UNITED NATIONS UNIVERSITY

UNU-VIE SCYCLE

Sustainable Cycles Programme

SCYCLE

Programme

E-waste statistics

General principles of e-waste statistics

Michelle Wagner

November, 2019 – Regional Workshop on Environment Statistics and Climate Change Statistics for the CARICOM Region - Grenada

UNU-Vie-SCYCLE – Key Projects & Activities

1. Policy advice

- European Commission (2007, 2014 & 2015)

2. SDG & E-waste Statistics

- Global E-waste Statistics Partnership
- Global E-waste Monitor (2017, 2014)
- Regional E-waste Studies: East and Southeast Asia (2017), Latin America (2018, 2015)

3. Capacity building and training

- E-waste Academies for Managers (EWAM) & Scientists (EWAS) (Global, since 2009)

4. Facilitating International Dialogue

- Hosting StEP Secretariat: Solving the e-waste problem (Global, since 2004)
- UN E-waste: towards a joint e-waste effort of UN organizations (Global, since 2016)

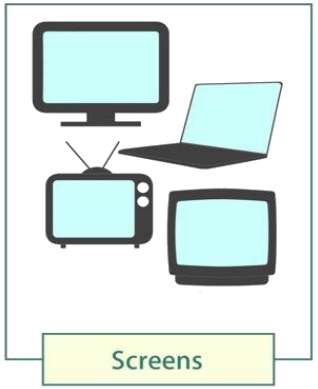
Outline

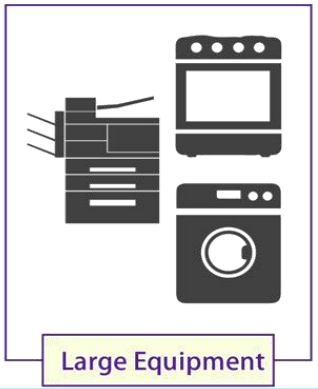
Harmonized framework to measure e-waste

Main principles on e-waste statistics

Tools to assist in e-waste statistics

What is e-waste





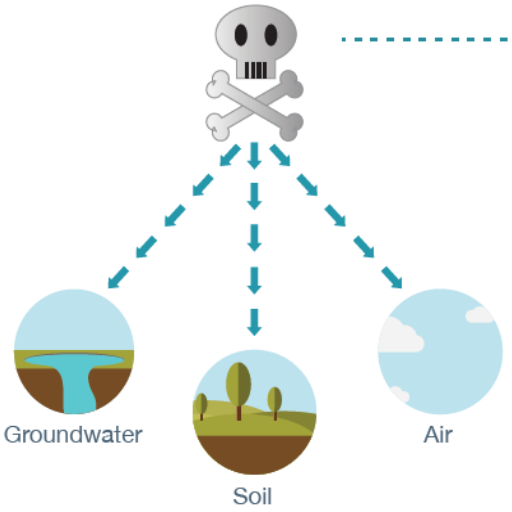
"E-waste, refers to all items of electrical and electronic equipment (EEE) and its parts that have been discarded by its owner as waste without the intent of re-use"

E-waste global problems

1. Hazardous materials in e-waste

e.g. fridges, phones, laptops, washing machines, sensors, TVs, lamps

- Heavy metals (such as mercury, lead, cadmium etc.)
- Chemicals (such as CFCs/chlorofluorocarbon or various flame retardants)

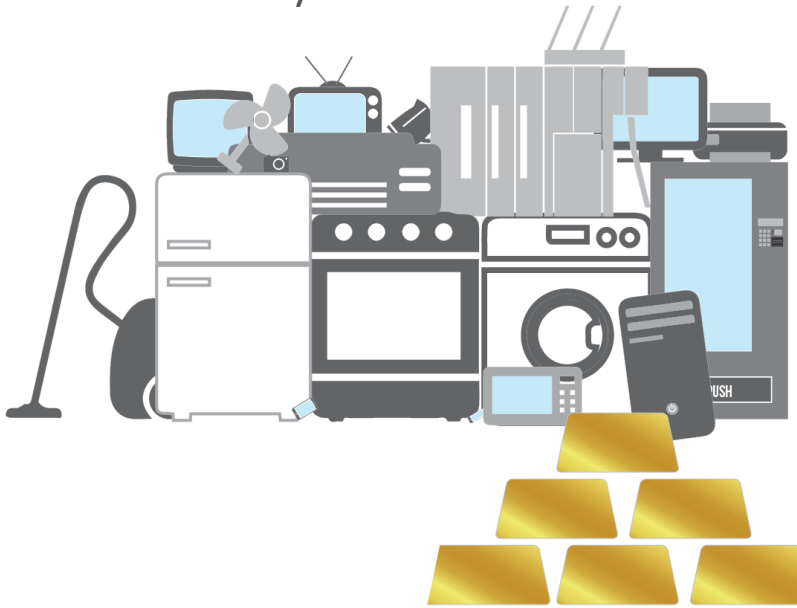


E-waste can pose considerable environmental and health risks.

E-waste global problems:

2. Losses of valuable material

- Precious metals including gold, silver, copper, platinum and palladium
- Valuable bulky materials such as iron and aluminum, and plastics



Estimated value of raw materials at

55 BILLION EUROS

E-waste quantities:

Overview of global e-waste quantities

44.7 Mt
Of e-waste generated in 2016

=

4500 Eiffel Towers

9 Mt are collected by official take back systems

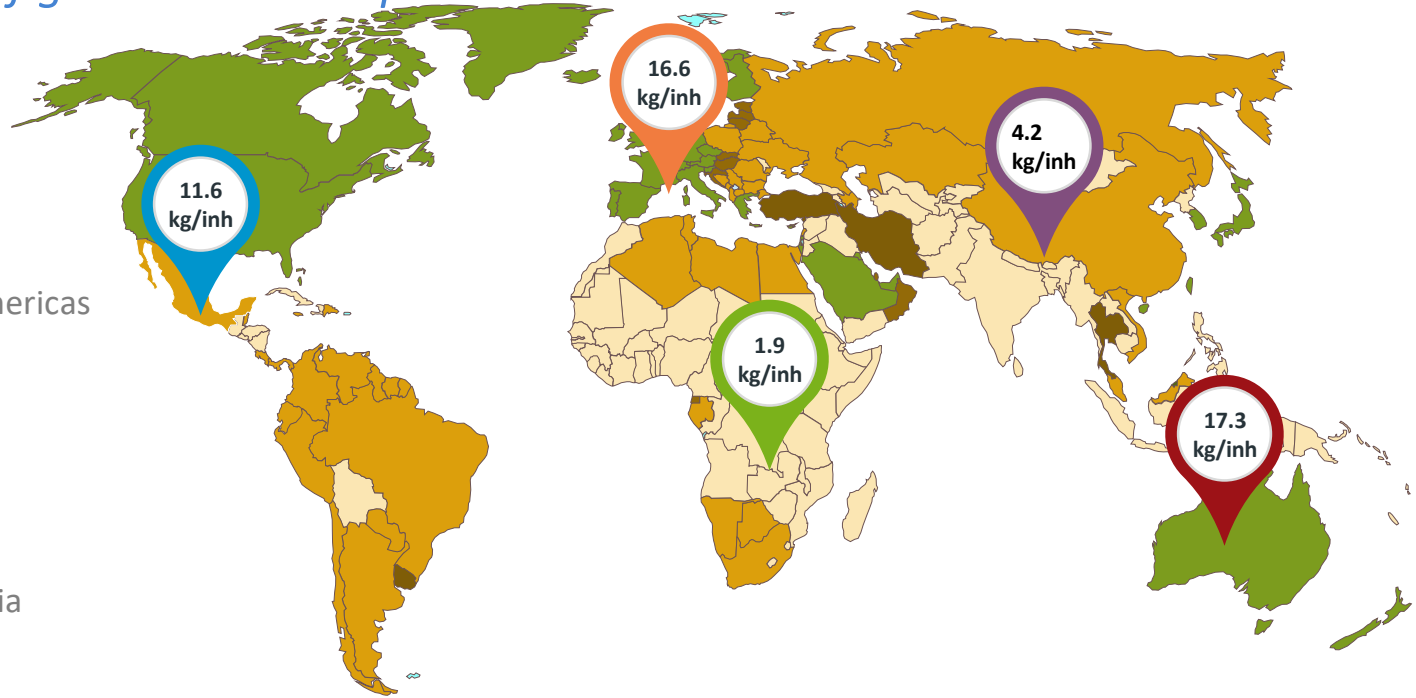
2 Mt end up in waste bins

Flows outside official take-back systems

1. Collection outside official take-back systems in countries is still unknown
2. Transboundary movements is still unknown
3. Informal collection system in countries is still unknown

E-waste quantities 2016:

Overview of global e-waste quantities

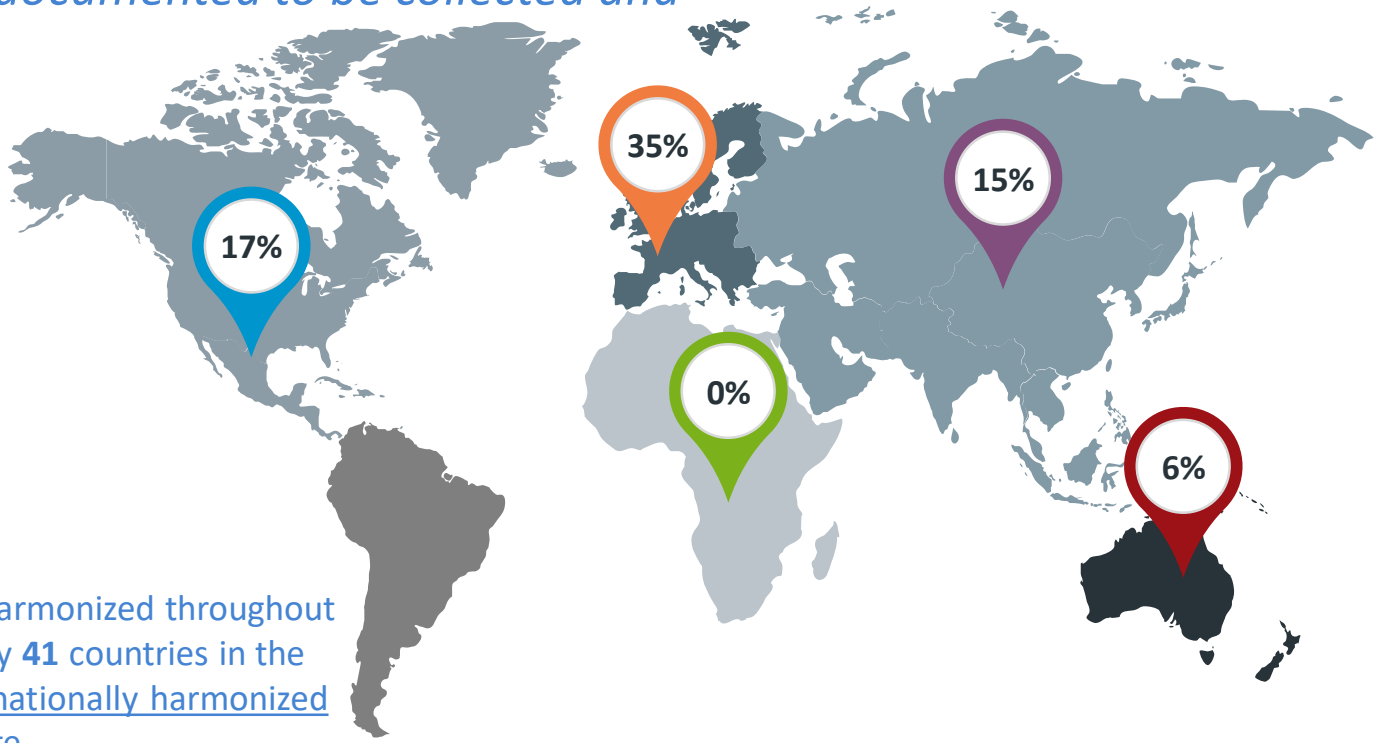


Source: global e-waste monitor 2017, UNU/ITU/ISWA

E-waste quantities 2016:

E-waste officially documented to be collected and recycled

- The Americas
- Europe
- Africa
- Asia
- Australia



Statistics are not harmonized throughout the countries : Only **41** countries in the world collect internationally harmonized statistics on e-waste

Source: global e-waste monitor 2017, UNU/ITU/ISWA

Harmonized framework to measure e-waste:

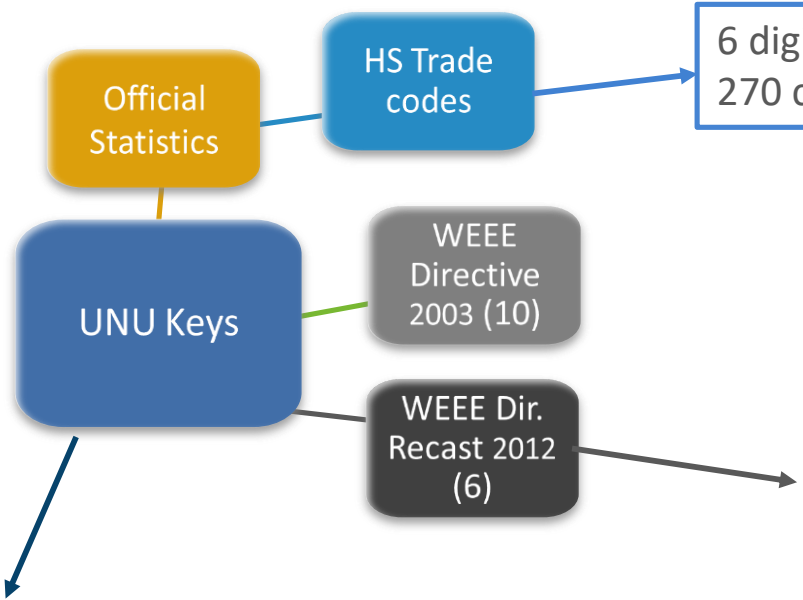
The Partnership Measuring ICT for Development

Support the compilation of reliable data on e-waste as a basis for political decision making and the environmentally sound management of used and end of life electric and electronic equipment.

- Objectives:
  - Develop a framework based on internationally defined indicators
  - Publish guidelines (in 2015 and 2018) http://collections.unu.edu/eserv/UNU:6477/RZ_EWaste_Guidelines_LoRes.pdf
  - Pilot questionnaires with UNECE, OECD and UNSD on e-waste following the principles of the framework.

Harmonized framework to measure e-waste:

UNU-KEYS Product classification



EU-6 Collection categories
(1) Temperature exchange equipment
(2) Screens and monitors
(3) Lamps
(4) Large equipment
(5) Small equipment
(6) Small IT

E-waste classification:

Link UNU-KEYS to the EU-6 Collection categories

UNU Key	Description	ANNEX III of Recast WEEE Directive	old EU-WEEE Directive
0001	Central Heating (household installed)	Large equipment	out of scope
0002	Photovoltaic Panels (incl. converters)	Large equipment	out of scope
0101	Professional Heating & Ventilation (excl. cooling equipment)	Large equipment	01
0102	Dishwashers	Large equipment	01
0103	Kitchen (f.i. large furnaces, ovens, cooking equipment)	Large equipment	01
0104	Washing Machines (incl. combined dryers)	Large equipment	01
0105	Dryers (wash dryers, centrifuges)	Large equipment	01
0106	Household Heating & Ventilation (f.i. hoods, ventilators, space heaters)	Large equipment	01
0108	Fridges (incl. combi-fridges)	Cooling and Freezing	01
0109	Freezers	Cooling and Freezing	01
0111	Air Conditioners (household installed and portable)	Cooling and Freezing	01
0112	Other Cooling (f.i. dehumidifiers, heat pump dryers)	Cooling and Freezing	01
0113	Professional Cooling (f.i. large air conditioners, cooling displays)	Cooling and Freezing	01
0114	Microwaves (incl. combined, excl. grills)	Small equipment	01
0201	Other Small Household (f.i. small ventilators, irons, clocks, adapters)	Small equipment	02
0202	Food (f.i. toaster, grills, food processing, frying pans)	Small equipment	02
0203	Hot Water (f.i. coffee, tea, water cookers)	Small equipment	02
0204	Vacuum Cleaners (excl. professional)	Small equipment	02
0205	Personal Care (f.i. tooth brushes, hair dryers, razors)	Small equipment	02
0301	Small IT (f.i. routers, mice, keyboards, external drives & accessories)	Small IT	03
0302	Desktop PCs (excl. monitors, accessories)	Small IT	03
0303	Laptops (incl. tablets)	Screens	03
0304	Printers (f.i. scanners, multifunctionals, faxes)	Small IT	03
0305	Telecom (f.i. (cordless) phones, answering machines)	Small IT	03
0306	Mobile Phones (incl. smartphones, pagers)	Small IT	03
0307	Professional IT (f.i. servers, routers, data storage, copiers)	Large equipment	03
0308	Cathode Ray Tube Monitors	Screens	03
0309	Flat Display Panel Monitors (LCD, LED)	Screens	03
0401	Small Consumer Electronics (f.i. headphones, remote controls)	Small equipment	04
0402	Portable Audio & Video (f.i. MP3, e-readers, car navigation)	Small equipment	04
0403	Music Instruments, Radio, HiFi (incl. audio sets)	Small equipment	04
0404	Video (f.i. Video recorders, DVD, Blue Ray, set-top boxes)	Small equipment	04
0405	Speakers	Small equipment	04
0406	Cameras (f.i. camcorders, photo & digital still cameras)	Small equipment	04
0407	Cathode Ray Tube TVs	Screens	04
0408	Flat Display Panel TVs (LCD, LED, Plasma)	Screens	04
0501	Lamps (f.i. pocket, Christmas, excl. LED & incandescent)	Lamps	05
0502	Compact Fluorescent Lamps (incl. retrofit & non-retrofit)	Lamps	05
0503	Straight Tube Fluorescent Lamps	Lamps	05
0504	Special Lamps (f.i. professional mercury, high & low pressure sodium)	Lamps	05
0505	LED Lamps (incl. retrofit LED lamps & household LED luminaires)	Lamps	05
0506	Household Luminaires (incl. household incandescent fittings)	Small equipment	05
0507	Professional Luminaires (offices, public space, industry)	Small equipment	05
0601	Household Tools (f.i. drills, saws, high pressure cleaners, lawn mowers)	Small equipment	06
0602	Professional Tools (f.i. for welding, soldering, milling)	Large equipment	06
0701	Toys (f.i. car racing sets, electric trains, music toys, biking computers)	Small equipment	07
0702	Game Consoles	Small IT	07
0703	Leisure (f.i. large exercise, sports equipment)	Large equipment	07
0801	Household Medical (f.i. thermometers, blood pressure meters)	Small equipment	08
0802	Professional Medical (f.i. hospital, dentist, diagnostics)	Large equipment	08
0901	Household Monitoring & Control (alarm, heat, smoke, excl. screens)	Small equipment	09
0902	Professional Monitoring & Control (f.i. laboratory, control panels)	Large equipment	09
1001	Non Cooled Dispensers (f.i. for vending, hot drinks, tickets, money)	Large equipment	10
1002	Cooled Dispensers (f.i. for vending, cold drinks)	Cooling and Freezing	10

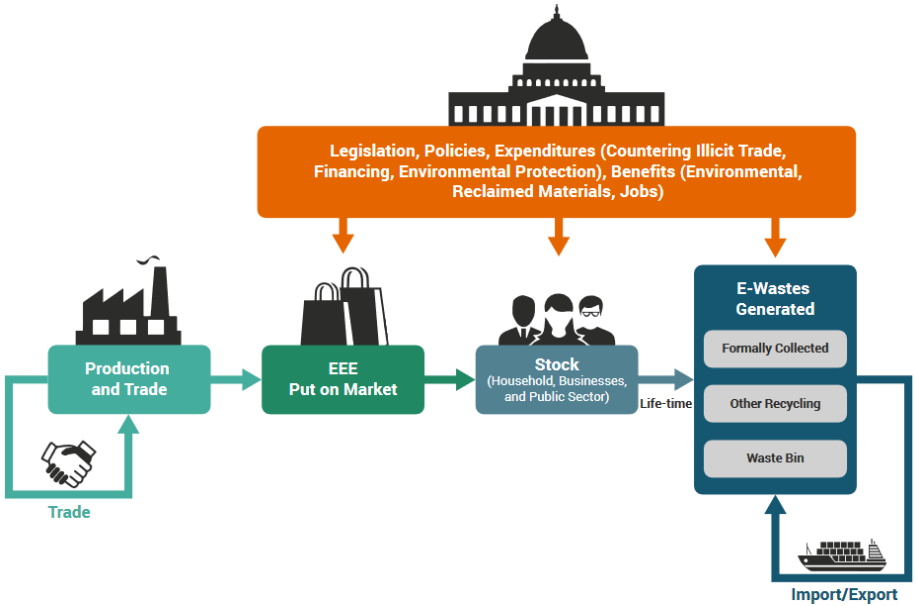
E-waste classification:

Link UNU-KEYS to the HS codes

UNU-KEY	UNU Key Description	HS	HS Description
0101	Professional Heating & Ventilation (excl. cooling equipment)	845110	Dry-cleaning machines
0101	Professional Heating & Ventilation (excl. cooling equipment)	845130	Ironing machines and presses including fusing presses
0102	Dishwashers	842211	Dish washing machines (domestic)
0103	Kitchen (f.i. large furnaces, ovens, cooking equipment)	851660	Electric cooking, grilling & roasting equipment nes
0104	Washing Machines (incl. combined dryers)	845011	Automatic washing machines, of a dry capacity < 10 kg
0104	Washing Machines (incl. combined dryers)	845012	Washing machines nes, capacity <10 kg, built-in drier
0104	Washing Machines (incl. combined dryers)	845019	Household/laundry-type washing machines <10 kg, nes
0104	Washing Machines (incl. combined dryers)	845020	Household or laundry-type washing machines, cap >10kg
0105	Dryers (wash dryers, centrifuges)	842112	Clothes-dryers, centrifugal
0105	Dryers (wash dryers, centrifuges)	845121	Drying machines, capacity <10 kg, except washer-drier
0105	Dryers (wash dryers, centrifuges)	845129	Drying machines, nes
0106	Household Heating & Ventilation (f.i. hoods, ventilators, space heaters)	841460	Ventilating hoods having a maximum width < 120 cm
0106	Household Heating & Ventilation (f.i. hoods, ventilators, space heaters)	851621	Electric storage heating radiators

Framework on e-waste statistics:
flows

The framework can integrate the harmonized existing data at country level and can serve as the basis for e-wastes statistics and e-waste indicators

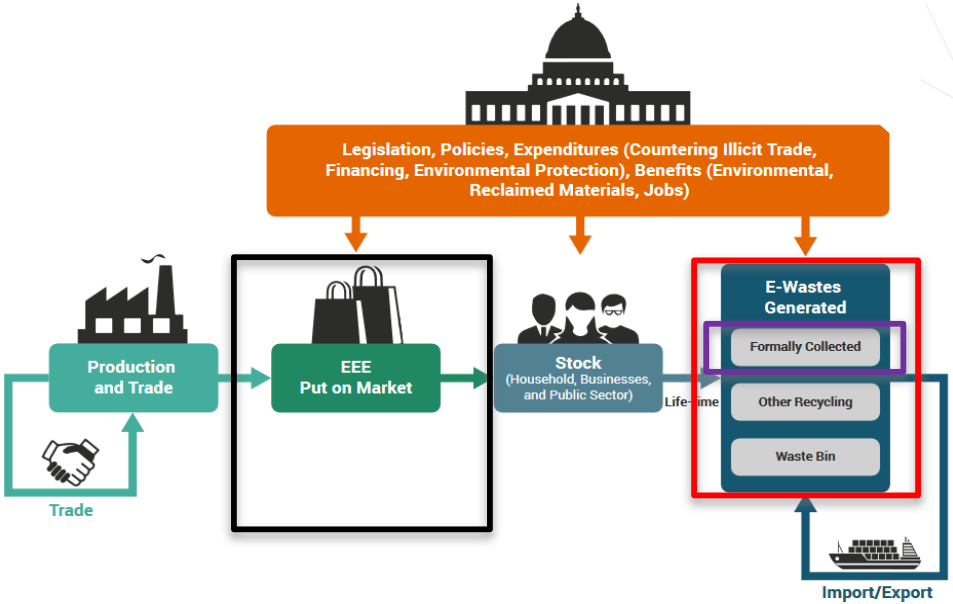


- In the model Stock and flows relate to one another
  - It allows to use data on possession, sales data or disposal
- The constructed indicators allows comparison between countries
- Some parameters can be transferred between countries (e.g. life span, market saturation, discarding behavior etc.)

Measure e-waste:

Indicators

Indicators arising from the measurement framework capture the most essential aspects of a country's performance of e-waste management



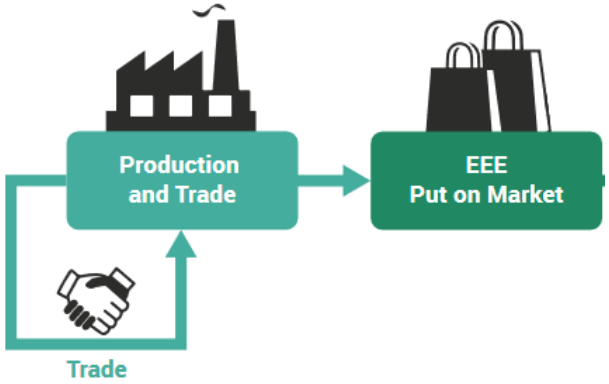
Indicators internationally identified

1. Total EEE Put on the Market (unit kg/inh)
2. E-waste generated (unit kg/inh)
3. E-waste formally collected (unit kg/inh)
4. E-waste collection rate (%)

$$= \frac{E\text{–waste formally collected (weight)}}{E\text{–waste generated (weight)}} x100$$

Track EEE sales

- Long time series, detailed for equipment
- Data collected and published by specific registers or custom organizations and/or national statistical institutes
- If not: “Apparent consumption method”:
- Link between trade statistics and national production statistics



$$POM\ (t) = Domestic\ production(t) + Imports(t) - Exports(t)$$

Track EEE stock

Equipment in households, business and public sector destined to become waste ("urban mine")

- Data available in national statistical institutes from households survey about:
  - Household possessions
  - Penetration rate
- Penetration rates of ICT use (statistics are compiled by ITU)

$$S(n) = \sum_{t=to}^{n} POM(t) - \sum_{t=to}^{n} \text{E waste generated } (n)$$

EEE life-time

(Time spent at household, business or public sector)

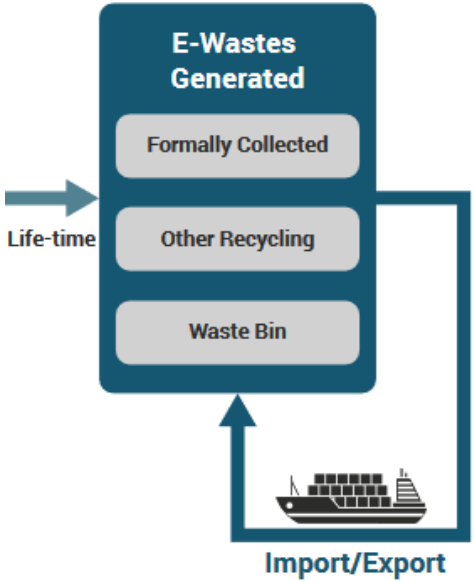
- Includes the exchange of second-hand equipment
- Possible data available from studies
- UNU calculates the lifespan using Weibull functions (Wang et al., 2013)
- Data can be measured with:
  - Household surveys
  - Waste collection points
  - Work with universities / Literature

Measure e-waste generated

EEE is disposed of after a certain lifetime and becomes e-waste (generated)

- Annual supply of e-waste generated prior to collection, without imports of externally generated EEE waste.
- E-waste generated in a given year in a specific country is based on:
  - Amount of EEE placed on the market (POM) in the preceding years
  - Corresponding product lifespan

$$E\ waste\ generated\ (n) = \sum_{t=t_0}^{n} POM\ (t) * L^{(p)}(t,n)$$



E-waste relation to SDGs

A better understanding and knowledge on e-waste will contribute to the achievement of several goals of the 2030 Agenda for Sustainable Development.

- Environmental protection
- Health
- Employment
- Economic growth

SDG 12.4.2

- Focuses on hazardous WG/capita + amount of hazardous waste treated by type of treatment
- The goal of this indicator is to **calculate** the **amount of hazardous WG/capita**, as well as the **amount of hazardous waste treated out of the total quantity generated**.

SDG 12.4.2

- The "**environmentally sound management of e-waste**" are performed under the requirements of **national e-waste legislation**.

- The national e-waste legislation ensures:
  - **hazardous elements are managed** in a manner which will **protect human health** and **the environment against adverse effects** resulting from improper e-waste disposal
  - **valuable fractions** are **recycled**.

SDG 12.4.2 Indicator

Preparation for reuse, treatment, recovery, including recycling, or export.

UNU methodology

- UNU developed a methodology to estimate:
  - EEE placed on the market (POM)
  - EEE stock
  - E-waste generated

- Countries can do their own estimates:
  - Methodology and scripts are published here for Europe: https://github.com/Statistics-Netherlands/ewaste
  - E-waste toolkit
  - Guidelines on how to track and measure e-waste flows http://collections.unu.edu/eserv/UNU:6477/RZ_EWaste_Guidelines_LoRes.pdf

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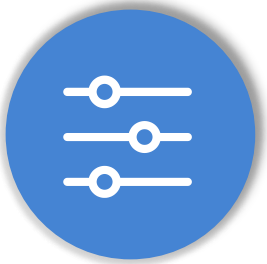
Introduction to the EEE Put on Market Tool

Michelle Wagner

November, 2019 – Regional Workshop on Environment Statistics and Climate Change Statistics for the CARICOM Region - Grenada

Outline

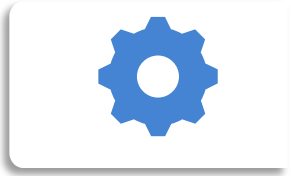


Introduction

Import of information

Tools functionality

Introduction

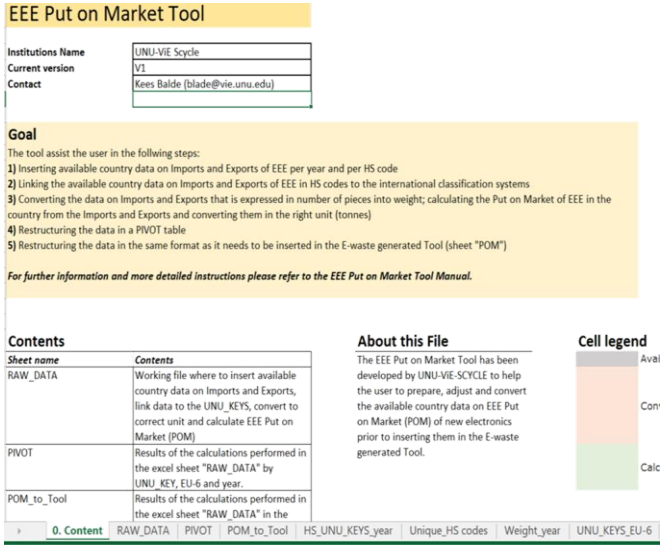


E-waste generated Tool uses Put on Market (POM) data of EEE to calculate the E-waste generated

The E-waste generated Tool is pre-populated with UNU's estimations of Put on Market data per country if national data is not available.

The "EEE Put on Market Tool" help the user to prepare, adjust and convert the available country data on Put on Market (POM) of electric and electronic equipment (EEE) prior to inserting it in the E-waste Generated Tool

Introduction



EEE Put on Market Tool

Institutions Name	UNU-ViE Scycle
Current version	V1
Contact	Kees Balde (blade@vie.unu.edu)

Goal

The tool assist the user in the follwing steps:
1) Inserting available country data on Imports and Exports of EEE per year and per HS code
2) Linking the available country data on Imports and Exports of EEE in HS codes to the international classification systems
3) Converting the data on Imports and Exports that is expressed in number of pieces into weight; calculating the Put on Market of EEE in the country from the Imports and Exports and converting them in the right unit (tonnes)
4) Restructuring the data in a PIVOT table
5) Restructuring the data in the same format as it needs to be inserted in the E-waste generated Tool (sheet "POM")

For further information and more detailed instructions please refer to the EEE Put on Market Tool Manual.

Contents

Sheet name	*Contents*
RAW_DATA	Working file where to insert available country data on Imports and Exports, link data to the UNU_KEYS, convert to correct unit and calculate EEE Put on Market (POM)
PIVOT	Results of the calculations performed in the excel sheet "RAW_DATA" by UNU_KEY, EU-6 and year.
POM_to_Tool	Results of the calculations performed in the excel sheet "RAW_DATA" in the

About this File

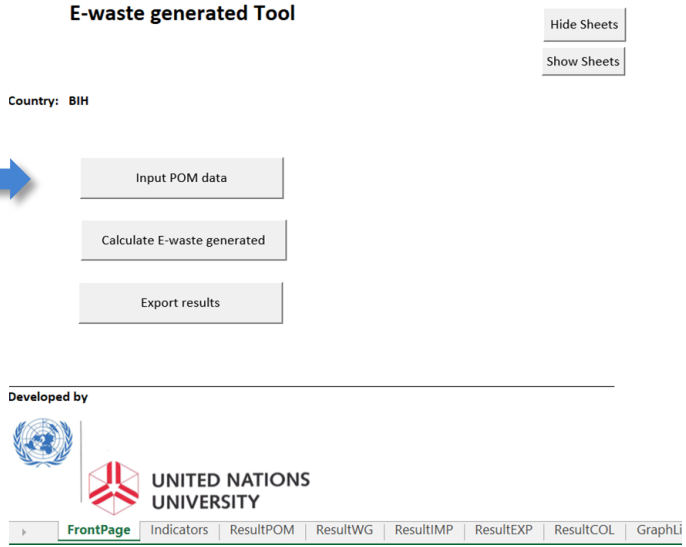
The EEE Put on Market Tool has been developed by UNU-ViE-SCYCLE to help the user to prepare, adjust and convert the available country data on EEE Put on Market (POM) of new electronics prior to inserting them in the E-waste generated Tool.

Cell legend

Aval
Con
Calc

0. Content | RAW_DATA | PIVOT | POM_to_Tool | HS_UNU_KEYS_year | Unique_HS codes | Weight_year | UNU_KEYS_EU-6

POM Data



E-waste generated Tool

Hide Sheets
Show Sheets

Country: BIH

Input POM data
Calculate E-waste generated
Export results

Developed by

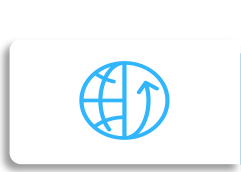
UNITED NATIONS UNIVERSITY

FrontPage | Indicators | ResultPOM | ResultWG | ResultIMP | ResultEXP | ResultCOL | GraphLi

Type of data to feed into the Tool

- *EEE Put on Market = Imports – Exports (+ Domestic Production)*
- Imports and Exports data can be available at the National Bureau of Statistics or at any other Trade Authority in the country.
- It is important to obtain data on Imports and Exports:
  - for a long time-series (preferably 20 to 30 years, or at least 10 years)
  - Aggregated by year (annual data)
  - by HS code (6 digits)
  - in weight (kg) or pieces

Functionalities of the Tool



Inserting available country data on Imports and Exports of EEE by years and by HS code **A**

Linking the available country data on Imports and Exports of EEE in HS codes to the international classification systems (UNU_KEYS and the EU-6) **B**

Converting the data on Imports and Exports that is expressed in number of pieces into weight; calculating the EEE Put on Market in the country from the Imports and Exports and converting them in right unit (tonnes) . **C**

Restructuring the data in a PIVOT table **D**

Restructuring the data in the same format as it needs to be inserted in the E-waste generated Tool (sheet "POM"). **E**

Functionalities of the Tool

Inserting available country data on Imports and Exports of EEE by years and by HS code (in the columns highlighted in grey).

A

- *Year = "2014"*
- *HS code (six digits) = "845110"*
- *Quantity unit = KGM (kilograms) or NMB (number of pieces)*

RAW DATA

	RAW COUNTRY DATA					CONVERSIONS		CALCULATION OF EEE PUT ON MARKET (POM)			
YEAR	HS_6_digit	QUANTITY_UNIT	IMPORT_QUANTITY	EXPORT_QUANTITY		UNU_KEY	EU-6	AVWEIGHT	POM (kg)	POM (kg)	POM (t)
2014	845110	KGM	10000000	2000		0101	4	124.61	9998000	9998000	9,998
2015	841810	NMB	1000	2		0108	1	40.79	40708	40708	41
						#N/A	#N/A	#N/A	0	0	-
						#N/A	#N/A	#N/A	0	0	-
						#N/A	#N/A	#N/A	0	0	-
						#N/A	#N/A	#N/A	0	0	-
						#N/A	#N/A	#N/A	0	0	-
						#N/A	#N/A	#N/A	0	0	-
						#N/A	#N/A	#N/A	0	0	-

0. Content | RAW_DATA | PIVOT | POM_to_Tool | HS_UNU_KEYS_year | Unique_HS codes | Weight_year | UNU_KEYS_EU-6

EDIT

Functionalities of the Tool

Linking the available country data on Imports and Exports of EEE in HS codes to the international classification systems (UNU_KEYS and the EU-6) (in the columns highlighted in light orange).

B

- In column “F” the VLOOKUP function searches for the combination of HS codes and year in the sheet “HS_UNU_KEYS_year” and returns the corresponding UNU_KEY.

RAW DATA

	RAW COUNTRY DATA					CONVERSIONS		CALCULATION OF EEE PUT ON MARKET (POM)			
YEAR	HS_6_digit	QUANTITY_UNIT	IMPORT_QUANTITY	EXPORT_QUANTITY	UNU_KEY	EU-6	AVWEIGHT	POM (kg)	POM (kg)	POM (t)
2014	845110	KGM	10000000	2000	0101	4	124.61	9998000	9998000	9,998
2015	841810	NMB	1000	2	0108	1	40.79	40708	40708	41
					#N/A	#N/A	#N/A	0	0	-
					#N/A	#N/A	#N/A	0	0	-
					#N/A	#N/A	#N/A	0	0	-
					#N/A	#N/A	#N/A	0	0	-
					#N/A	#N/A	#N/A	0	0	-
					#N/A	#N/A	#N/A	0	0	-
					#N/A	#N/A	#N/A	0	0	-

0. Content | RAW_DATA | PIVOT | POM_to_Tool | HS_UNU_KEYS_year | Unique_HS codes | Weight_year | UNU_KEYS_EU-6

EDIT

Functionalities of the Tool

Linking the available country data on Imports and Exports of EEE in HS codes to the international classification systems (UNU_KEYS and the EU-6) (in the columns highlighted in light orange).

B

- In column “G” the VLOOKUP function searches for the combination of HS codes and year in the sheet “UNU_KEYS_EU-6” and returns the EU-6.

	A	B	C	D	E	F	G	H	I	J	K
1	RAW DATA										
2											
3			RAW COUNTRY DATA			CONVERSIONS		CALCULATION OF EEE PUT ON MARKET (POM)			
4	YEAR	HS_6_digit	QUANTITY_UNIT	IMPORT_QUANTITY	EXPORT_QUANTITY	UNU_KEY	EU-6	AVWEIGHT	POM (kg)	POM (kg)	POM (t)
5	2014	845110	KGM	10000000	2000	0101	4	124.61	9998000	9998000	9,998
6	2015	841810	NMB	1000	2	0108	1	40.79	40708	40708	41
7						#N/A	#N/A	#N/A	0	0	-
8						#N/A	#N/A	#N/A	0	0	-
9						#N/A	#N/A	#N/A	0	0	-
10						#N/A	#N/A	#N/A	0	0	-
11						#N/A	#N/A	#N/A	0	0	-
12						#N/A	#N/A	#N/A	0	0	-
13						#N/A	#N/A	#N/A	0	0	-

0. Content | RAW_DATA | PIVOT | POM_to_Tool | HS_UNU_KEYS_year | Unique_HS codes | Weight_year | UNU_KEYS_EU-6

EDIT

Functionalities of the Tool

Converting the data on Imports and Exports that is expressed in number of pieces into weight; calculating the EEE Put on Market in the country from the Imports and Exports and converting them in right unit (tonnes) (in the columns highlighted in green).

C

- The average weight (column “H”) is used to convert the POM data expressed in NMB into KGM (column “I”)

RAW DATA

	RAW COUNTRY DATA					CONVERSIONS		CALCULATION OF EEE PUT ON MARKET (POM)			
YEAR	HS_6_digit	QUANTITY_UNIT	IMPORT_QUANTITY	EXPORT_QUANTITY		UNU_KEY	EU-6	AVWEIGHT	POM (kg)	POM (kg)	POM (t)
2014	845110	KGM	10000000	2000		0101	4	124.61	9998000	9998000	9,998
2015	841810	NMB	1000	2		0108	1	40.79	40708	40708	41
						#N/A	#N/A	#N/A	0	0	-
						#N/A	#N/A	#N/A	0	0	-
						#N/A	#N/A	#N/A	0	0	-
						#N/A	#N/A	#N/A	0	0	-
						#N/A	#N/A	#N/A	0	0	-
						#N/A	#N/A	#N/A	0	0	-
						#N/A	#N/A	#N/A	0	0	-

0. Content | RAW_DATA | PIVOT | POM_to_Tool | HS_UNU_KEYS_year | Unique_HS codes | Weight_year | UNU_KEYS_EU-6

EDIT

Functionalities of the Tool

Converting the data on Imports and Exports that is expressed in number of pieces into weight; calculating the EEE Put on Market in the country from the Imports and Exports and converting them in right unit (tonnes) (in the columns highlighted in green).

C

- Column “J” returns only the positive values of column “I” and sets to 0 the negative values.

RAW DATA

	RAW COUNTRY DATA					CONVERSIONS		CALCULATION OF EEE PUT ON MARKET (POM)			
YEAR	HS_6_digit	QUANTITY_UNIT	IMPORT_QUANTITY	EXPORT_QUANTITY		UNU_KEY	EU-6	AVWEIGHT	POM (kg)	POM (kg)	POM (t)
2014	845110	KGM	10000000	2000		0101	4	124.61	9998000	9998000	9,998
2015	841810	NMB	1000	2		0108	1	40.79	40708	40708	41
						#N/A	#N/A	#N/A	0	0	-
						#N/A	#N/A	#N/A	0	0	-
						#N/A	#N/A	#N/A	0	0	-
						#N/A	#N/A	#N/A	0	0	-
						#N/A	#N/A	#N/A	0	0	-
						#N/A	#N/A	#N/A	0	0	-
						#N/A	#N/A	#N/A	0	0	-

0. Content | RAW_DATA | PIVOT | POM_to_Tool | HS_UNU_KEYS_year | Unique_HS codes | Weight_year | UNU_KEYS_EU-6

EDIT

Functionalities of the Tool

Converting the data on Imports and Exports that is expressed in number of pieces into weight; calculating the EEE Put on Market in the country from the Imports and Exports and converting them in right unit (tonnes) (in the columns highlighted in green).

C

- Column “K” converts the POM data in tonnes (t).

RAW DATA

	RAW COUNTRY DATA					CONVERSIONS		CALCULATION OF EEE PUT ON MARKET (POM)			
YEAR	HS_6_digit	QUANTITY_UNIT	IMPORT_QUANTITY	EXPORT_QUANTITY	UNU_KEY	EU-6	AVWEIGHT	POM (kg)	POM (kg)	POM (t)
2014	845110	KGM	10000000	2000	0101	4	124.61	9998000	9998000	9,998
2015	841810	NMB	1000	2	0108	1	40.79	40708	40708	41
					#N/A	#N/A	#N/A	0	0	-
					#N/A	#N/A	#N/A	0	0	-
					#N/A	#N/A	#N/A	0	0	-
					#N/A	#N/A	#N/A	0	0	-
					#N/A	#N/A	#N/A	0	0	-
					#N/A	#N/A	#N/A	0	0	-
					#N/A	#N/A	#N/A	0	0	-

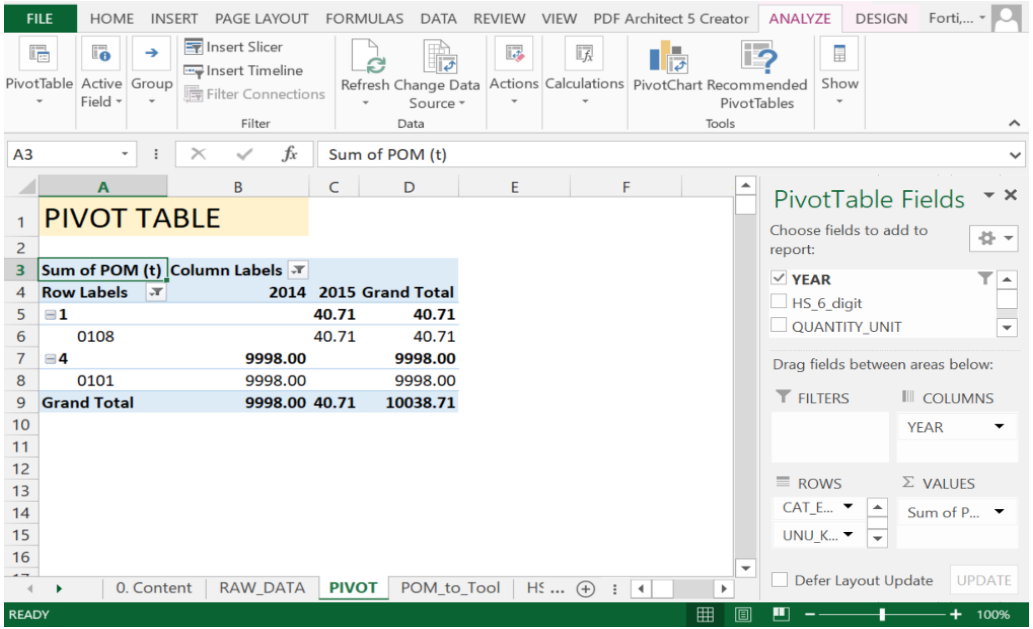
0. Content | RAW_DATA | PIVOT | POM_to_Tool | HS_UNU_KEYS_year | Unique_HS codes | Weight_year | UNU_KEYS_EU-6

EDIT

Functionalities of the Tool

Restructuring the data in a PIVOT table

D



Functionalities of the Tool

Restructuring the data in the same format as it needs to be inserted in the E-waste generated Tool (sheet "POM"). E

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	POM to be inserted in the					N	54	54	54	54	54	54	54	54	54	54	54	54
2	E-waste generated Tool					Sum	0	0	0	0	0	0	0	0	0	0	0	0
3																		
4		Classification					Year											
5	UNU	EU-6	EU-6PV	EU-10	EU-10PV		1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
6	0001	4	4a	1	1		0	0	0	0	0	0	0	0	0	0	0	0
7	0002	4	4b	4	4b		0	0	0	0	0	0	0	0	0	0	0	0
8	0101	4	4a	1	1		0	0	0	0	0	0	0	0	0	0	0	0
9	0102	4	4a	1	1		0	0	0	0	0	0	0	0	0	0	0	0
10	0103	4	4a	1	1		0	0	0	0	0	0	0	0	0	0	0	0
11	0104	4	4a	1	1		0	0	0	0	0	0	0	0	0	0	0	0
12	0105	4	4a	1	1		0	0	0	0	0	0	0	0	0	0	0	0
13	0106	4	4a	1	1		0	0	0	0	0	0	0	0	0	0	0	0
14	0108	1	1	1	1		0	0	0	0	0	0	0	0	0	0	0	0
15	0109	1	1	1	1		0	0	0	0	0	0	0	0	0	0	0	0
16	0111	1	1	1	1		0	0	0	0	0	0	0	0	0	0	0	0
17	0112	1	1	1	1		0	0	0	0	0	0	0	0	0	0	0	0
18	0113	1	1	1	1		0	0	0	0	0	0	0	0	0	0	0	0
19	0114	5	5	1	1		0	0	0	0	0	0	0	0	0	0	0	0
20	0201	5	5	2	2		0	0	0	0	0	0	0	0	0	0	0	0
21	0202	5	5	2	2		0	0	0	0	0	0	0	0	0	0	0	0
22	0203	5	5	2	2		0	0	0	0	0	0	0	0	0	0	0	0
23	0204	5	5	2	2		0	0	0	0	0	0	0	0	0	0	0	0
24	0205	5	5	2	2		0	0	0	0	0	0	0	0	0	0	0	0
25	0301	6	6	3	3		0	0	0	0	0	0	0	0	0	0	0	0
26	0302	6	6	3	3		0	0	0	0	0	0	0	0	0	0	0	0
27	0303	2	2	3	3		0	0	0	0	0	0	0	0	0	0	0	0
28	0304	6	6	3	3		0	0	0	0	0	0	0	0	0	0	0	0
29	0305	6	6	3	3		0	0	0	0	0	0	0	0	0	0	0	0
30	0306	6	6	3	3		0	0	0	0	0	0	0	0	0	0	0	0
31	0307	4	4a	3	3		0	0	0	0	0	0	0	0	0	0	0	0
32	0308	2	2	3	3		0	0	0	0	0	0	0	0	0	0	0	0
33	0309	2	2	3	3		0	0	0	0	0	0	0	0	0	0	0	0
34	0401	5	5	4	4a		0	0	0	0	0	0	0	0	0	0	0	0
35	0402	5	5	4	4a		0	0	0	0	0	0	0	0	0	0	0	0

0. Content | RAW_DATA | PIVOT | POM_to_Tool | HS_UNU_KEYS_year | Unique_HS codes | Weight_year | UNU_KEYS_EU-6

Exercise

IMPORTS									
HS Code	Customs Code	Product Description	2012	2013	2014	2015	2016	2017	2018
841451	8414510000	Ventilators	1,960,462	1,869,698	1,516,928	1,470,358	2,477,378	2,408,040	1,528,667

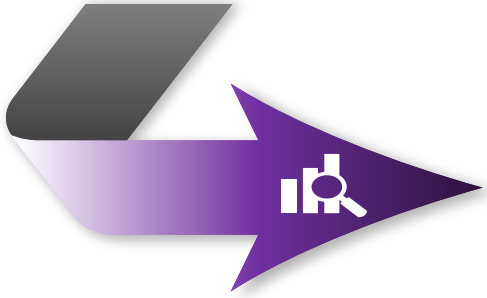
EXPORTS									
HS Code	Customs Code	Product Description	2012	2013	2014	2015	2016	2017	2018
841451	8414510000	Ventilators		54045	49848	60377	34201	26737	48289

#N/A

- Code doesn't exist
- Code is not part of the files database
- HS code doesn't correspond to (W)EEE

Next Steps

Perform statistical analysis prior to insert the Put on Market data in the E-waste generated Tool.



Calculating the E-waste generated from the E-waste generated Tool.

UNITED NATIONS UNIVERSITY

UNU-VIE SCYCLE

Sustainable Cycles Programme

SCYCLE

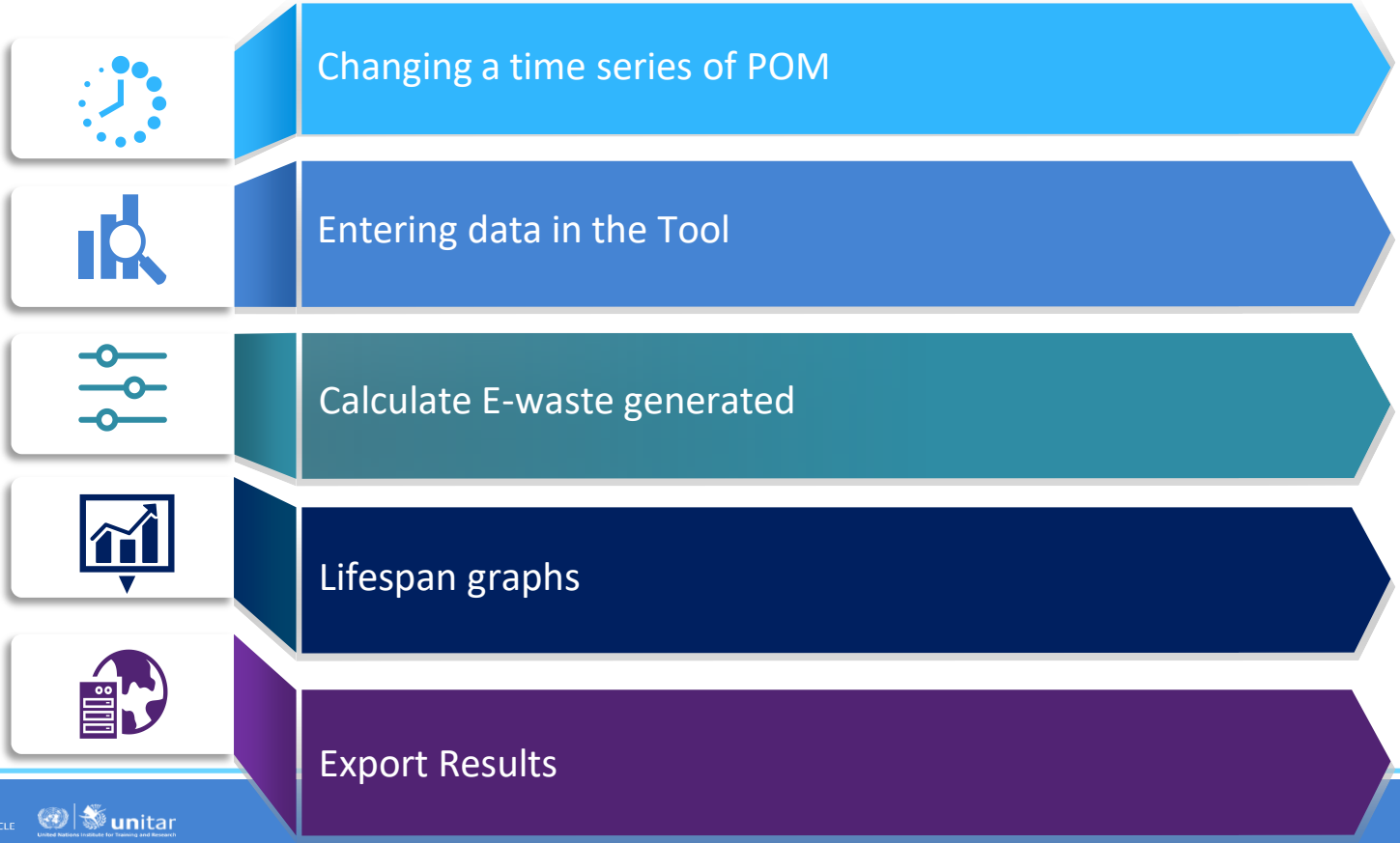
Programme

Introduction to the E-waste generated tool

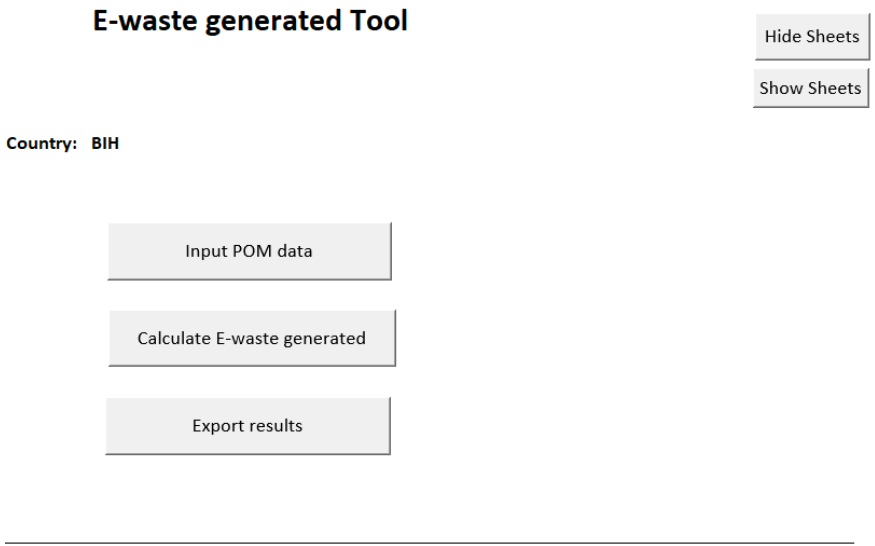
Michelle Wagner

November, 2019 – Regional Workshop on Environment Statistics and Climate Change Statistics for the CARICOM Region - Grenada

Description



Changing a time series of POM



- Go to ‘POM’ sheet
- Overwrite data
- Red font means: data has been changed from original input

Entering data in the Tool

- POM

A1 | EEE Put on Market (POM)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	EEE Put on Market (POM)					N	54	54	54	54	54	54	54	54	54
2						Sum	2170	2407	2658	2937	3237	3559	3904	4270	4654
3	Red font means: data has been changed from original input														
4		Classification					Year								
5	UNU	EU-6	EU-6PV	EU-10	EU-10PV		1980	1981	1982	1983	1984	1985	1986	1987	1988
6	0001	4	4a	1	1		14	15	17	18	19	21	22	24	25
7	0002	4	4b	4	4b		0	0	0	0	0	0	0	0	0
8	0101	4	4a	1	1		5	6	6	7	7	8	8	9	10
9	0102	4	4a	1	1		3	4	4	5	5	6	6	7	8
10	0103	4	4a	1	1		87	94	102	109	118	126	136	145	156
11	0104	4	4a	1	1		37	40	43	46	50	53	57	61	66
12	0105	4	4a	1	1		3	4	5	6	7	8	10	11	13
13	0106	4	4a	1	1		4	4	5	5	6	6	7	7	8
14	0108	1	1	1	1		461	498	538	579	622	668	717	768	823
15	0109	1	1	1	1		83	98	114	130	148	166	186	207	230
16	0111	1	1	1	1		24	50	77	106	136	169	204	241	280
17	0112	1	1	1	1		24	32	39	47	56	64	74	84	95
18	0113	1	1	1	1		81	88	95	102	110	118	126	135	145
19	0114	5	5	1	1		0	0	0	0	0	2	3	5	7
20	0201	5	5	2	2		387	418	451	485	522	560	601	644	690
21	0202	5	5	2	2		22	25	28	31	34	37	41	45	49
22	0203	5	5	2	2		45	50	56	62	69	76	83	91	100
23	0204	5	5	2	2		7	8	8	9	10	10	11	12	13
24	0205	5	5	2	2		18	19	21	22	24	26	28	30	32
25	0301	6	6	3	3		4	9	14	19	25	31	37	44	51
26	0302	6	6	3	3		0	0	0	0	15	30	46	64	83	103
27	0303	2	2	3	3		0	4	8	12	17	22	27	32	38

FrontPage | Indicators | ResultPOM | ResultWG | GraphLifespan | GraphPOM_EU6 | GraphWG_EU6 | POM

Entering data in the Tool

- POM

POM to be inserted in the E-waste generated					54	54	54	54	54	54	54	54	54
					48207	49731	49266	47240	48699	52741	62217	51398	20968
	Classification												
UNU	EU-6	EU-6PV	EU-10	EU-10PV	2011	2012	2013	2014	2015	2016	2017	2018	2019
0001	4	4a	1	1	72	110	226	287	185	354	3233	3024	180
0002	4	4b	4	4b	0	0	0	0	0	0	0	0	0
0101	4	4a	1	1	0	0	0	0	0	0	0	0	0
0102	4	4a	1	1	43	49	60	75	77	55	58	44	11
0103	4	4a	1	1	449	507	653	716	747	1143	1082	937	362
0104	4	4a	1	1	2799	3764	2989	3789	3135	4016	4933	4097	1994
0105	4	4a	1	1	17	18	32	39	28	24	8	21	3
0106	4	4a	1	1	227	338	193	183	159	273	360	559	292
0108	1	1	1	1	9196	8174	8871	8671	9495	9269	10161	7410	3999
0109	1	1	1	1	2375	2376	2178	2280	2748	2356	2126	2097	955
0111	1	1	1	1	2090	2745	2613	2534	3640	4260	3910	2880	1202
0112	1	1	1	1	266	241	393	478	390	407	341	487	121
0113	1	1	1	1	84	149	89	132	237	119	28	37	34
0114	5	5	1	1	766	1087	838	652	693	696	870	744	286
0201	5	5	2	2	3238	3541	3365	2906	2604	3590	3715	2643	841
0202	5	5	2	2	1759	2461	2799	2338	2405	3964	5287	4034	1739
0203	5	5	2	2	770	734	948	1009	975	1214	1099	760	267
0204	5	5	2	2	215	242	253	211	284	228	238	281	100
0205	5	5	2	2	315	325	348	283	343	413	785	512	198
0301	6	6	3	3	598	615	602	628	442	393	413	512	186
0302	6	6	3	3	364	470	390	464	402	234	257	247	153
0303	2	2	3	3	393	485	193	152	156	141	120	65	
0304	6	6	3	3	1017	1435	1955	1584	1213	1321	1464	1345	648
0305	6	6	3	3	976	728	957	1383	2163	1259	1395	1640	634
0306	6	6	3	3	97	90	107	121	183	176	132	143	47
0307	4	4a	3	3	1129	942	785	541	509	617	521	342	160
0308	2	2	3	3	81	29	8	15	5	5	1	5	0
0309	2	2	3	3	665	393	408	324	347	282	67	74	63
0401	5	5	4	4a	273	365	545	504	398	496	625	572	249
0402	5	5	4	4a	1631	2077	1430	1272	978	1368	1793	1474	526
0403	5	5	4	4a	1769	1753	1646	1245	1121	1010	1196	843	391
0404	5	5	4	4a	1137	1296	1117	878	889	726	1177	825	398
0405	5	5	4	4a	661	832	880	1003	971	1246	1623	1770	826
0406	5	5	4	4a	114	110	110	116	106	134	144	150	69
0407	2	2	4	4a	8	4	8	4	2	0	1	3	0
0408	2	2	4	4a	4418	3843	2958	2090	1838	1696	2185	1891	696
0501	3	3	5	5	587	553	630	563	498	574	928	603	212
0502	3	3	5	5	1952	1031	1296	1294	1398	0	0	0	0
0503	3	3	5	5	23	9	12	9	9	8	22	7	3
0504	3	3	5	5	62	77	104	146	303	1291	1240	532	201
0505	3	3	5	5	0	0	0	0	0	0	0	0	0
0506	5	5	5	5	1656	1900	1891	1906	2028	2606	2956	2676	833
0507	5	5	5	5	596	753	756	945	1239	958	1217	1193	430
0601	5	5	6	6	1819	1936	2533	2134	1847	2056	2641	2475	945
0602	4	4a	6	6	0	0	0	0	0	0	0	0	0

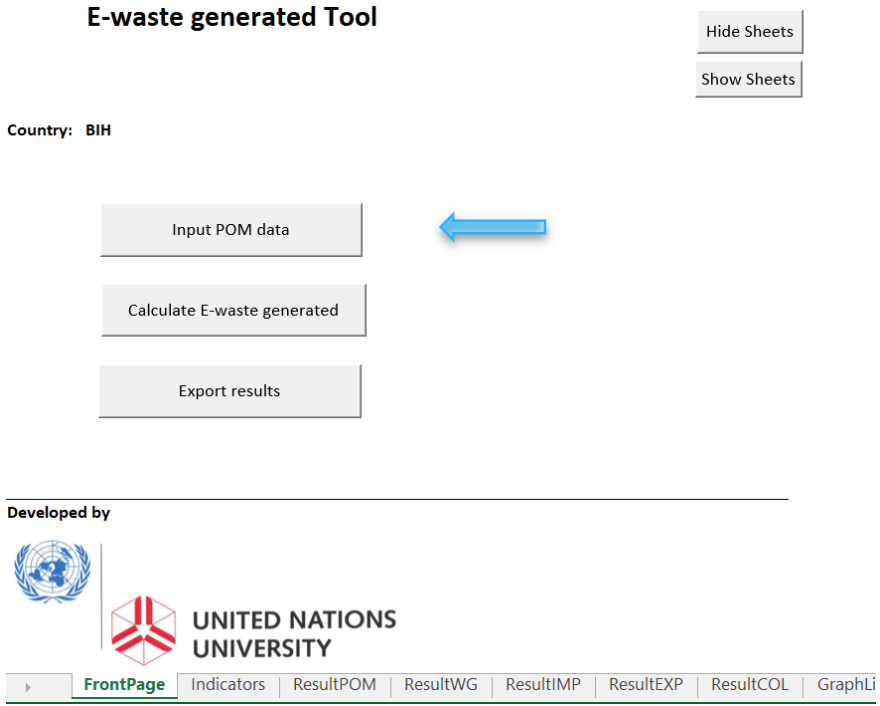
0. Content | RAW_DATA | PIVOT | POM_to_Tool | HS_UNU_KEYS_year | Unique_HS codes | Weight_year | UNU_KEYS_EU-6

EEE Put on Market (POM)					54	54	54	54	54	54	54	54	54
					48207	49731	49266	47240	48699	52741	62217	51398	20968
Red font means: data has been changed from original input													
	Classification												
UNU	EU-6	EU-6PV	EU-10	EU-10PV	2011	2012	2013	2014	2015	2016	2017	2018	2019
0001	4	4a	1	1	72	110	226	287	185	354	3233	3024	180
0002	4	4b	4	4b	0	0	0	0	0	0	0	0	0
0101	4	4a	1	1	0	0	0	0	0	0	0	0	0
0102	4	4a	1	1	43	49	60	75	77	55	58	44	11
0103	4	4a	1	1	449	507	653	716	747	1143	1082	937	362
0104	4	4a	1	1	2799	3764	2989	3789	3135	4016	4933	4097	1994
0105	4	4a	1	1	17	18	32	39	28	24	8	21	3
0106	4	4a	1	1	227	338	193	183	159	273	360	559	292
0108	1	1	1	1	9196	8174	8871	8671	9495	9269	10161	7410	3999
0109	1	1	1	1	2375	2376	2178	2280	2748	2356	2126	2097	955
0111	1	1	1	1	2090	2745	2613	2534	3640	4260	3910	2880	1202
0112	1	1	1	1	266	241	393	478	390	407	341	487	121
0113	1	1	1	1	84	149	89	132	237	119	28	37	34
0114	5	5	1	1	766	1087	838	652	693	696	870	744	286
0201	5	5	2	2	3238	3541	3365	2906	2604	3590	3715	2643	841
0202	5	5	2	2	1759	2461	2799	2338	2405	3964	5287	4034	1739
0203	5	5	2	2	770	734	948	1009	975	1214	1099	760	267
0204	5	5	2	2	215	242	253	211	284	228	238	281	100
0205	5	5	2	2	315	325	348	283	343	413	785	512	198
0301	6	6	3	3	598	615	602	628	442	393	413	512	186
0302	6	6	3	3	364	470	390	464	402	234	257	247	153
0303	2	2	3	3	393	485	193	152	156	166	141	120	65
0304	6	6	3	3	1017	1435	1955	1584	1213	1321	1464	1345	648
0305	6	6	3	3	976	728	957	1383	2163	1259	1395	1640	634
0306	6	6	3	3	97	90	107	121	183	176	132	143	47
0307	4	4a	3	3	1129	942	785	541	509	617	521	342	160
0308	2	2	3	3	81	29	8	15	5	5	1	5	0
0309	2	2	3	3	665	393	408	324	347	282	67	74	63
0401	5	5	4	4a	273	365	545	504	398	496	625	572	249
0402	5	5	4	4a	1631	2077	1430	1272	978	1368	1793	1474	526
0403	5	5	4	4a	1769	1753	1646	1245	1121	1010	1196	843	391
0404	5	5	4	4a	1137	1296	1117	878	889	726	1177	825	398
0405	5	5	4	4a	661	832	880	1003	971	1246	1623	1770	826
0406	5	5	4	4a	114	110	110	116	106	134	144	150	69
0407	2	2	4	4a	8	4	8	4	2	0	1	3	0
0408	2	2	4	4a	4418	3843	2958	2090	1838	1696	2185	1891	696
0501	3	3	5	5	587	553	630	563	498	574	928	603	212
0502	3	3	5	5	1952	1031	1296	1294	1398	0	0	0	0

FrontPage | Indicators | ResultPOM | ResultWG | GraphLifespan | GraphPOM_EU6 | GraphWG_EU6 | POM

Entering data in the Tool

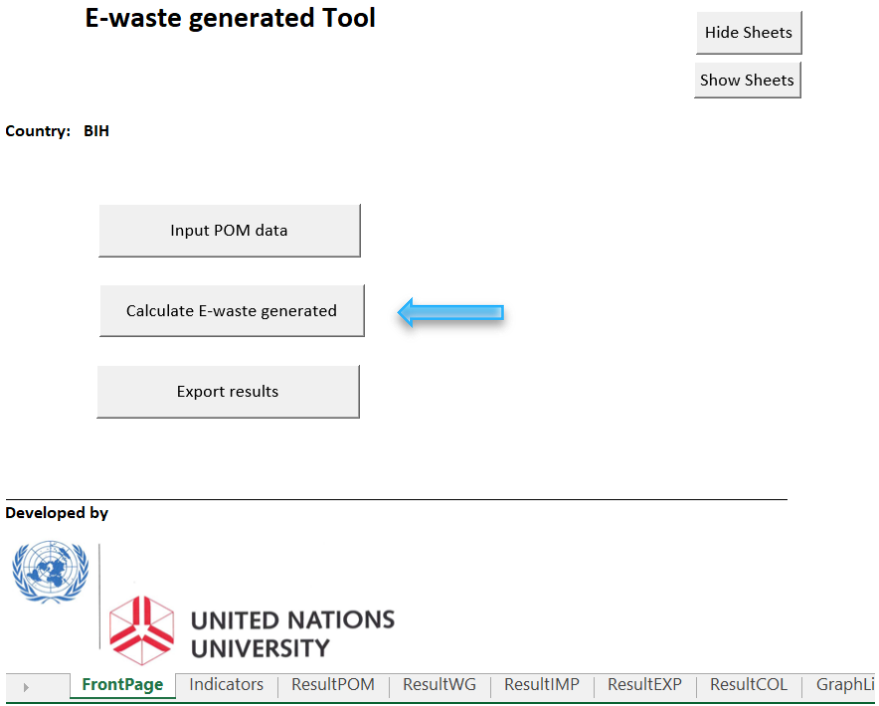
- POM



Options to select different classifications:

1. EU-6 categories: 6 categories
2. UNU categories: 54 UNU KEYs

Calculate E-waste generated

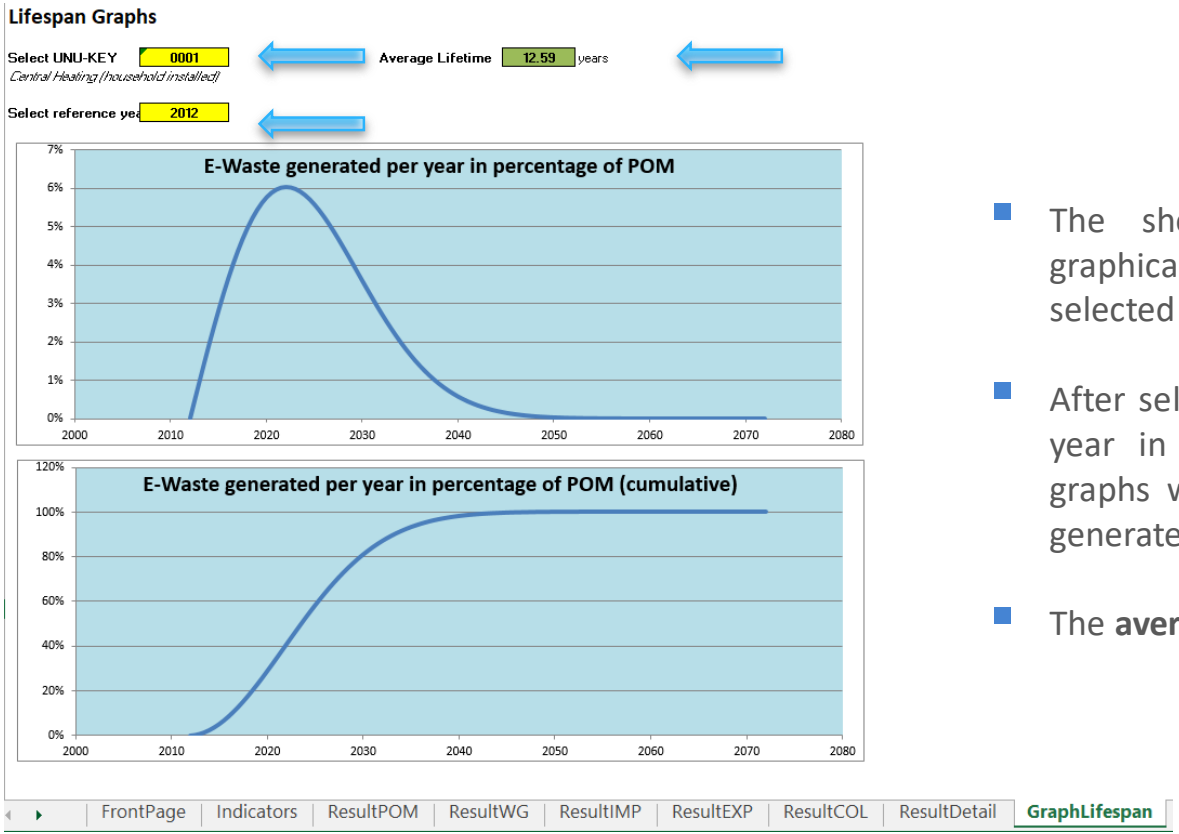


Once the user has entered into the tool the POM data for a year of reference, the tool can calculate the quantity of E-waste generated.

Calculations are done until last year of POM data

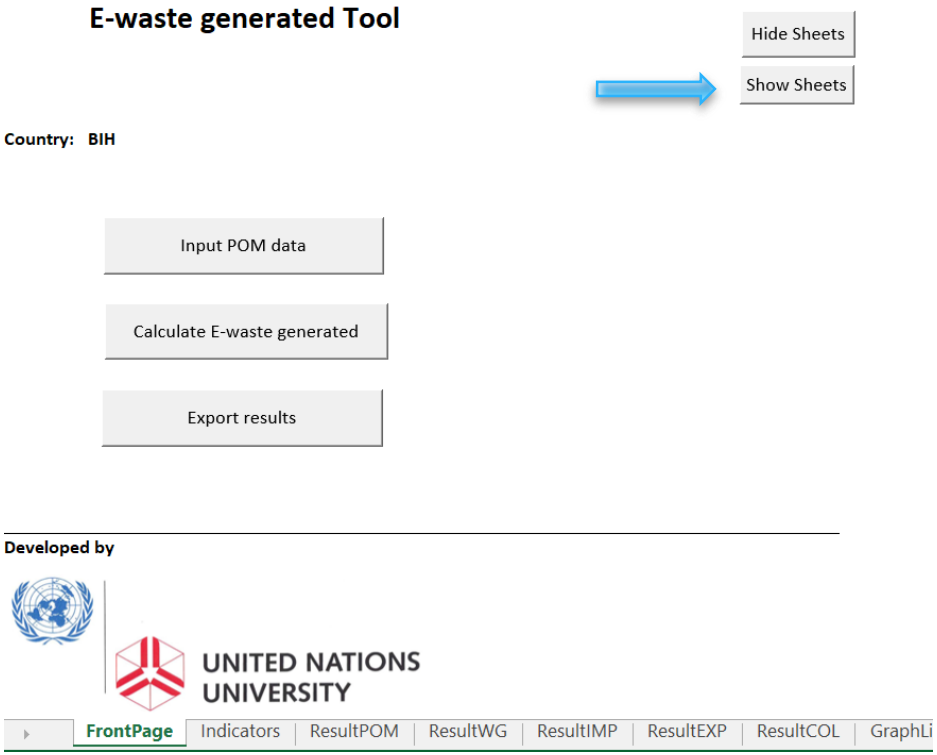
POM needs to be inserted annually

Lifespan graphs



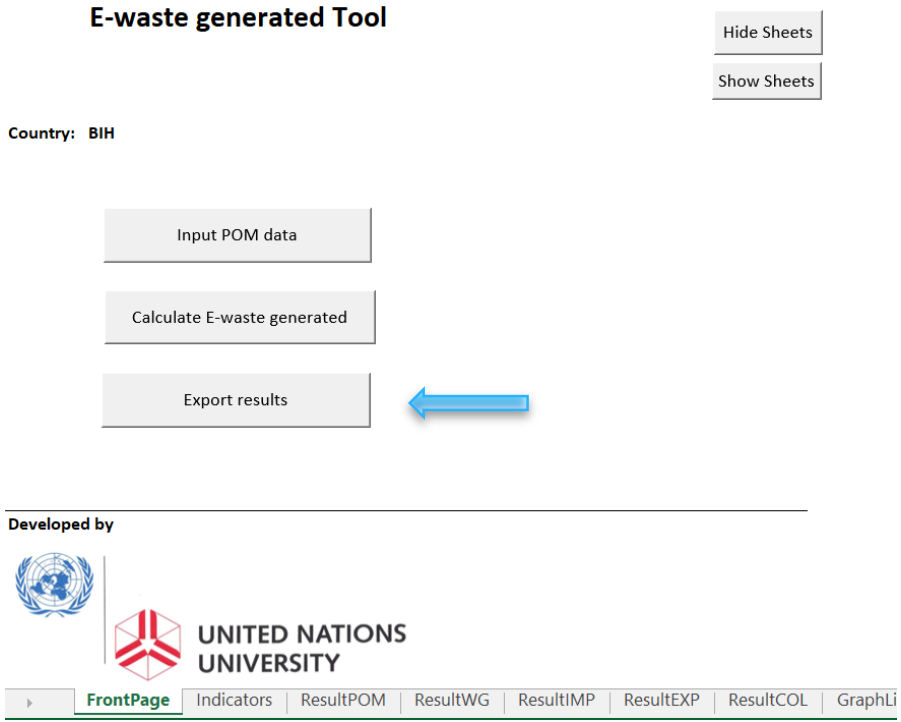
- The sheet **"GraphLifespan"** provides a graphical representation of the lifespan of a selected product group per UNU-KEY.
- After selecting an UNU-KEY and a reference year in the corresponding dropdown the graphs will show the **percentages** of WEEE generated.
- The **average lifespan** is also shown.

Changing the lifespans



- Press show sheets at frontpage
- Go to ‘Scale’ and ‘shape’ sheet
- Overwrite data
- Red font means: data has been changed from original input
- Press Hide sheets at frontpage

Export Results



By pressing the button, a new spreadsheet will be created named **"Result.xlsx".** This spreadsheet will be saved in the same directory were the WEEE calculation tool is stored.

Export Results

Export Results

Indicators

Indicators

RESULTS

		Weight in tonnes								
	Full name	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**
Totals	Put on Market	51229	53383	52520	60575	64634	78599	87664	102292	125192
	E-waste generated	25866	28149	30553	33140	35949	38997	42337	45864	49949

Indicators | ResultPOM | ResultWG | GraphLifespan | GraphWG_EU6 | GraphPOM_EU6

Export Results

Result POM

POM										
RESULTS										
		Weight in tonnes								
EU-6	Full name	1995	1996	1997	1998	1999	2000	2001	2002	2003
1	Temperat	13740	14170	16841	17709	19352	22975	23600	27637	33556
2	Screens, m	10210	13814	7354	11654	7088	12073	15437	21319	27337
3	Lamps	1975	1840	1999	1630	2166	2041	2051	2481	2439
4a	Large equi	5874	5670	5634	5708	6612	7871	8377	10216	13773
4b	Photovolt	0	0	0	0	0	0	0	0	0
5	Small equi	16920	13696	15101	16563	21922	25120	28248	29858	35734
6	Small IT ar	2510	4192	5591	7310	7494	8521	9951	10782	12353
TOTAL		51229	53383	52520	60575	64634	78599	87664	102292	125192

Indicators | ResultPOM | ResultWG | GraphLifespan | GraphWG_EU6 | GraphPOM_EU6

Export Results

E-waste generated

RESULTS Consolidated

		Weight in tonnes								
EU-6	**Full name**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**
1	Temperat	5431	6032	6647	7267	7901	8573	9269	10029	10869
2	Screens, m	5389	5901	6411	6895	7354	7800	8283	8855	9574
3	Lamps	1428	1505	1579	1632	1689	1746	1796	1861	1934
4a	Large equi	2350	2632	2911	3177	3437	3699	3971	4290	4683
4b	Photovolta	0	0	0	0	0	0	0	0	0
5	Small equi	9059	9664	10241	10873	11694	12643	13709	14745	15965
6	Small IT ar	2208	2415	2764	3296	3875	4537	5308	6085	6924
TOTAL		**25866**	**28149**	**30553**	**33140**	**35949**	**38997**	**42337**	**45864**	**49949**

Indicators | ResultPOM | **ResultWG** | GraphLifespan | GraphWG_EU6 | GraphPOM_EU6

Export Results

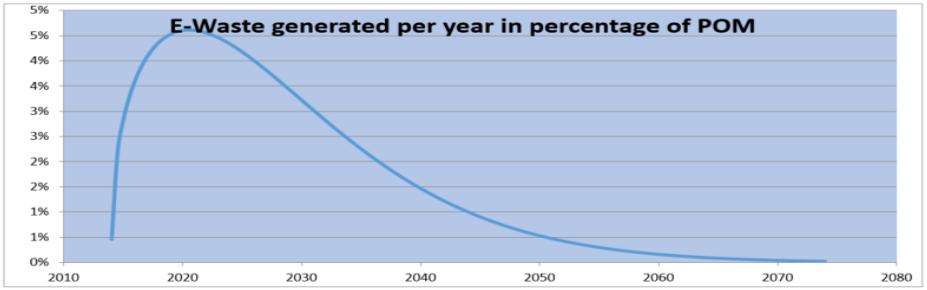
Graph Lifespan

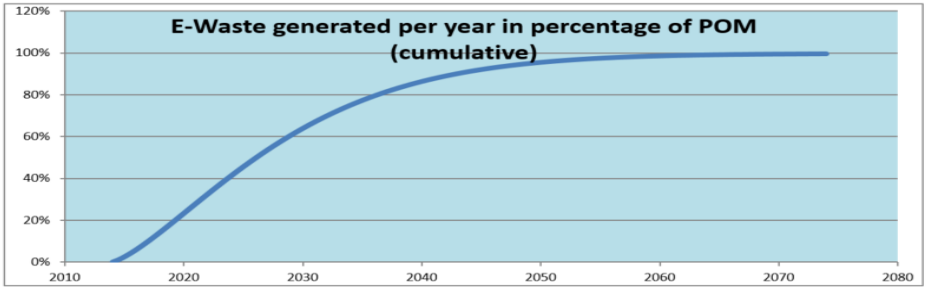
Lifespan Graphs

Select UN 0306 Average Lifetime 5.07 years

Mobile Phones (incl. smartphones, pagers)

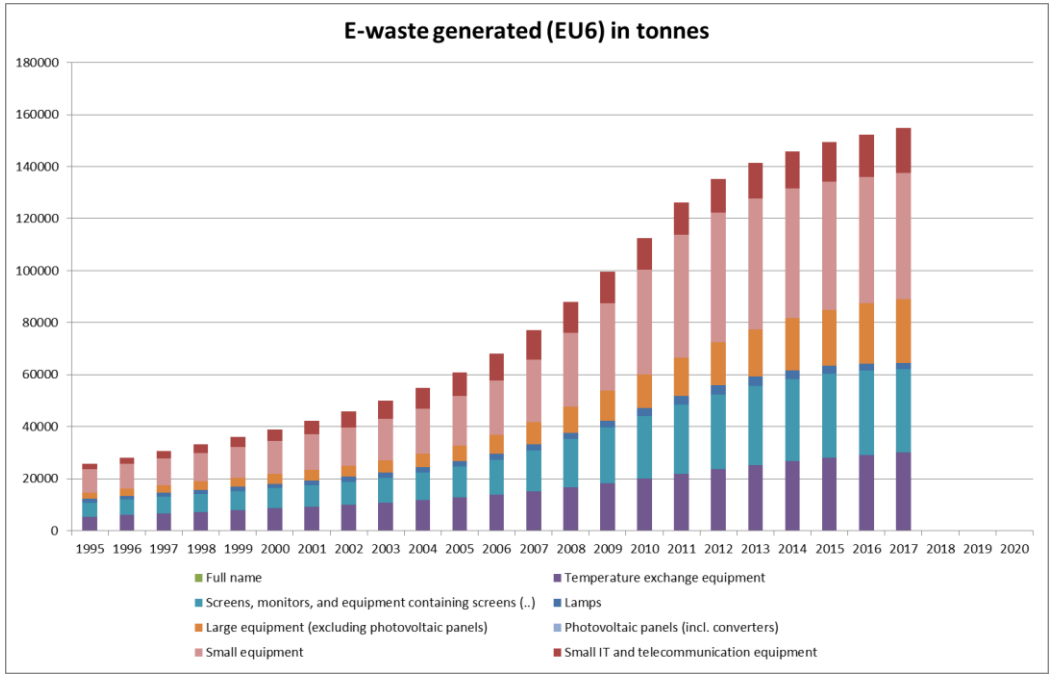
Select refe 2018





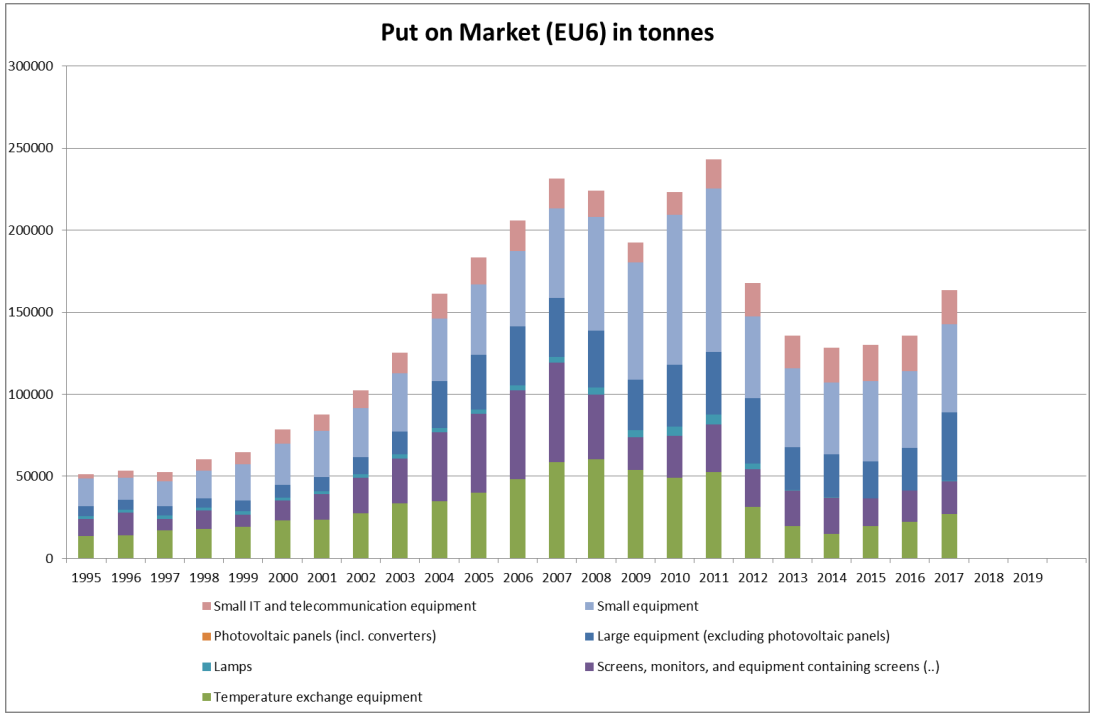
Export Results

GraphWG_EU6



Export Results

GraphPOM_EU6



¿Questions?

Questions

1. What is the methodology you are currently using in your country to measure e-waste flows?
2. Which classification are you currently using?
3. Is e-waste data a problem in your country (e.g. data gaps, data gathering etc.) ?
4. Is the informal sector well established in your country?
5. What are the biggest challenges in your country regarding e-waste statistics?

UNITED NATIONS UNIVERSITY

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Sustainable Cycles Programme

Thank you for your attention!!

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Extra Slides

- E-waste in the Caribbean- Current Situation
- E-waste global problems
- E-waste and international policies

E-waste in the Caribbean

- Current Status

Few countries with specific e-waste legislation

Few quantification and assessment studies

Similarities, but also differences

E-waste in the Caribbean

- Current Status

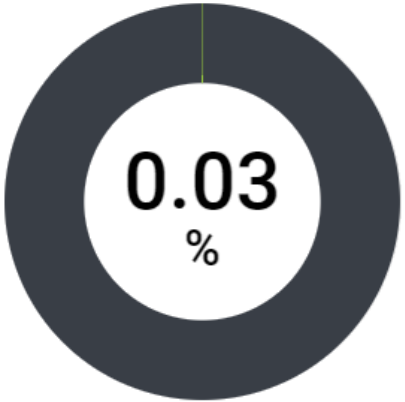
E-waste generated

111 kt

EEE Put on Market

147 kt

E-waste collection rate



E-waste formally collected

0.03 kt

E-waste Imported

n/a kt

E-waste Exported

n/a kt

Source: Global e-waste monitor 2017, UNU/ITU/ISWA

E-waste in CARICOM

- Current Status

Country	E-waste generated in 2016 (kg/inh)	E-waste generated in 2016 (t)	National regulation in force in January 2017
Bahamas	13.2	4,900	No
Barbados	13.7	3,800	No
Belize	6	2,300	No
Dominica	7.7	500	No
Dominican Republic	5.8	59,000	No
Grenada	7.8	800	No
Guyana	6.1	4,700	No
Jamaica	5.9	17,000	No
Saint Kitts and Nevis	12.1	700	No
Saint Lucia	9.3	1,600	No
Saint Vincent and the Grenadines	8.3	900	No
Suriname	9.6	5,400	No
Trinidad and Tobago	15.8	22,000	No

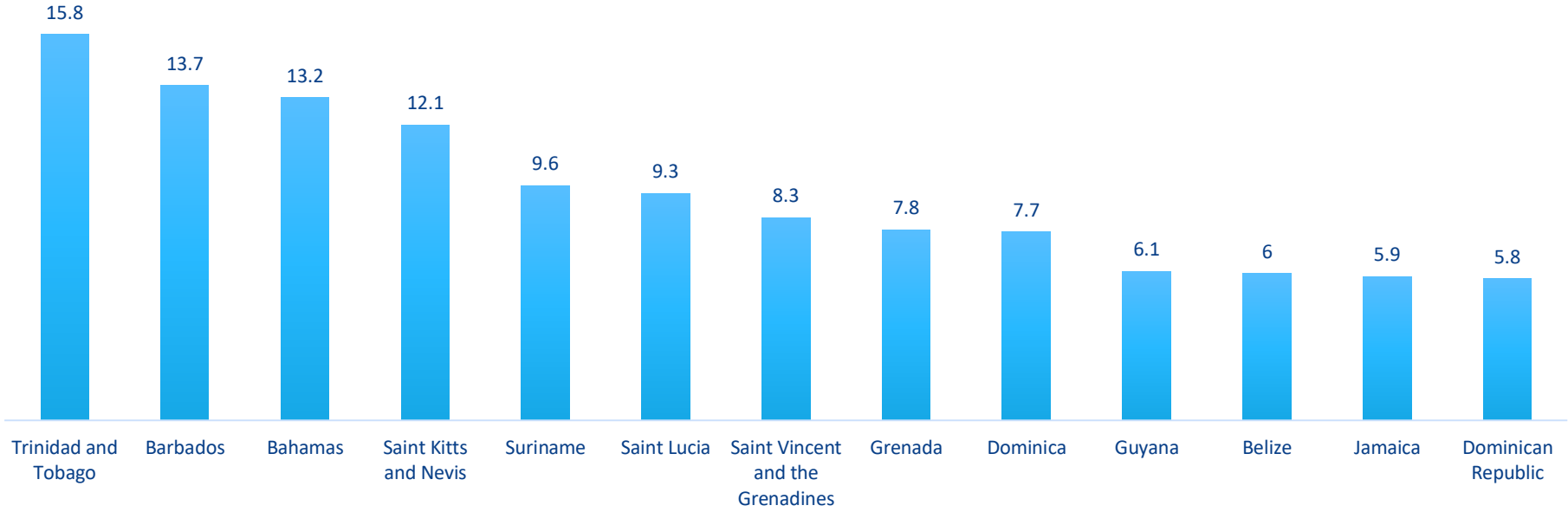
< 5 Kg/inh | 5 to 10 Kg/inh | 10 to 15 Kg/inh | > 15 Kg/inh

< 1,000 t | 1,000 to 25,000 t | 25,000 to 50,000 t | >50,000 t

Source: Global E-waste Monitor 2017

E-waste quantities:

E-waste generation in CARICOM



Source: Global e-waste monitor 2017, UNU/ITU/ISWA

E-waste and international policies

- 2030 Agenda for Sustainable Development
  - 17 Sustainable Development Goals (SDGs) identified
  - 4 SDGs linked to better understanding of e-waste

- WEEE Directive in Europe
  - Extend Producer Responsibility (EPR) principle
  - Sets standards + collection targets

- ITU: Connect2020 sets challenges and targets for ICT-sector