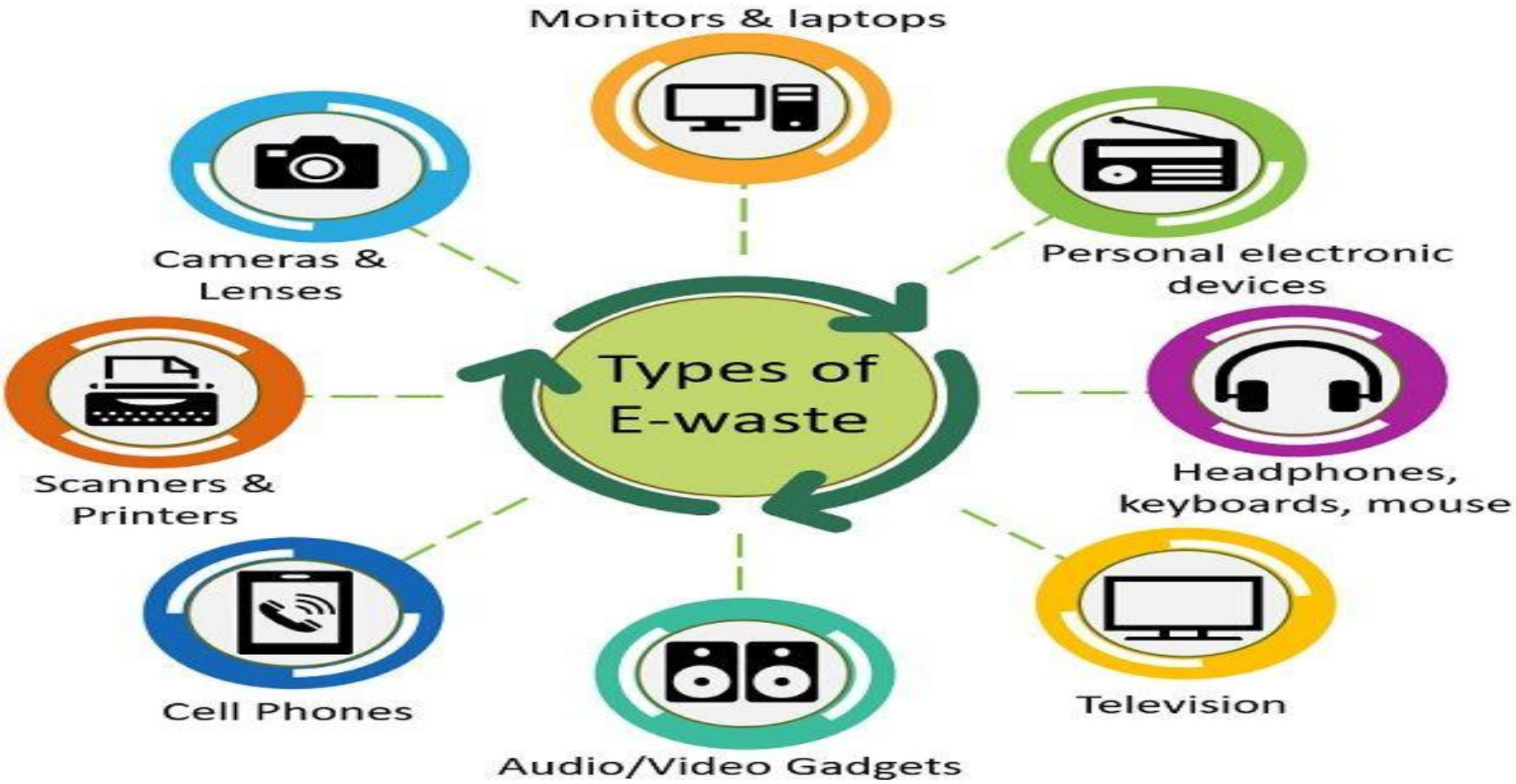
E-waste Defintion

- **E-waste** is any electrical or electronic equipment that's been discarded.
- This includes working and broken items that are thrown in the garbage or donated to a charity reseller like Goodwill.
- Often, if the item goes unsold in the store, it will be thrown away.
- **E-waste** is particularly dangerous due to toxic chemicals that naturally leach from the metals inside when buried.

List of Common E-waste Items:



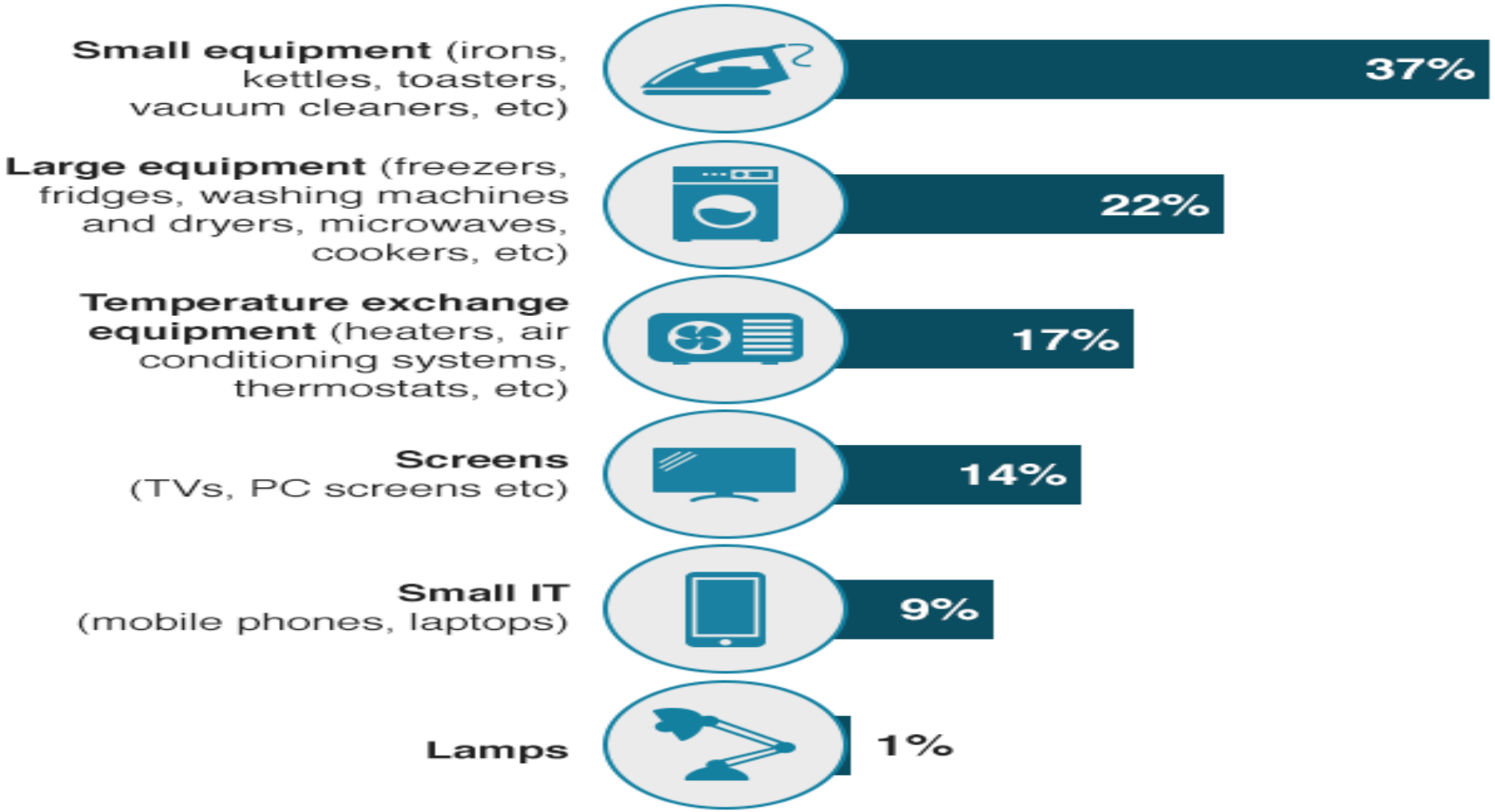
Types of E-Waste



Sources of E-Waste


Electronic Waste Production in the World
16,6; 17%
14,2; 14%
5,2; 5%
1,3; 1%
62,7; 63%
USA
China
Japan
Turkey
Other

Global e-waste in 2020

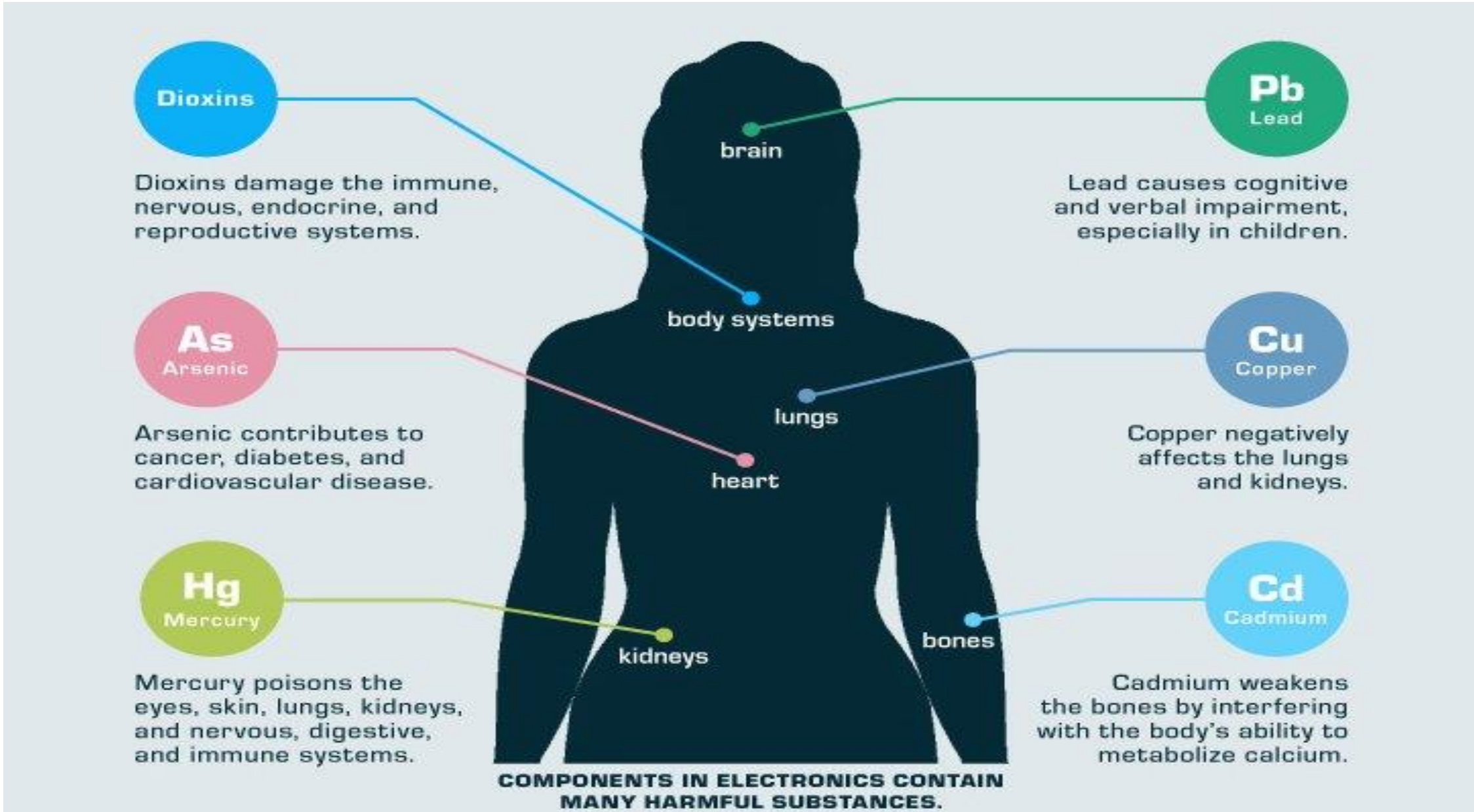


Source: Southampton University

BBC

E-waste toxic effect on human health

Toxicants	Sources	Health effects
Lead	Solder in printed circuit boards, glass panels and gaskets in computer monitors	• Damage to central and peripheral nervous systems, blood and kidney. • Affects brain development in children.
Cadmium	Chip resistors and semiconductors	• Irreversible damage to human health. • Accumulates in kidney and liver. • Causes damage to nerves. • Teratogenicity.
Mercury	Relays and switches, printed circuit boards	• Chronic damage to the brain. • Respiratory and skin disorders in fishes due to bioaccumulation.
Hexavalent chromium	Corrosion protection of untreated and galvanized steel plates, decorator or hardner for steel housings	• Causes Asthmatic bronchitis and DNA damage.
Plastics	Cabling and computer housing	Burning produces dioxin which causes • Reproductive and developmental problems; • Damage to immune system and regulatory hormones.



COMPONENTS IN ELECTRONICS CONTAIN MANY HARMFUL SUBSTANCES.

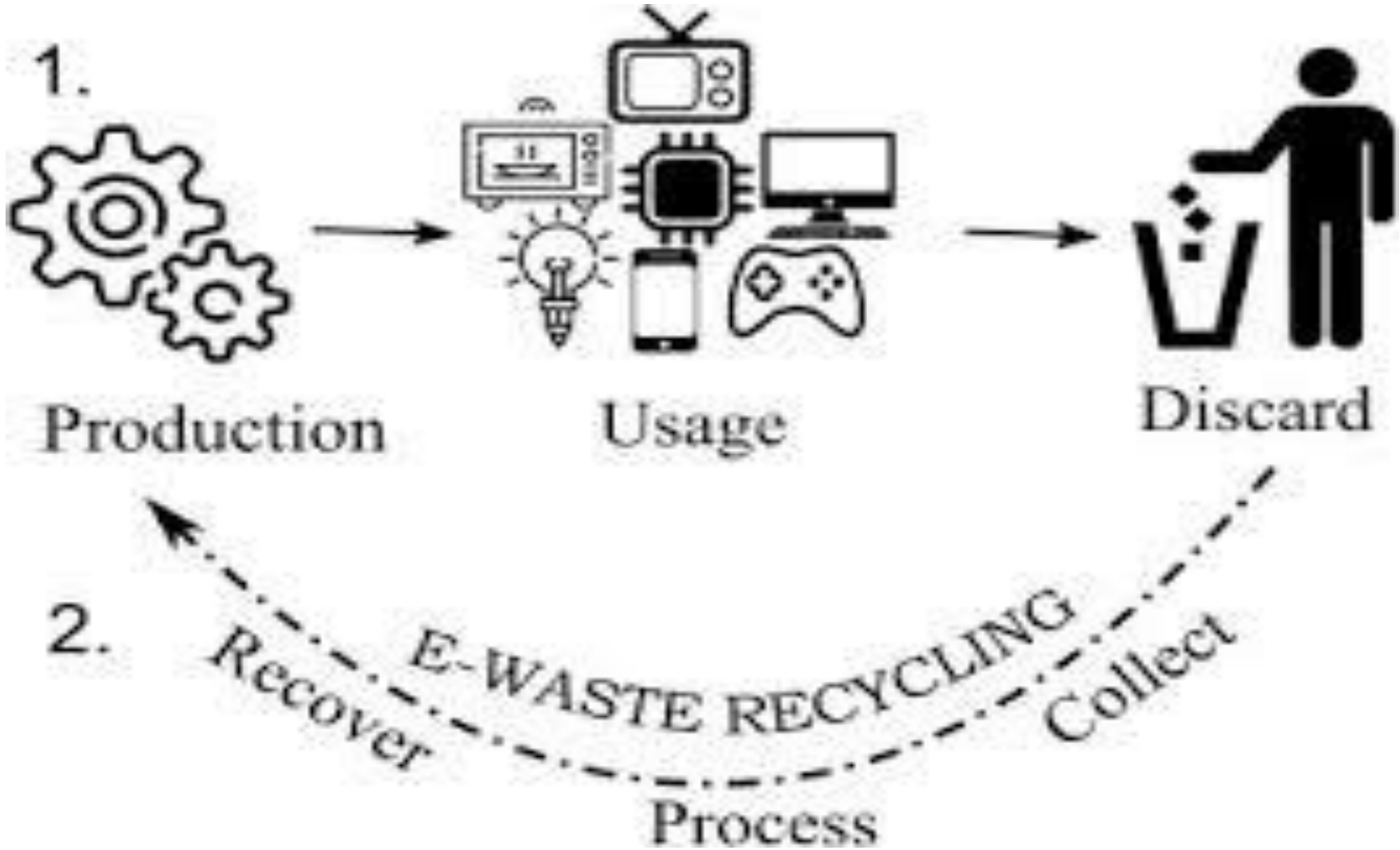
E-Waste Management.

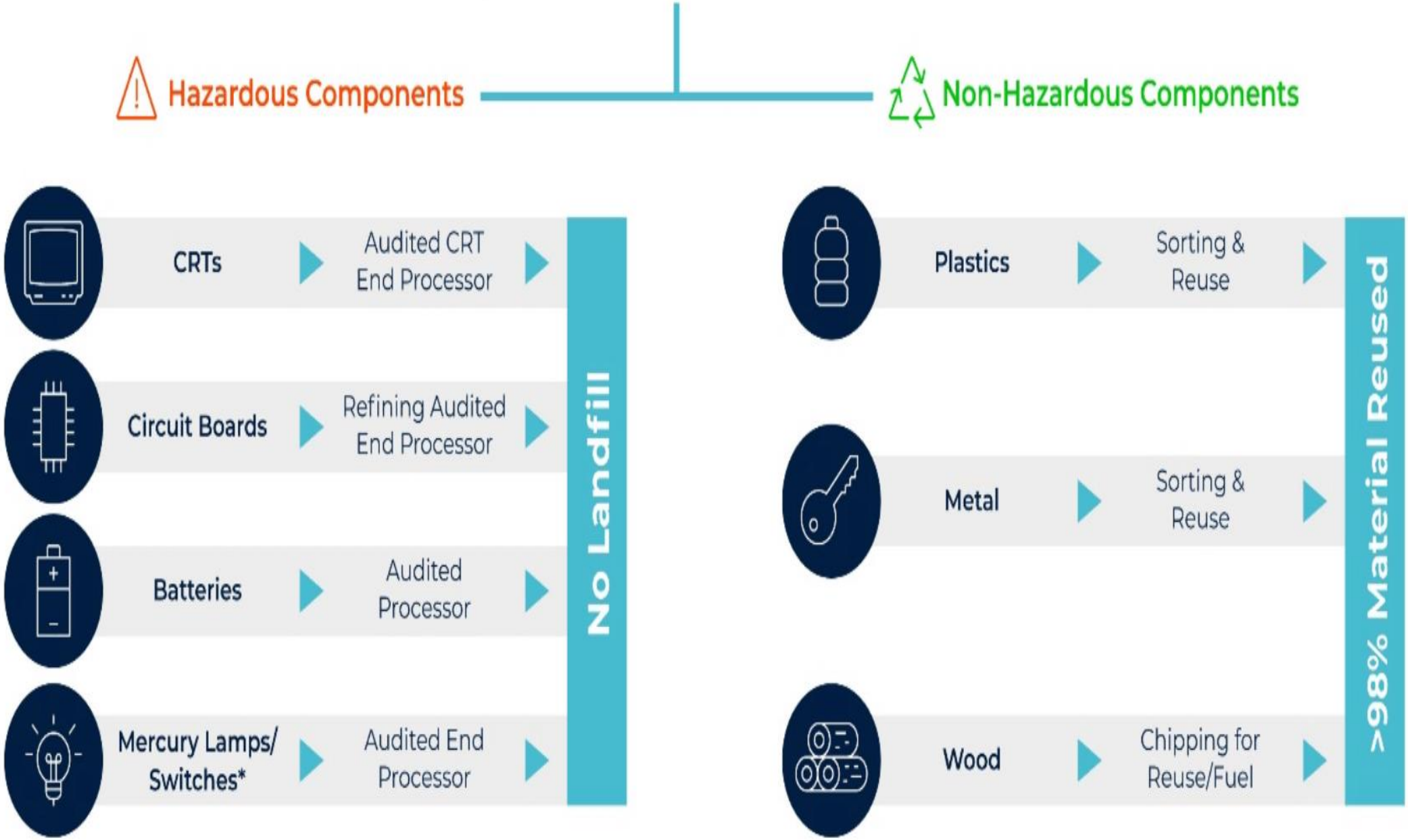
- In industries management of e-waste should begin at the point of generation. This can be done by waste minimization techniques and by sustainable product design. Waste minimization in industries involves adopting:

1. Inventory management,
2. Production-process modification,
3. Volume reduction,
4. Recovery and reuse.

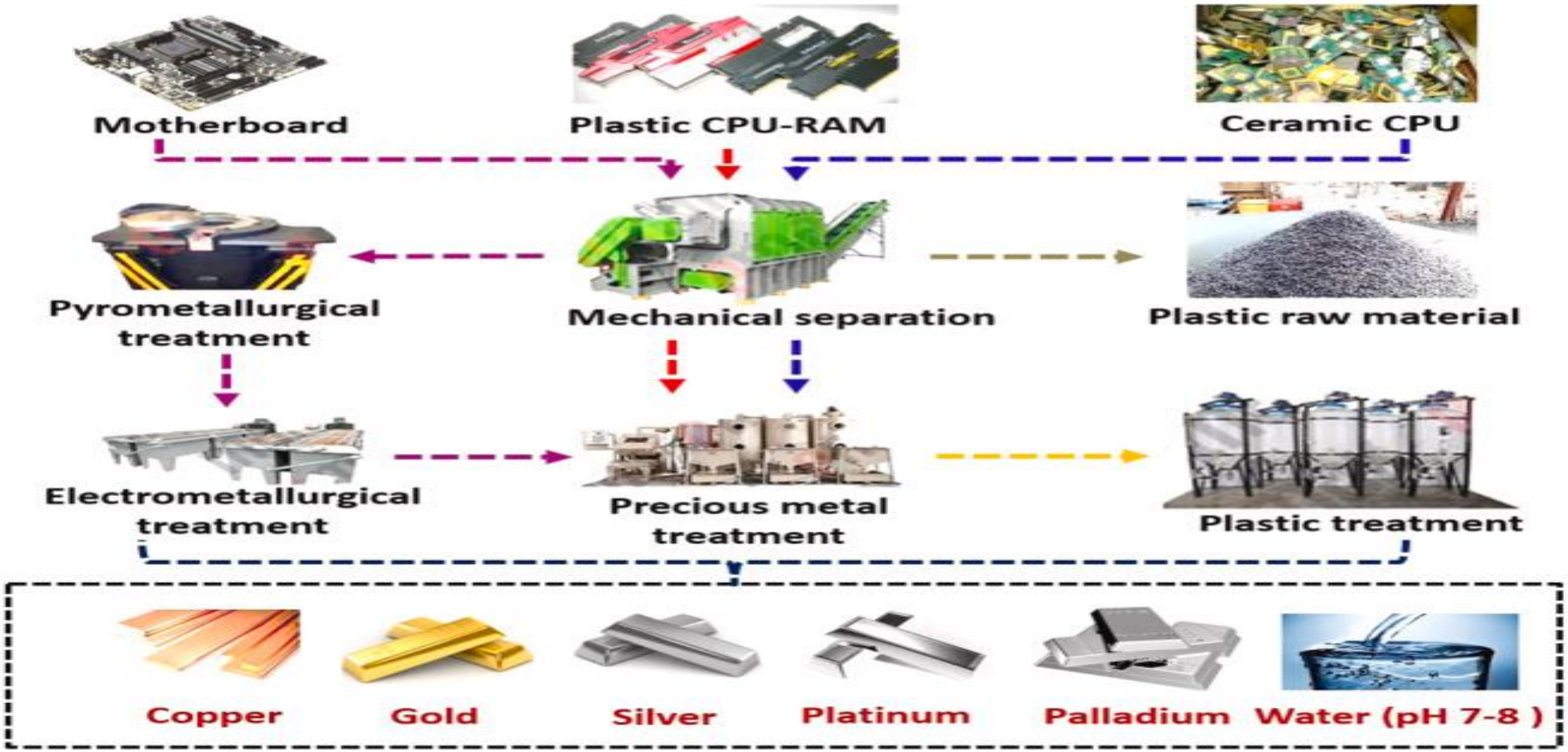
E-waste recycling process

Bring awareness and promote E-Waste recycling today!

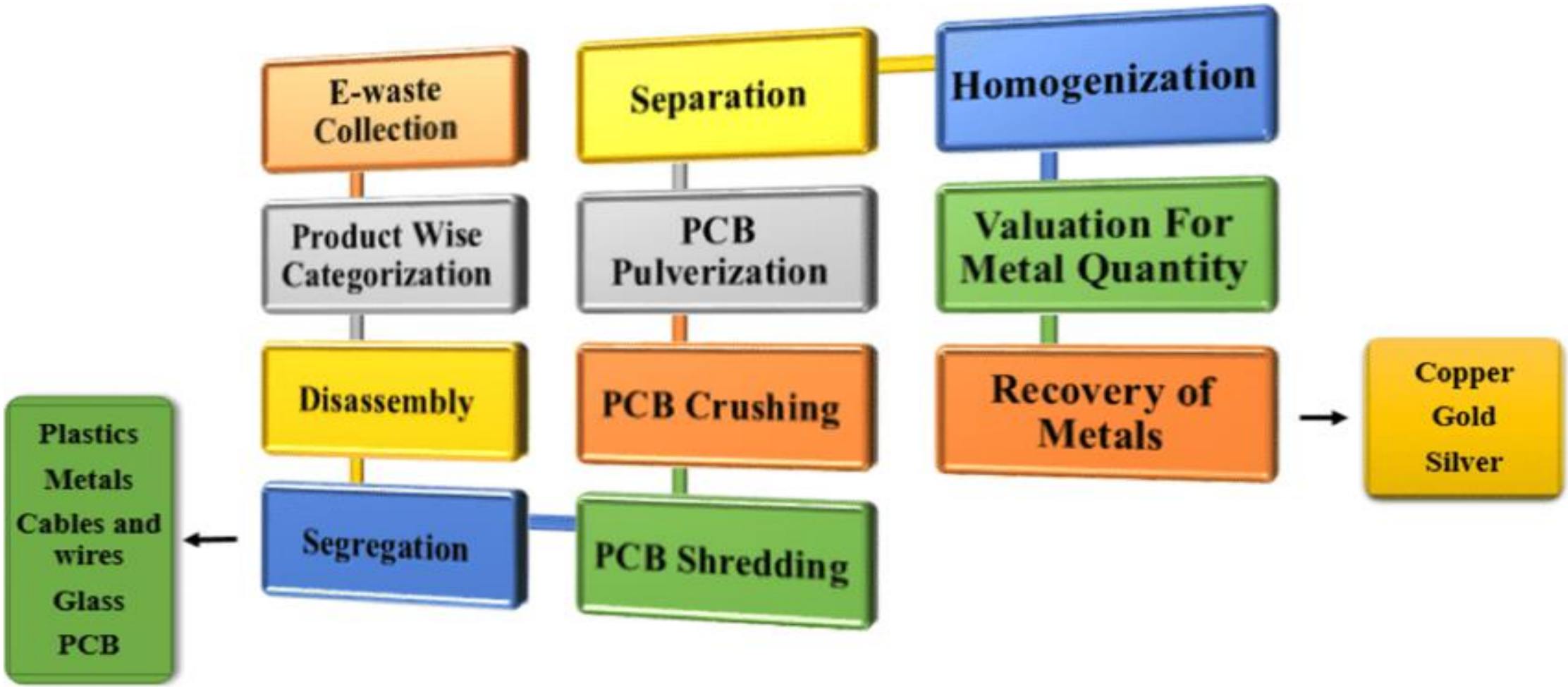

1.
Production
Usage
Discard
2.
E-WASTE RECYCLING
Recover
Collect
Process


Hazardous Components
Non-Hazardous Components
CRTs
Audited CRT End Processor
Circuit Boards
Refining Audited End Processor
Batteries
Audited Processor
Mercury Lamps/ Switches*
Audited End Processor
No Landfill
Plastics
Sorting & Reuse
Metal
Sorting & Reuse
Wood
Chipping for Reuse/Fuel
>98% Material Reused

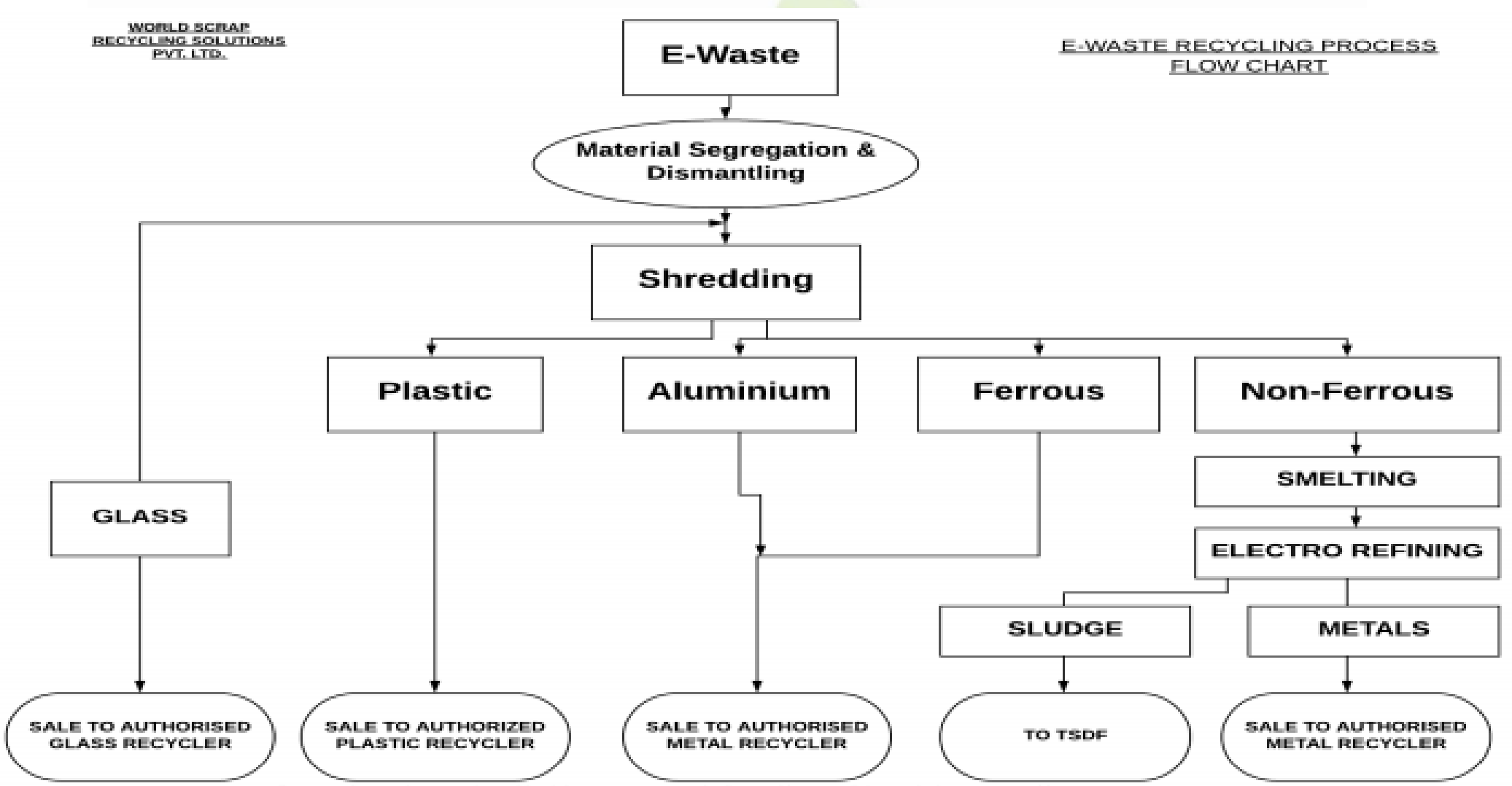
Electronic waste generation, recycling and resource recovery



E-waste recycling and recovery of valuable material



Recycling Process



Future research directions

- **Future research directions in resource recovery from e-waste can be aimed at new technology development, process optimization, understanding the mechanism of biocatalyst-mediated metal recovery processes and the use of new materials, chemicals that can facilitate a bio-circular economy.**

- **Some of the emerging research topics include, amongst others:**
- **(i) Decomposition of waste high-impact polystyrene (HIPS) resin from e-waste using supercritical water oxidation process .**

Conclusions

- **From a circular economy and environmental perspective, the recycling of e-waste will be an authoritative and important sector in the near future.**
- **The integration of technology in every aspect of our daily life (e.g. working and learning from home) has led to an increase in the use of electronic devices by the common people.**

- **However, the boosting sales of PC and other IT accessories during COVID-19, combined with the short life time of many e-devices.**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