

MONITORING GLOBAL TRANSBOUNDARY E-WASTE FLOWS

Elena D'Angelo

14 September 2022 – *Unwaste* webinar



Sustainable Cycles (SCYCLE) Programme



Vision

to enable societies to reduce the environmental load of production, including but not limited to the use and disposal of electrical and electronic equipment, to sustainable levels through independent, comprehensive, and practical research that provides facts for more thorough policy development and decision-making

SCYCLE Work

Quantification



- [Global and Regional E-waste Monitors](#)
- [National country studies](#)
- [E-waste statistics Guidelines](#)
- [Person in Port](#)
- [ProSUM](#)

Capacity building and trainings

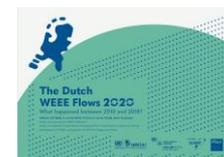
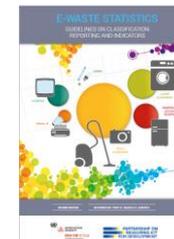


- [E-waste Academies EWAM & EWAS](#)
- [E-]waste Academy against Environmental Crime (to counter illegal management of [e-]waste)
- [Workshops on E-waste statistics](#)

Policy advice & Partnerships



- Studies on Article 7 & 11 and review of the WEEE Directive
- UN E-waste Coalition
- Global E-waste Statistics Partnership



SCYCLE - 10 years of applied research on waste crime - illicit trafficking and management of waste



2013



2022



2022/23



Global Transboundary E-waste Flows Monitor 2022

Authors:

C.P. Baldé, E. D'Angelo, V. Luda, O. Deubzer, and R. Kuehr



REPORT MAIN OBJECTIVES



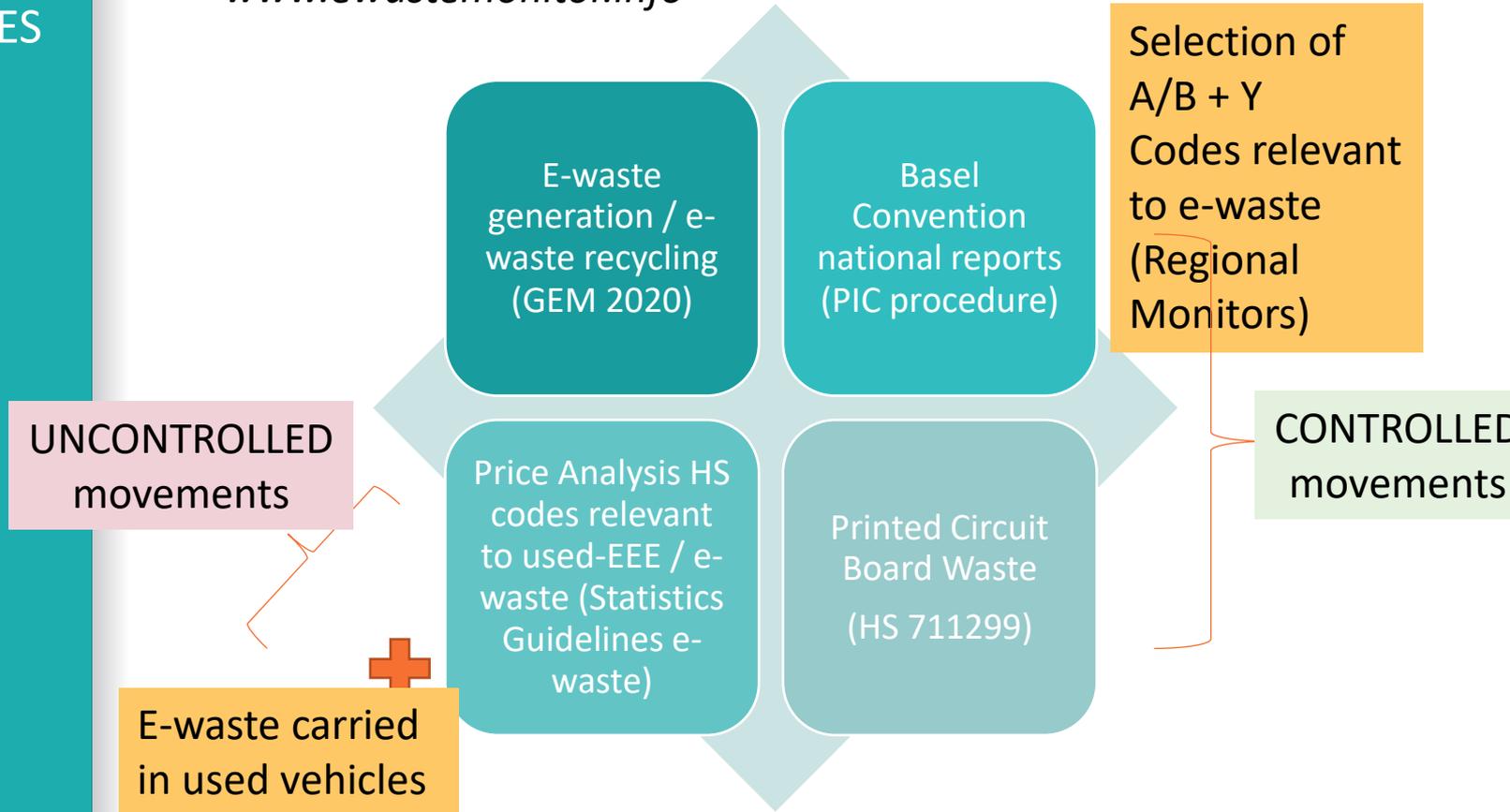
1. Improve the current estimate on the TBM of e-waste



2. Improve the data on lost value of mismanaged e-waste at global level

DATA SOURCES

www.ewastemonitor.info



EEE / e-waste:

6 categories based on EU WEEE Directive



Category 1: Temperature exchange equipment

More commonly referred to as cooling and freezing equipment. Typical equipment includes refrigerators, freezers and air conditioners, and heat pumps.



Category 2: Screens, monitors, and equipment containing screens (..)

Typical equipment includes televisions, monitors, laptops and tablets.



Category 3: Lamps

Typical equipment includes fluorescent lamps, LED lamps.



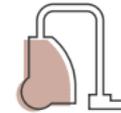
Category 4: Large equipment

Typical equipment includes washing machines, clothes dryers, dish washing machines, large printing devices and photovoltaic panels.



Category 6: Small IT and telecommunication equipment

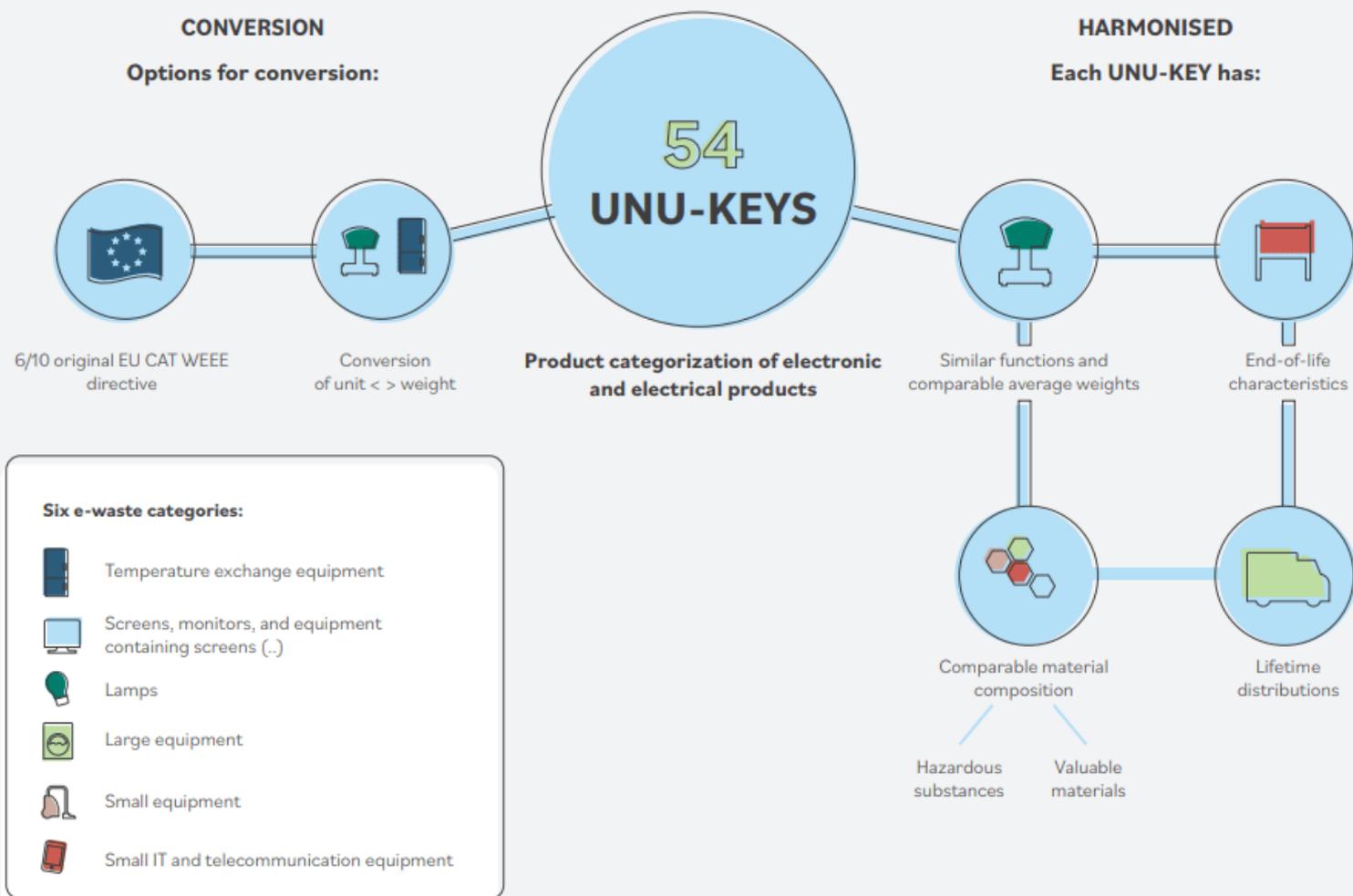
Typical equipment includes mobile phones, personal computers, printers, game consoles, calculators, and other small IT equipment.



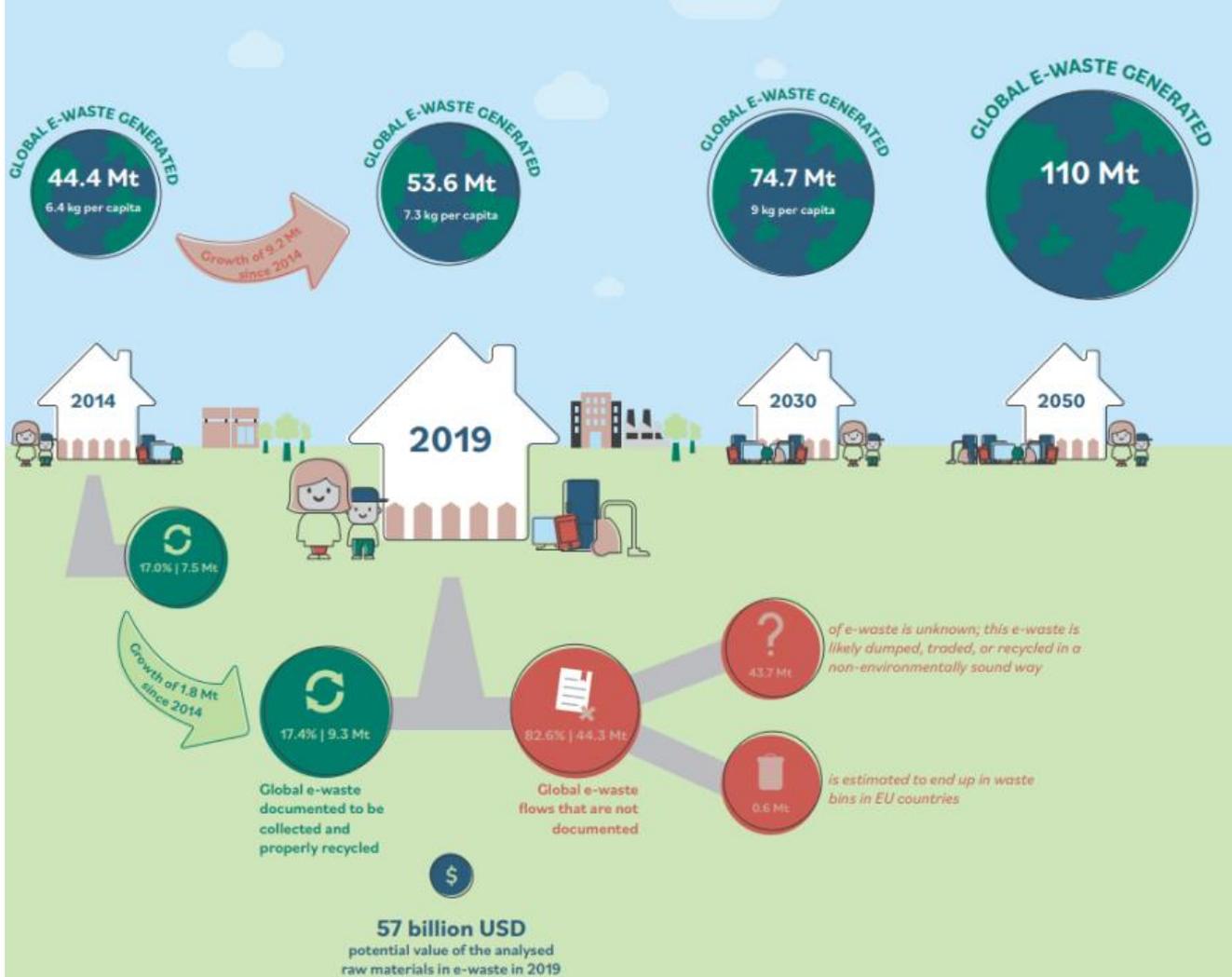
Category 5: Small equipment

Typical equipment includes vacuum cleaners, microwaves, ventilation equipment, toasters, electric kettles, electric shavers, scales, electric toys, small medical devices and control instruments.

UNU Keys categorization



Global e-waste flows



Why do unmanaged flows of e-waste increase?

1. Increasing volumes of e-waste

2. Absence of specific e-waste legislation

3. Limitations of e-waste management infrastructure

4. Competition formal VS informal sector for valuable e-waste fractions

5. Legal & Illegal import – export issues

6. Mixing of e-waste with other waste streams

Stakeholder consultation

- Preliminary results of the analysis, a set of selected stakeholders have been contacted for in-depth online interviews.
- Representatives of the enforcement sector and international experts, smelting industry, with field experience and operational knowledge on the topic of transboundary movements, including of e-waste and used-EEE.
- Operate in the main exporting hotspots such as Belgium, Germany, Netherlands, and the United Kingdom – and have ground experience in main importing hubs in Asia and Africa.

Global E-waste Flows



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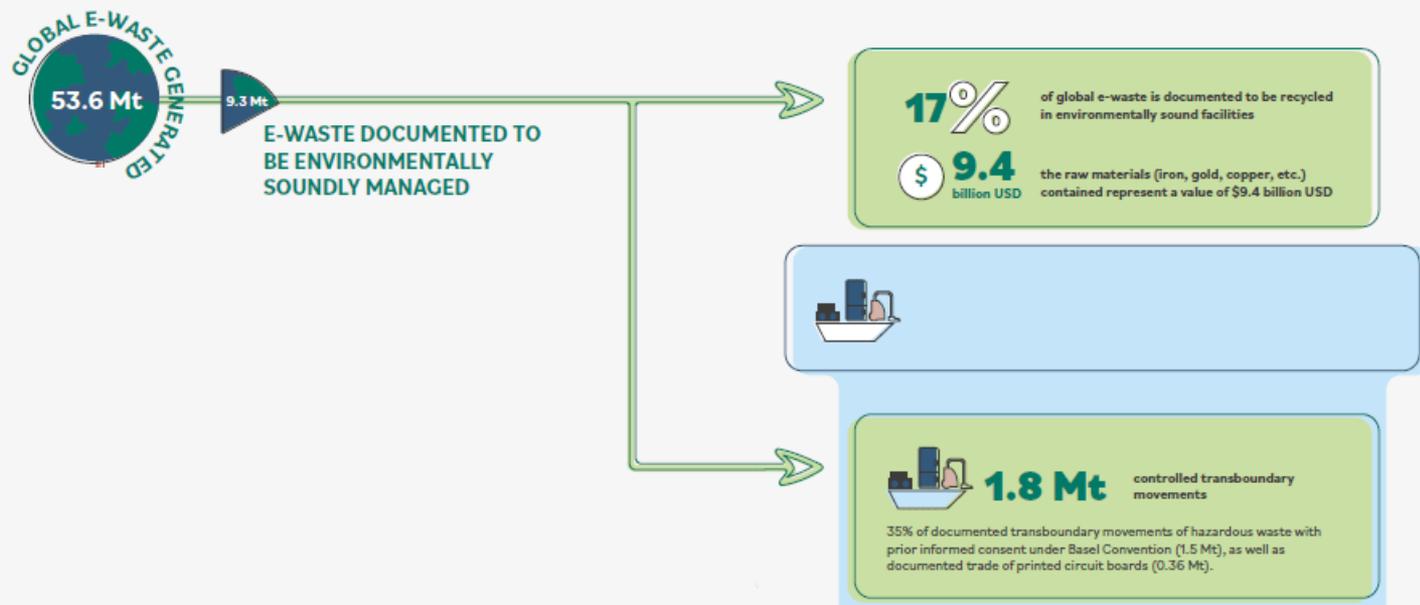
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Global E-waste Flows



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UNU-VIE SCYCLE

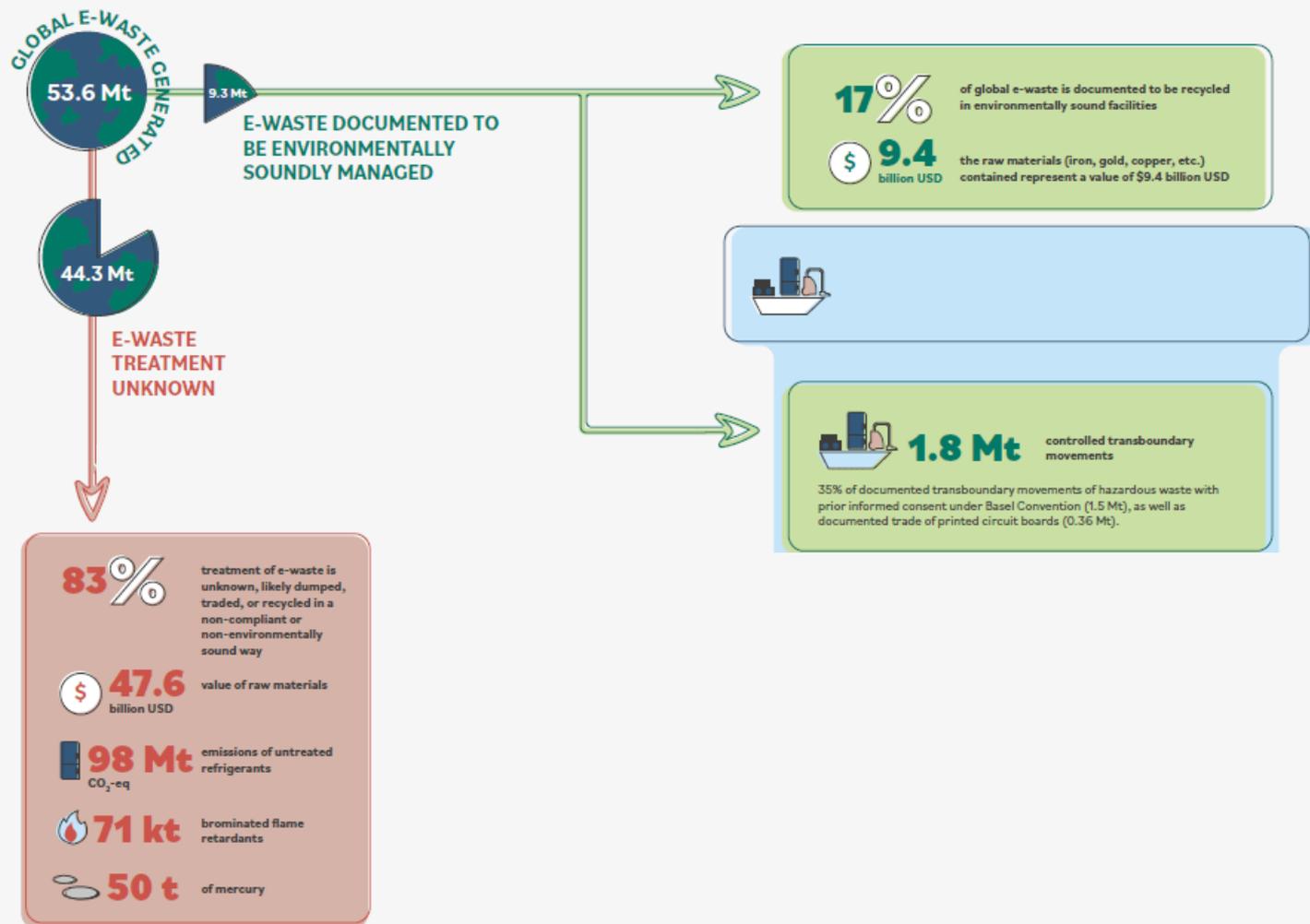
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Global E-waste Flows



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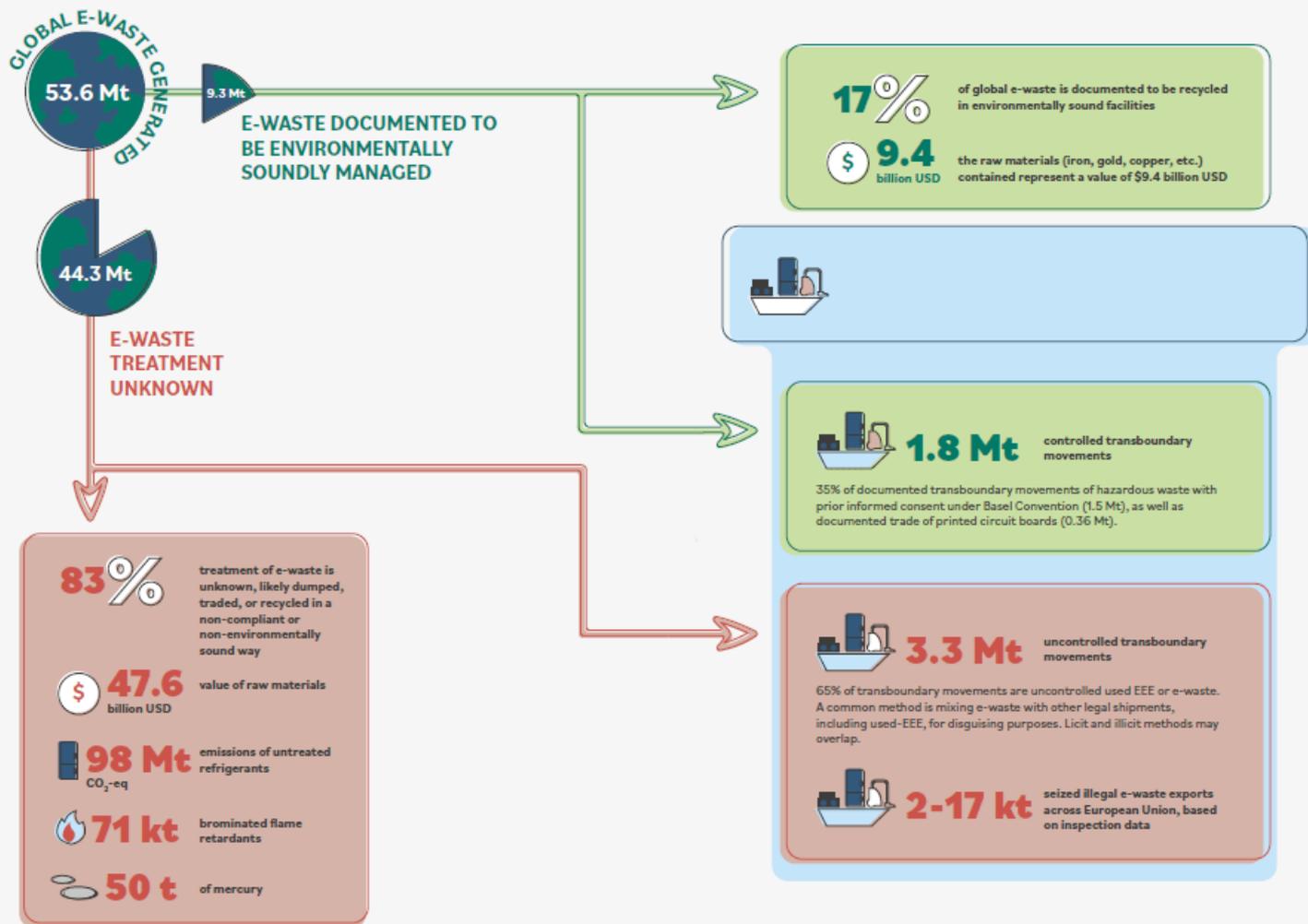
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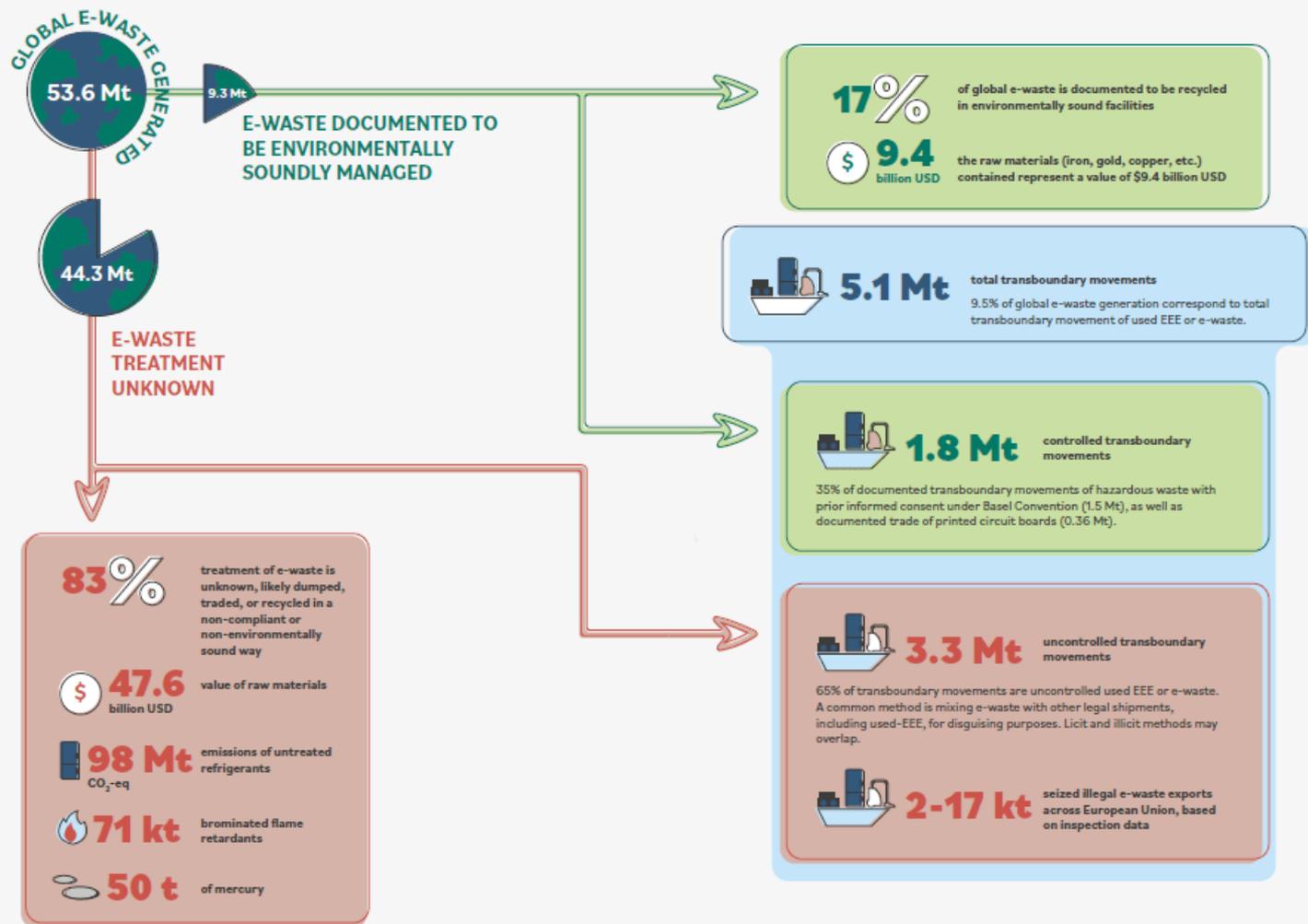
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Global E-waste Flows



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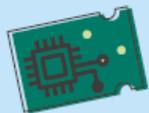
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Waste Printed Circuit Boards



1.2 Mt
EMBEDDED PRINTED
CIRCUIT BOARDS

0.2 Mt
COLLECTION BY
FORMAL SECTOR



0.2 Mt
COLLECTION BY
INFORMAL SECTOR



0.4 Mt
LIKELY TO BE ENVIRONMENTALLY
SOUNDLY MANAGED

34%

of global printed circuit boards is documented to be recycled in environmentally sound facilities



High risk of cherry picking
Valuable parts are collected and shipped for proper treatment, but there is not much money left for treating the rest of the (hazardous) e-waste components



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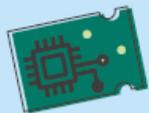
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Transboundary movements

Printed circuit boards are separated from e-waste and exported to countries where specialist recyclers are located

0.36 Mt

Printed circuit boards are not high in the list of export controls, as hazardous materials in it are mostly destroyed during the melting process



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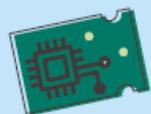
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Waste Printed Circuit Boards



1.2 Mt
EMBEDDED PRINTED
CIRCUIT BOARDS



0.8 Mt
WITH UNKNOWN
TREATMENT

0.2 Mt
COLLECTION BY
FORMAL SECTOR



0.2 Mt
COLLECTION BY
INFORMAL SECTOR



0.4 Mt
LIKELY TO BE ENVIRONMENTALLY
SOUNDLY MANAGED

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66% of treatment of printed circuit boards is unknown:

- Waste printed circuit boards are undocumented, but still may be treated environmentally sound
- Waste printed circuit boards that are separated and recycled with backyard techniques
- Embedded waste printed circuit boards in e-wastes that are likely to be dumped or recycled in a non-compliant or non-environmentally sound way



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AMERICAS

13.1 Mt (13.3 kg/inh) e-waste generated.
1.2 Mt (9%) documented to be environmentally soundly managed.
0.55 Mt (3%) imports.
0.39 Mt (4%) exports.

North America imports printed circuit boards waste, as several specialized recyclers are based in the region. Central America, South, and North America export printed circuit board waste. The lack of information may hinder a better understanding of and improve the e-waste problem in the region.



► **Uncontrolled e-waste used-EEE**

● Import
○ Export



► **Movement of hazardous e-waste with prior informed consent under Basel Convention**

● Import
○ Export



► **Printed Circuit Board Waste**

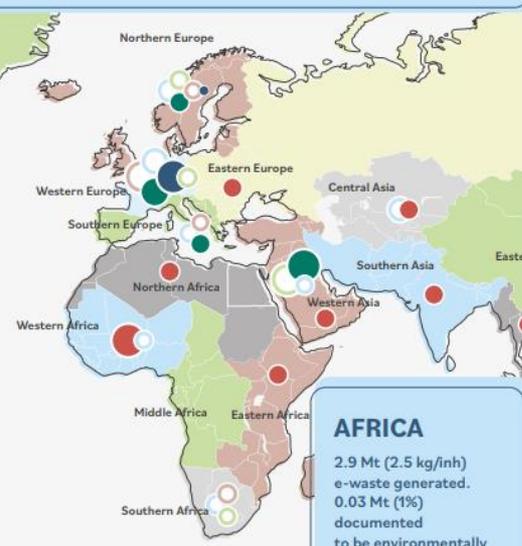
● Import
○ Export

EUROPE

12 Mt (16.2 kg/inh) e-waste generated.
5.1 Mt (42%) documented to be environmentally soundly managed.

1.2 Mt (10%) imports.
1.9 Mt (15%) exports.

Europe has the main exporting hubs for controlled and uncontrolled e-waste, as well as the capacity to treat e-waste and printed circuit board waste.



AFRICA

2.9 Mt (2.5 kg/inh) e-waste generated.
0.03 Mt (1%) documented to be environmentally soundly managed.
0.55 Mt (19%) imports.
0.13 Mt (5%) exports.

Very little reporting of transboundary movement of e-waste exists in the African continent. This may be due to either low levels of reporting or to imported used-EEE becoming waste while already in the region.

ASIA

24.9 Mt e-waste generated.
2.9 Mt (12%) documented to be environmentally soundly managed.
2.9 Mt (12%) imports.
2.8 Mt (10%) exports.

Eastern Asia imports hazardous e-waste and waste printed circuit boards, also through intra-regional trade. "Increasingly, flows of e-waste from East to Southeast Asia, follow similar logics like flows from Europe to African countries."



OCEANIA

0.7 Mt (16.1 kg/inh) e-waste generated.
0.06 Mt (9%) documented to be environmentally soundly managed.
0 Mt (0%) imports.
0.021 Mt (3%) exports.

Oceania exports printed circuit board waste, but has a low level of reporting on other transboundary flows. The lack of information may hinder a better understanding of and improve the e-waste problem in the region.





➤ Printed Circuit Board Waste



Flow within the region



► Movement of hazardous e-waste with prior informed consent under Basel Convention



Flow within the region



> Uncontrolled
e-waste used-EEE

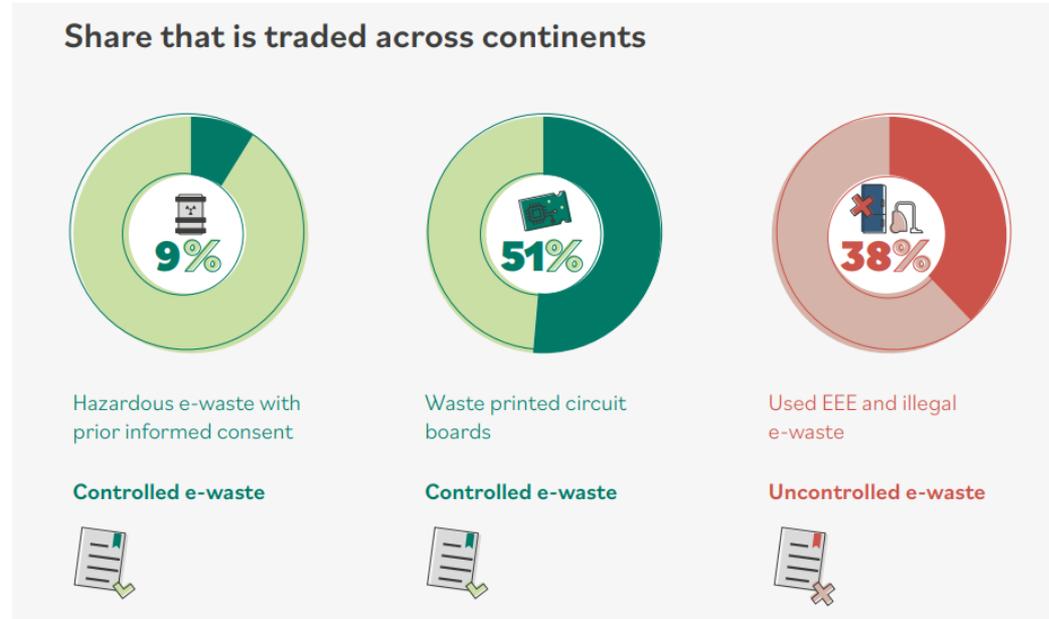


Flow within the
region

“

“In the current world, post-pandemic and with the geopolitical escalations and the increasing prices of fuels and energy, we might expect even more intra-regional waste trade taking place”

*Interviewed stakeholders
– investigator*



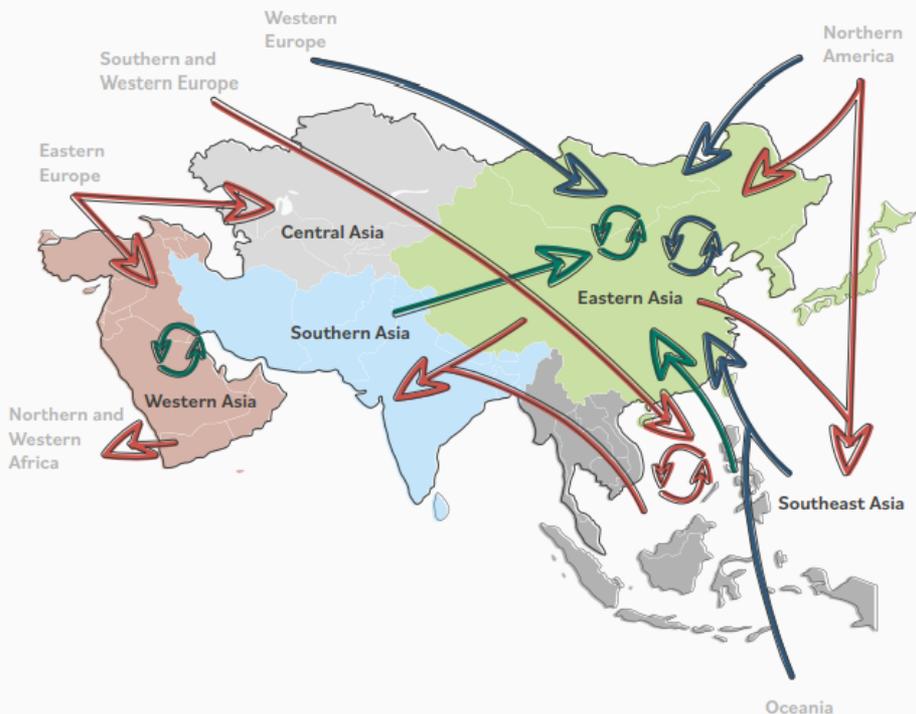
E-waste flows in South-East Asia and Europe

Elise Vermeersch

14 September 2022 – *Unwaste* webinar



Asia



INDICATORS ASIA

Waste generation (Mt)

Total e-waste	24.9
Embedded Waste Printed Circuit Board	0.6

Environmental sound collection and recycling (Mt)

Total e-waste	2.9
Printed Circuit Board Waste	0.1

Not environmental sound managed e-waste (Mt)

Total e-waste	22.0
Embedded and Printed Circuit Board Waste	0.5

Environmental sound collection and recycling rates

Total e-waste	12%
Printed Circuit Board Waste	17%

Not environmental sound managed rates

Total e-waste	88%
Printed Circuit Board Waste	83%

TRANSBOUNDARY MOVEMENT BETWEEN COUNTRIES (kt)

Total Exports 2 537

<i>Controlled</i>	
E-waste reported as hazardous	1 038
Printed Circuit Board Waste	36
<i>Uncontrolled</i>	
Undocumented exports of mixed used EEE and e-waste	1 463

Total Imports 2 889

<i>Controlled</i>	
E-waste reported as hazardous	964
Printed Circuit Board Waste	111
<i>Uncontrolled</i>	
Undocumented exports of mixed used EEE and e-waste	1 814

INHABITANTS (MILLION)

4 445

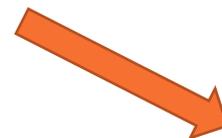
East and South-East Asia as hubs for TBM in the region

Asia generated 24.9 Mt of e-waste annually, with 561 kt printed circuit boards embedded.

Only 2.9 Mt of e-waste are documented as being treated in environmentally sound facilities.

Main issues:

- lack of e-waste management and infrastructure
- presence of informal sector in competition with the formal one for valuable components



Most transboundary movement can be observed around **East Asia and Southeast Asia**

Emerging phenomenon of intra-regional trade of e-waste

East Asia

imports ~1 Mt
exports ~0.9 Mt

Southeast Asia

imports ~1.1 Mt
exports ~1.0 Mt

In 2019, SEA imported 1139 KT of e-waste and UEEE:

- 713 kt were hazardous e-waste imported under the PIC procedure
- 180 kt where undocumented e-waste or used-EEE
- 118 kt where high-value components - printed circuit board waste

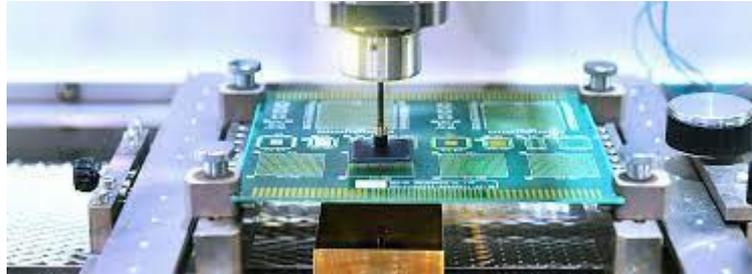
Imported e-waste and used-EEE corresponds to 32% of the e-waste generated in the region.

Data reveal an emerging phenomenon of intra-regional trade of e-waste in the Asian continent.

Importance of the EEE industry

ASEAN is a significant hub of EEE production

- contributing \$268 billion to regional GDP
- employing more than 2.4 million workers
- accounting for the largest share of ASEAN's total exports (27%)



Main challenges in SEA

- **East Asia exports uncontrolled e-waste to Southeast Asia and Southern Asia.**
- Recipient countries do not have the capacities to treat e-waste in an ESM, leading to **significant burden on the environment** and to the **loss of valuable resources.**
- Flows from East Asia to Southeast Asia follow the same driving factors as from Europe to West Africa, namely demand for second-hand electronics; lower costs for processing, disposing, dismantling; etc.



Main challenges in SEA

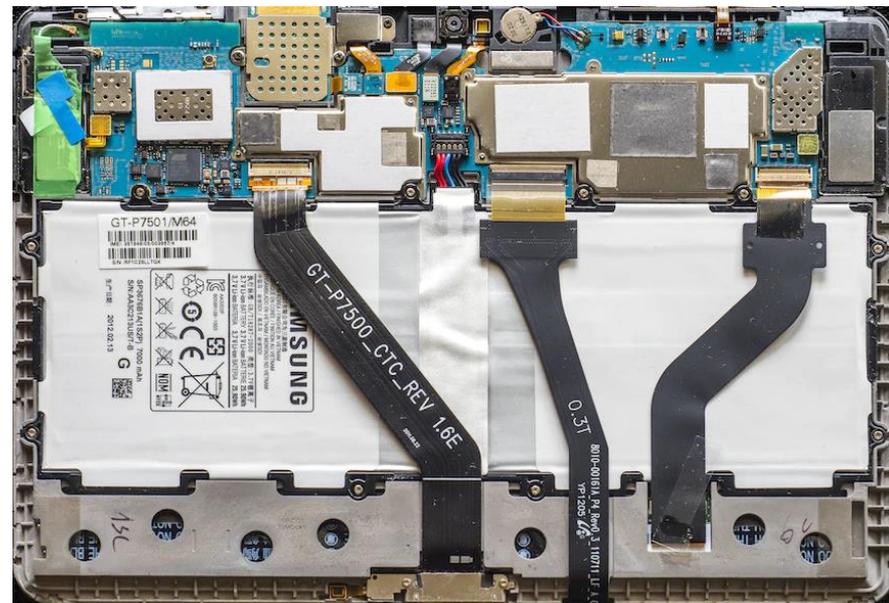
- Southeast Asia, similarly to North Africa, is an **emerging hub for re-exporting e-waste**.
- There is possible **intra-regional trade of low quality or counterfeit EEE**.
- After the China ban, the main imports of e-waste have shifted from China to Malaysia, Vietnam, and Thailand.



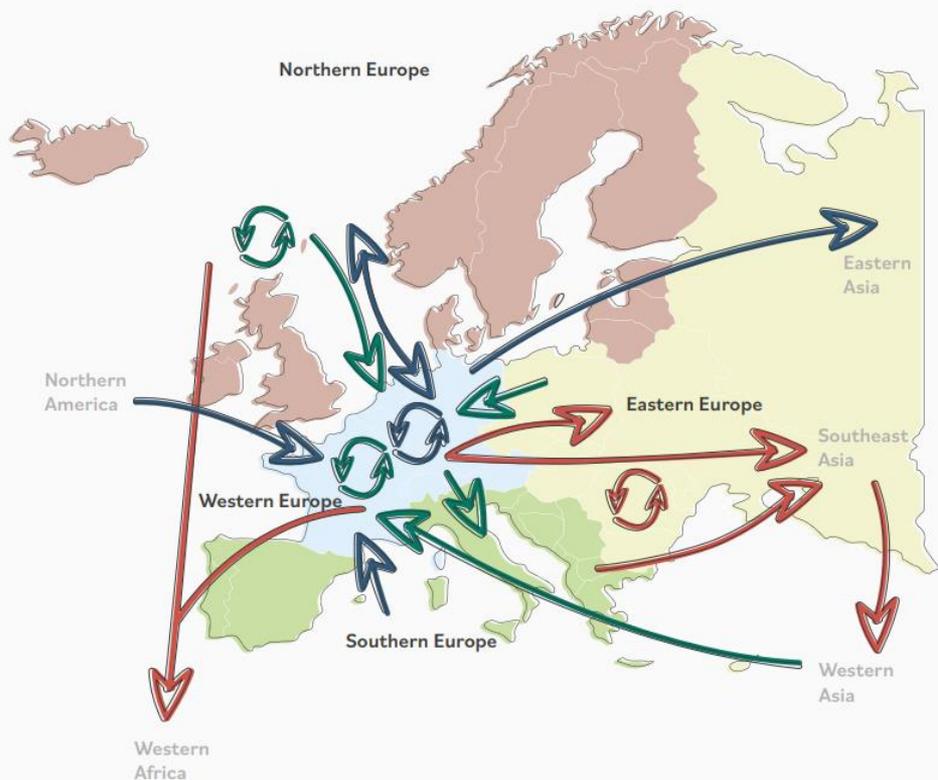
Flows of printed circuit boards

Southeast Asia sends the most valuable parts (PCB waste) back to manufacturing countries in East Asia for recycling of mainly precious metals and copper as secondary raw materials.

Treatment facilities in East Asia also receive PCB waste from Western Europe and North America.



Europe



INDICATORS EUROPE

Waste generation (Mt)

Total e-waste	12.0
Embedded Waste Printed Circuit Board	0.3

Environmental sound collection and recycling (Mt)

Total e-waste	5.1
Printed Circuit Board Waste	0.2

Not environmental sound managed e-waste (Mt)

Total e-waste	6.9
Embedded and Printed Circuit Board Waste	0.1

Environmental sound collection and recycling rates

Total e-waste	42%
Printed Circuit Board Waste	61%

Not environmental sound managed rates

Total e-waste	58%
Printed Circuit Board Waste	39%

TRANSBOUNDARY MOVEMENT BETWEEN COUNTRIES (kt)

Total Exports	1 850
<i>Controlled</i>	
E-waste reported as hazardous	375
Printed Circuit Board Waste	184
<i>Uncontrolled</i>	
Undocumented exports of mixed used EEE and e-waste	1 290
Total Imports	1 248
<i>Controlled</i>	
E-waste reported as hazardous	457
Printed Circuit Board Waste	172
<i>Uncontrolled</i>	
Undocumented exports of mixed used EEE and e-waste	619

INHABITANTS (MILLION)

740

Thank you for your attention!

Any question?



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