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## E-waste statistics

How to measure e-waste collected and recycled

April, 2018 – E-waste statistics workshop - Zanzibar



# Outline



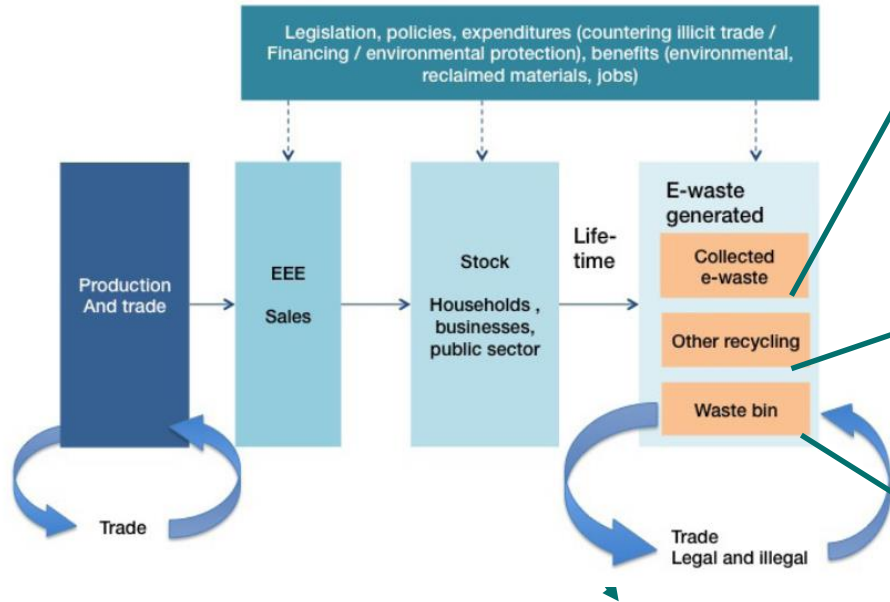
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- E-waste collection scenarios
- What is the official collection and recycling?
- Good recycling technologies for e-waste
- Data sources

# E-waste collection scenarios



Usually sent to proper e-waste recycling facilities

**Assumption:** *e-waste collected = e-waste recycled*

**Countries with developed waste management:**

collected by waste dealers or companies

**Countries with NO developed waste management:**

Informal collection and recycling

End up in land fill or municipal solid waste incineration

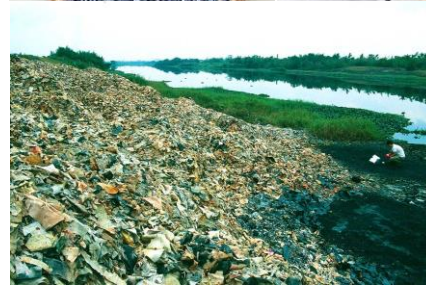
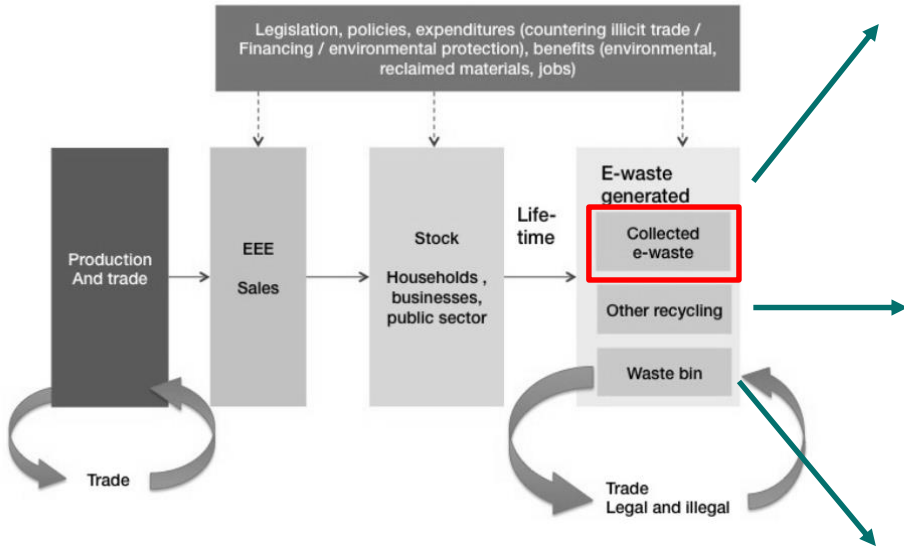
# E-waste collection scenarios



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# What is the official collection and recycling?



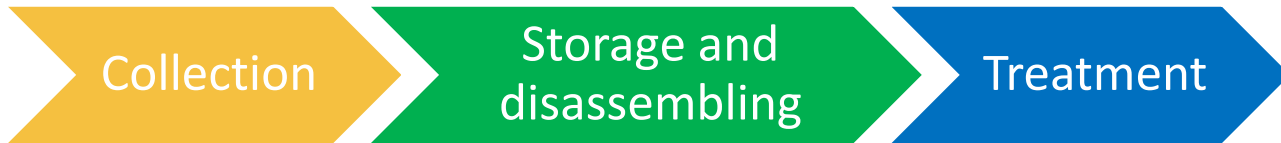
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- Recycling of e-waste has to be supported by an efficient e-waste management system

- Minimum standard of recycling is set by a law, specifically on e-waste

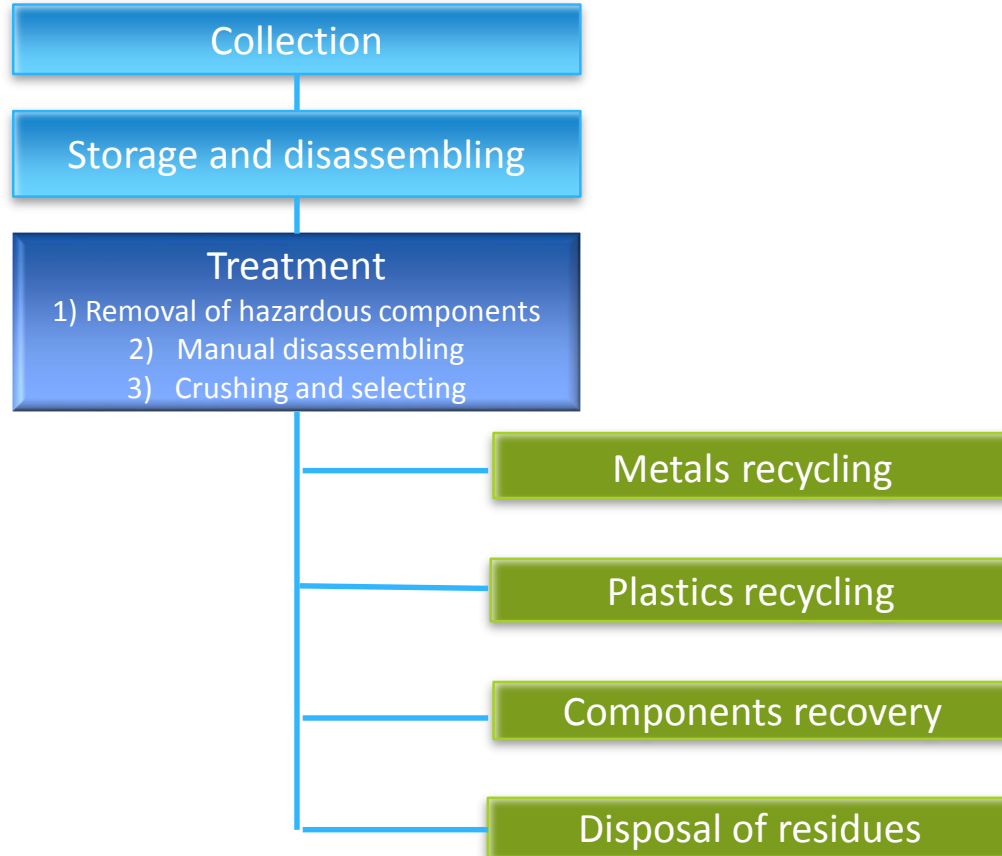


- Collection points
- Pick up services
- Collection by (in)formal sector

- Sorting of e-waste by type
- Selection and screening at early stage
- Disassembling of big components

- At state of art facilities
- Include at minimum the removal of fluids
- Selective treatments according to the type or e-waste

# Good recycling technology for e-waste



# Data sources for e-waste collected and recycled through official takeback system



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- Data can be gathered tracing:
  - E-waste from its generation to the treatment (waste production perspective)
  - E-waste in the treatment facility, not “imports” (waste treatment perspective)



**All the actors involved in the e-waste management system are potential sources for data**

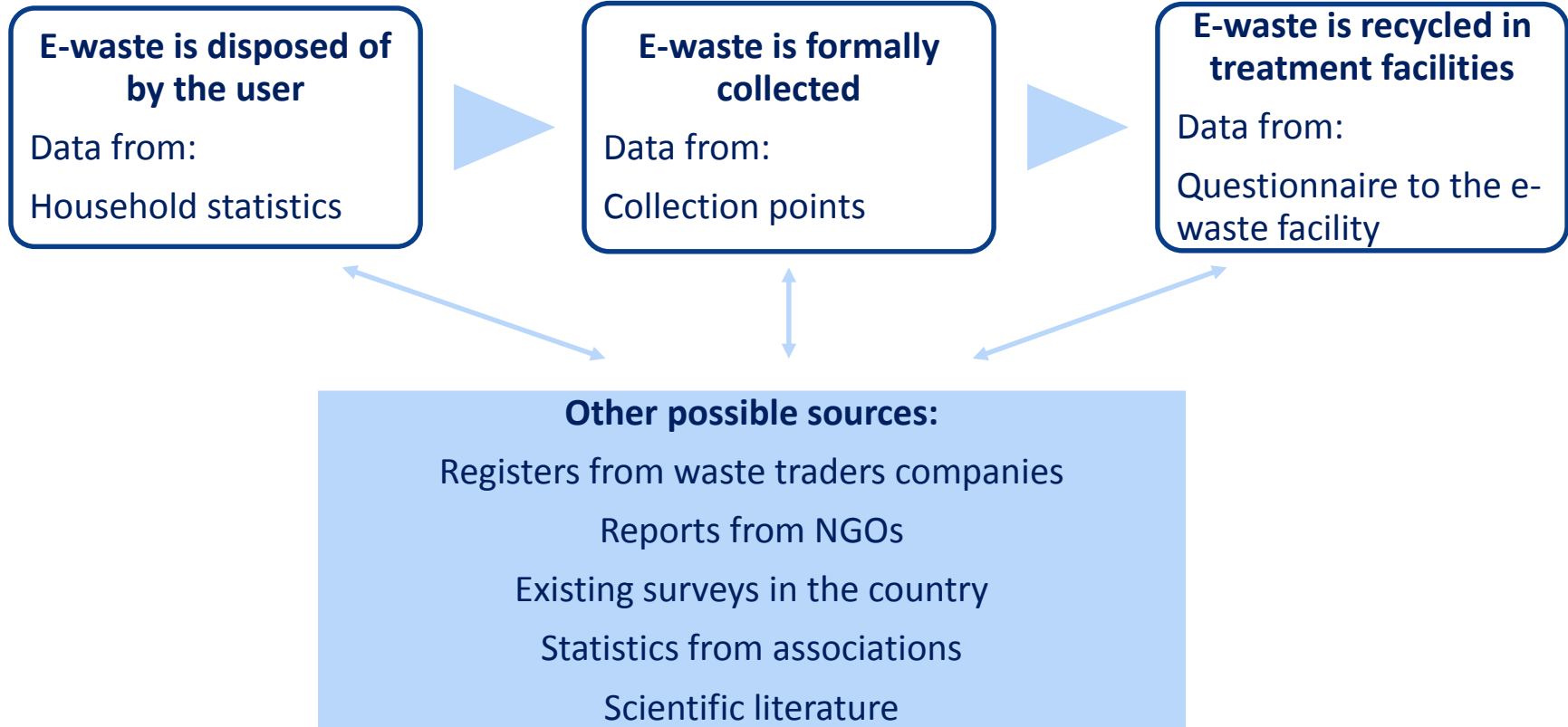


**Authorities** for licensing, monitoring and law enforcement purposes



**Organizations/producers/associations** under the requirements of the EPR principle

# Data sources for e-waste collected and recycled through official takeback system





# Data sources for e-waste collected and recycled through official takeback system



## Example 1 of an household survey template

A	B	C	D	E	F
UNU Key	Description	Which of this 54 types of e-waste did you dispose of during last year?	How many units did you disposed of?	What was the approximate age when you discarded it?	How did you discard the product?
		<i>Put a cross</i>	<i>Indicate the number</i>	<i>Choose one option from A to K</i>	<i>Choose one option from A to K</i>
0001	Central Heating (household installed)				
0002	Photovoltaic Panels (incl. converters)				
0101	Professional Heating & Ventilation (excl. cooling equipment)				
0102	Dishwashers				
0103	Kitchen (f.i. large furnaces, ovens, cooking equipment)				
0104	Washing Machines (incl. combined dryers)				
0105	Dryers (wash dryers, centrifuges)				
0106	Household Heating & Ventilation (f.i. hoods, ventilators, space heaters)				
0108	Fridges (incl. combi-fridges)				
0109	Freezers				
0111	Air Conditioners (household installed and portable)				
0112	Other Cooling (f.i. dehumidifiers, heat pump dryers)				
0113	Professional Cooling (f.i. large air conditioners, cooling displays)				
0114	Microwaves (incl. combined, excl. grills)				
0201	Other Small Household (f.i. small ventilators, irons, clocks, adapters)				
0202	Food (f.i. toaster, grills, food processing, frying pans)				

**Column D:** What was the approximate age when you discarded it?

- A. Less than 1 year
- B. 1 year
- C. 2 years
- D. 3 years
- E. 4 -5 years
- F. 6-10 years
- G. 11-15 years
- H. 16-20 years
- I. 21-40 years
- J. >40 years
- K. do not remember/do not know

**Column E:** How did you discard the product?

- A. Bring to the shop
- B. Retailer pick up at home
- C. Bring to Municipal Collection Point
- D. Municipality pick up at home
- E. Sold on e-bay, parents, friends for free
- F. Moved it to my old/other house
- G. Sold to a refurbisher
- H. Waste bin
- I. With Plastic waste
- J. Warranty substitution
- K. Not Know/Do not Remember

# Data sources for e-waste collected and recycled through official takeback system



## Example 2 of an household survey template

1a. Did you dispose of a “E-WASTE CATEGORY” during the last year?

If YES:

1b. How did you dispose of the product?

1. Took it to the shop
2. A retailer picked it up at home
3. Took it to municipal collection point
4. Municipality picked it up at home
5. Sold it or gave it to family, friends for free
6. Moved it to my old/other house
7. Sold it to a refurbisher
8. Threw it into a waste bin
9. Threw it away with plastic waste
10. Warranty substitution
11. Do not Know/Do not Remember

1c. How many items.

<b>Temperature exchange equipment</b>	More commonly referred to as cooling and freezing equipment. Typical equipment includes refrigerators, freezers, air conditioners, heat pumps.
<b>Screens, monitors</b>	Typical equipment includes televisions, monitors, laptops, notebooks, and tablets
<b>Lamps</b>	Typical equipment includes fluorescent lamps, high intensity discharge lamps, and LED lamps
<b>Large equipment</b>	Typical equipment includes washing machines, clothes dryers, dish-washing machines, electric stoves, large printing machines, copying equipment, and photovoltaic panels
<b>Small equipment</b>	Typical equipment includes vacuum cleaners, microwaves, ventilation equipment, toasters, electric kettles, electric shavers, scales, calculators, radio sets, video cameras, electrical and electronic toys, small electrical and electronic tools, small medical devices, small monitoring and control instruments
<b>Small IT</b>	Typical equipment includes mobile phones, Global Positioning Systems (GPS), pocket calculators, routers, personal computers, printers, telephones

# Data sources for e-waste collected and recycled through official takeback system



<i>UNU Key</i>	<i>Description</i>	<i>EU-6 classification</i>	<i>Average weight (kg)</i>
0001	Central Heating (household installed)	Large equipment	30.85
0002	Photovoltaic Panels (incl. converters)	Large equipment	17
0101	Professional Heating & Ventilation (excl. cooling equipment)	Large equipment	124.61
0102	Dishwashers	Large equipment	43.3
0103	Kitchen (f.i. large furnaces, ovens, cooking equipment)	Large equipment	47.66
0104	Washing Machines (incl. combined dryers)	Large equipment	72.54
0105	Dryers (wash dryers, centrifuges)	Large equipment	45.98
0106	Household Heating & Ventilation (f.i. hoods, ventilators, space heaters)	Large equipment	12.14
0108	Fridges (incl. combi-fridges)	Cooling and Freezing	40.79
0109	Freezers	Cooling and Freezing	44.09
0111	Air Conditioners (household installed and portable)	Cooling and Freezing	26.7
0112	Other Cooling (f.i. dehumidifiers, heat pump dryers)	Cooling and Freezing	41.7
0113	Professional Cooling (f.i. large air conditioners, cooling displays)	Cooling and Freezing	110.1
0114	Microwaves (incl. combined, excl. grills)	Small equipment	22.9
0201	Other Small Household (f.i. small ventilators, irons, clocks, adapters)	Small equipment	0.99

Table to convert units in weight

# Data sources for 'other recycling'



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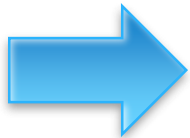


## ■ Countries with waste management laws

- E-waste usually registered as metal/plastic scrap, and mixed with other scrap.
- Estimations should determine how much e-waste is mixed with the other waste.

## ■ Developing countries

- Collection and recycling of e-waste by the informal sector is often not regulated.
- Hard to gather data on the informal e-waste sector.



Need to develop appropriate methodologies to collect and analyze data on e-waste collected outside the formal take back system both in developed and in developing countries.



- Typically small appliances containing the highest concentration of valuable materials.
- Data availability on e-waste in “waste bins” is rather poor in most countries.
  - The amount of e-waste retrieved from a sorting analysis is sometimes performed by national governments or municipalities.
  - Studies of residual waste are available for various countries – require regular update to monitor the trends of e-waste that ends up in mixed-waste from households.



- **Sources can be combined to:**
  - Provide complete coverage of registers and surveys
  - Avoid overlapping data collection
  - Harmonize data available in different administrative bodies
- **Minimize problems:**
  - Harmonize definitions and classifications (e.g. EU6, EU10, UNU\_KEYS etc.)
  - Integrate data collection systems (e.g. harmonisation of reporting obligations)



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Thank you for your attention!