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
1. Policy advice

2. SDG & E-waste Statistics
   - Global E-waste Statistics Partnership

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

The Americas: 11.6 kg/inh
Europe: 16.6 kg/inh
Africa: 17.3 kg/inh
Asia: 4.2 kg/inh
Australia: 1.9 kg/inh

- < 5 kg/inh
- 5 to 10 kg/inh
- 10 to 15 kg/inh
- >15 kg/inh

Source: global e-waste monitor 2017, UNU/ITU/ISWA
E-waste quantities 2016:
E-waste officially documented to be collected and recycled

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)
  - 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**

- **UNU Keys**
  - Official Statistics
  - HS Trade codes
  - WEEE Directive 2003 (10)
  - WEEE Dir. Recast 2012 (6)

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

- **6 digits (e.g. 840310). 270 codes are relevant for e-waste**

- **4 digits (e.g. 0306). 54 product codes and are linked to the HS codes**
### E-waste classification:

**Link UNU-KEYS to the EU-6 Collection categories**

<table>
<thead>
<tr>
<th>UNU Key</th>
<th>Description</th>
<th>ANNEX III of Roast</th>
<th>old 20 WEEE Directive</th>
<th>New WEEE Directive</th>
</tr>
</thead>
<tbody>
<tr>
<td>0020</td>
<td>Flat Display Panel TVs (LCD, LED, Plasma)</td>
<td>Screens</td>
<td>04</td>
<td></td>
</tr>
<tr>
<td>0021</td>
<td>Lamps (incl. pocket, Christmas, excl. LED &amp; incandescent)</td>
<td>Lamps</td>
<td>05</td>
<td></td>
</tr>
<tr>
<td>0022</td>
<td>Compact Fluorescent Lamps (incl. retrofit &amp; non-retrofit)</td>
<td>Lamps</td>
<td>05</td>
<td></td>
</tr>
<tr>
<td>0023</td>
<td>Straight Tube Fluorescent Lamps</td>
<td>Lamps</td>
<td>05</td>
<td></td>
</tr>
<tr>
<td>0024</td>
<td>Special Lamps (incl. professional mercury, high &amp; low pressure sodium)</td>
<td>Lamps</td>
<td>05</td>
<td></td>
</tr>
<tr>
<td>0025</td>
<td>LED Lamps (incl. retrofit &amp; household LED luminaires)</td>
<td>Lamps</td>
<td>05</td>
<td></td>
</tr>
<tr>
<td>0026</td>
<td>Household Luminaires (incl. household incandescent fittings)</td>
<td>Small equipment</td>
<td>05</td>
<td></td>
</tr>
<tr>
<td>0027</td>
<td>Professional Luminaires (offices, public space, industry)</td>
<td>Small equipment</td>
<td>05</td>
<td></td>
</tr>
<tr>
<td>0028</td>
<td>Household Tools (incl. drills, saws, high pressure cleaners, lawn mowers)</td>
<td>Small equipment</td>
<td>05</td>
<td></td>
</tr>
<tr>
<td>0029</td>
<td>Professional Tools (incl. for welding, soldering, milling)</td>
<td>Large equipment</td>
<td>05</td>
<td></td>
</tr>
<tr>
<td>0030</td>
<td>Toys (incl. car racing sets, electric trains, music toys, biking computers)</td>
<td>Small equipment</td>
<td>05</td>
<td></td>
</tr>
<tr>
<td>0031</td>
<td>Game Consoles</td>
<td>Small IT</td>
<td>07</td>
<td></td>
</tr>
<tr>
<td>0032</td>
<td>Leisure (incl. large exercise, sports equipment)</td>
<td>Large equipment</td>
<td>07</td>
<td></td>
</tr>
<tr>
<td>0033</td>
<td>Household Medical (incl. thermometers, blood pressure meters)</td>
<td>Small equipment</td>
<td>05</td>
<td></td>
</tr>
<tr>
<td>0034</td>
<td>Professional Medical (incl. hospital, dental, diagnostics)</td>
<td>Large equipment</td>
<td>05</td>
<td></td>
</tr>
<tr>
<td>0035</td>
<td>Household Monitoring &amp; Control (alarm, heat, smoke, excl. sensors)</td>
<td>Small equipment</td>
<td>05</td>
<td></td>
</tr>
<tr>
<td>0036</td>
<td>Professional Monitoring &amp; Control (incl. laboratory, control panels)</td>
<td>Large equipment</td>
<td>05</td>
<td></td>
</tr>
<tr>
<td>0037</td>
<td>Non Cooled Dispensers (incl. for vending, hot drinks, tickets, money)</td>
<td>Large equipment</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>0038</td>
<td>Cooled Dispensers (incl. for vending, cold drinks)</td>
<td>Cooling and Freezing</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>
## E-waste classification: Link UNU-KEYS to the HS codes

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

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 (%)

\[ \text{E-waste collection rate} = \frac{E\text{-waste formally collected (weight)}}{E\text{-waste generated (weight)}} \times 100 \]
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)

\[ S(n) = \sum_{t=t_0}^{n} POM(t) - \sum_{t=t_0}^{n} E \text{ waste generated} (n) \]
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

\[
E_{\text{waste generated}}(n) = \sum_{t=t_0}^{n} POM(t) \times L^{(p)}(t, n)
\]
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
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.
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

Total weight of e-waste resulting from EEE placed on the market + Other collection of e-waste + Unaccounted e-waste = E-WASTE GENERATED

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
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

**POM Data**

**EEE Put on Market Tool**

**E-waste generated Tool**

- Input POM data
- Calculate E-waste generated
- Export results

**Contents**

- **About this file**
  - The EEE Put on Market Tool has been developed by UNITED NATIONS 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**

- Col
- Avg
- Cnt
- Csl

Developed by UNITED NATIONS UNIVERSITY
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

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

B. 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)

C. 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).

D. Restructuring the data in a PIVOT table

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

- **Year** = “2014”
- **HS code (six digits)** = “845110”
- **Quantity unit** = KGM (kilograms) or NMB (number of pieces)
Functionalities of the Tool

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

- 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.
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).

- 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.
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).

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

![Image of a spreadsheet with data]

- 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).

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

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

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

Restructuring the data in a PIVOT table

![PIVOT Table Example](image-url)
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").
## Exercise

### Imports

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>841451</td>
<td>8414510000</td>
<td>Ventilators</td>
<td>1,960,462</td>
<td>1,869,698</td>
<td>1,516,928</td>
<td>1,470,358</td>
<td>2,477,378</td>
<td>2,408,040</td>
<td>1,528,667</td>
</tr>
</tbody>
</table>

### Exports

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>841451</td>
<td>8414510000</td>
<td>Ventilators</td>
<td>54045</td>
<td>49848</td>
<td>60377</td>
<td>34201</td>
<td>26737</td>
<td>48289</td>
<td></td>
</tr>
</tbody>
</table>

#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.
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
- Entering data in the Tool
- Calculate E-waste generated
- Lifespan graphs
- Export Results

Grenda, 06.11.2019
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

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EU-6</td>
<td></td>
<td>14</td>
<td>15</td>
<td>17</td>
<td>18</td>
<td>19</td>
<td>21</td>
<td>22</td>
<td>24</td>
<td>25</td>
</tr>
<tr>
<td>EU-6PV</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>EU-10</td>
<td></td>
<td>87</td>
<td>94</td>
<td>102</td>
<td>109</td>
<td>118</td>
<td>126</td>
<td>136</td>
<td>145</td>
<td>156</td>
</tr>
<tr>
<td>EU-10PV</td>
<td></td>
<td>37</td>
<td>40</td>
<td>43</td>
<td>46</td>
<td>50</td>
<td>53</td>
<td>57</td>
<td>61</td>
<td>66</td>
</tr>
<tr>
<td>UNU</td>
<td></td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>10</td>
<td>11</td>
<td>13</td>
</tr>
<tr>
<td>0001</td>
<td></td>
<td>14</td>
<td>15</td>
<td>17</td>
<td>18</td>
<td>19</td>
<td>21</td>
<td>22</td>
<td>24</td>
<td>25</td>
</tr>
<tr>
<td>0002</td>
<td></td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>7</td>
<td>8</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>0004</td>
<td></td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0101</td>
<td></td>
<td>14</td>
<td>15</td>
<td>17</td>
<td>18</td>
<td>19</td>
<td>21</td>
<td>22</td>
<td>24</td>
<td>25</td>
</tr>
<tr>
<td>0102</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0103</td>
<td></td>
<td>87</td>
<td>94</td>
<td>102</td>
<td>109</td>
<td>118</td>
<td>126</td>
<td>136</td>
<td>145</td>
<td>156</td>
</tr>
<tr>
<td>0104</td>
<td></td>
<td>37</td>
<td>40</td>
<td>43</td>
<td>46</td>
<td>50</td>
<td>53</td>
<td>57</td>
<td>61</td>
<td>66</td>
</tr>
<tr>
<td>0105</td>
<td></td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>10</td>
<td>11</td>
<td>13</td>
</tr>
<tr>
<td>0106</td>
<td></td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0107</td>
<td></td>
<td>461</td>
<td>498</td>
<td>538</td>
<td>579</td>
<td>622</td>
<td>668</td>
<td>717</td>
<td>768</td>
<td>823</td>
</tr>
<tr>
<td>0108</td>
<td></td>
<td>83</td>
<td>98</td>
<td>114</td>
<td>130</td>
<td>148</td>
<td>166</td>
<td>186</td>
<td>207</td>
<td>230</td>
</tr>
<tr>
<td>0109</td>
<td></td>
<td>24</td>
<td>50</td>
<td>77</td>
<td>106</td>
<td>136</td>
<td>169</td>
<td>204</td>
<td>241</td>
<td>280</td>
</tr>
<tr>
<td>0111</td>
<td></td>
<td>24</td>
<td>32</td>
<td>39</td>
<td>47</td>
<td>56</td>
<td>64</td>
<td>74</td>
<td>84</td>
<td>95</td>
</tr>
<tr>
<td>0112</td>
<td></td>
<td>81</td>
<td>88</td>
<td>95</td>
<td>102</td>
<td>110</td>
<td>118</td>
<td>126</td>
<td>135</td>
<td>145</td>
</tr>
<tr>
<td>0113</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>0114</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>0115</td>
<td></td>
<td>387</td>
<td>418</td>
<td>451</td>
<td>485</td>
<td>522</td>
<td>560</td>
<td>601</td>
<td>644</td>
<td>690</td>
</tr>
<tr>
<td>0121</td>
<td></td>
<td>22</td>
<td>25</td>
<td>28</td>
<td>31</td>
<td>34</td>
<td>37</td>
<td>41</td>
<td>45</td>
<td>51</td>
</tr>
<tr>
<td>0122</td>
<td></td>
<td>45</td>
<td>50</td>
<td>56</td>
<td>62</td>
<td>69</td>
<td>76</td>
<td>93</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>0123</td>
<td></td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0124</td>
<td></td>
<td>18</td>
<td>19</td>
<td>21</td>
<td>22</td>
<td>24</td>
<td>26</td>
<td>28</td>
<td>30</td>
<td>32</td>
</tr>
<tr>
<td>0125</td>
<td></td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>0126</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Red font means: data has been changed from original input.
Entering data in the Tool
Entering data in the Tool

**POM**

**E-waste generated Tool**

Country: BIH

- Input POM data
- Calculate E-waste generated
- Export results

**Options to select different classifications:**

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

Developed by

[UNIVERSITY OF THE UNITED NATIONS]

[FrontPage | Indicators | ResultPOM | ResultWG | ResultIMP | ResultEXP | ResultCOL | Graph]
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

E-waste generated Tool

Country: BIH

- Input POM data
- Calculate E-waste generated
- Export results

Developed by

UNITED NATIONS UNIVERSITY

- 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 where the WEEE calculation tool is stored.
## Export Results

### Indicators

<table>
<thead>
<tr>
<th></th>
<th>ResultPOM</th>
<th>ResultWG</th>
<th>GraphLifespan</th>
<th>GraphWG_EU6</th>
<th>GraphPOM_EU6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Full name</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Put on Market</td>
<td>51229</td>
<td>53383</td>
<td>52520</td>
<td>60575</td>
<td>78599</td>
</tr>
<tr>
<td>E-waste generated</td>
<td>25866</td>
<td>28149</td>
<td>30553</td>
<td>33140</td>
<td>35949</td>
</tr>
</tbody>
</table>

**Weight in tonnes**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>51229</td>
<td>53383</td>
<td>52520</td>
<td>60575</td>
<td>64634</td>
<td>78599</td>
<td>87664</td>
<td>102292</td>
<td>125192</td>
</tr>
<tr>
<td>25866</td>
<td>28149</td>
<td>30553</td>
<td>33140</td>
<td>35949</td>
<td>38997</td>
<td>42337</td>
<td>45864</td>
<td>49949</td>
</tr>
</tbody>
</table>
Export Results

### POM RESULTS

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Temperat.</td>
<td>13740</td>
<td>14170</td>
<td>16841</td>
<td>17708</td>
<td>19352</td>
<td>22975</td>
<td>23600</td>
<td>27637</td>
<td>33556</td>
</tr>
<tr>
<td>2</td>
<td>Screens, n</td>
<td>10210</td>
<td>13814</td>
<td>7354</td>
<td>11654</td>
<td>7088</td>
<td>12073</td>
<td>15437</td>
<td>21319</td>
<td>27337</td>
</tr>
<tr>
<td>3</td>
<td>Lamps</td>
<td>1975</td>
<td>1840</td>
<td>1999</td>
<td>1630</td>
<td>2166</td>
<td>2041</td>
<td>2051</td>
<td>2481</td>
<td>2439</td>
</tr>
<tr>
<td>4a</td>
<td>Large equ.</td>
<td>5874</td>
<td>5670</td>
<td>5634</td>
<td>5708</td>
<td>6612</td>
<td>7871</td>
<td>8377</td>
<td>10216</td>
<td>13773</td>
</tr>
<tr>
<td>4b</td>
<td>Photovolt.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>Small equ.</td>
<td>16920</td>
<td>13096</td>
<td>15101</td>
<td>15653</td>
<td>21922</td>
<td>25120</td>
<td>28248</td>
<td>29858</td>
<td>35734</td>
</tr>
<tr>
<td>6</td>
<td>Small IT</td>
<td>2510</td>
<td>4192</td>
<td>5591</td>
<td>7310</td>
<td>7494</td>
<td>8521</td>
<td>9951</td>
<td>10782</td>
<td>12353</td>
</tr>
</tbody>
</table>

| TOTAL | 51229 | 53383 | 52520 | 60575 | 64634 | 78599 | 87664 | 102292 | 125192 |

### Indicators
- Result POM
- Result WG
- Graph Lifespan
- Graph WG EU6
- Graph POM EU6
## Export Results

### Result WG

**E-waste generated**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tempera</td>
<td>5431</td>
<td>6032</td>
<td>6647</td>
<td>7267</td>
<td>7901</td>
<td>8573</td>
<td>9269</td>
<td>10029</td>
<td>10869</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Screens</td>
<td>5389</td>
<td>5901</td>
<td>6411</td>
<td>6895</td>
<td>7354</td>
<td>7800</td>
<td>8283</td>
<td>8855</td>
<td>9574</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Lamps</td>
<td>1428</td>
<td>1505</td>
<td>1579</td>
<td>1632</td>
<td>1689</td>
<td>1746</td>
<td>1796</td>
<td>1861</td>
<td>1934</td>
<td></td>
</tr>
<tr>
<td>4a</td>
<td>Large equi</td>
<td>2350</td>
<td>2632</td>
<td>2911</td>
<td>3177</td>
<td>3437</td>
<td>3699</td>
<td>3971</td>
<td>4290</td>
<td>4683</td>
<td></td>
</tr>
<tr>
<td>4b</td>
<td>Photovolts</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Small equi</td>
<td>9059</td>
<td>9664</td>
<td>10241</td>
<td>10873</td>
<td>11694</td>
<td>12643</td>
<td>13709</td>
<td>14745</td>
<td>15965</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Small IT</td>
<td>2208</td>
<td>2415</td>
<td>2764</td>
<td>3296</td>
<td>3875</td>
<td>4537</td>
<td>5308</td>
<td>6085</td>
<td>6924</td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL**

<table>
<thead>
<tr>
<th>Indicators</th>
<th>ResultPOM</th>
<th>ResultWG</th>
<th>GraphLifeSpan</th>
<th>GraphWG EU6</th>
<th>GraphPOM EU6</th>
</tr>
</thead>
</table>
Export Results

Graph Lifespan

Lifespan Graphs

Select UN 0306
Average Lifetime 5.07 years
Mobile Phones (incl. smartphones, pagers)

Select ref 2018

E-Waste generated per year in percentage of POM

E-Waste generated per year in percentage of POM (cumulative)
Export Results

GraphWG_EU6

E-waste generated (EU6) in tonnes

- Full name
- Temperature exchange equipment
- Screens, monitors, and equipment containing screens (....)
- Lamps
- Large equipment (excluding photovoltaic panels)
- Photovoltaic panels (incl. converters)
- Small equipment
- Small IT and telecommunication equipment
Export Results

Put on Market (EU6) in tonnes

- Small IT and telecommunication equipment
- Small equipment
- Photovoltaic panels (incl. converters)
- Large equipment (excluding photovoltaic panels)
- Lamps
- Screens, monitors, and equipment containing screens (…)
- Temperature exchange equipment
¿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?
Thank you for your attention!

Michelle Wagner
Email: wagner@vie.unu.edu

UNITED NATIONS UNIVERSITY | Vice Rectorate in Europe | Sustainable Cycles Programme (SCYCLE)
Platz der Vereinten Nationen 1 | 53113 Bonn | GERMANY
www.unu.edu | scycle.vie.unu.edu | www.step-initiative.org
Extra Slides

1. E-waste in the Caribbean - Current Situation
2. E-waste global problems
3. 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: 0.03%
- E-waste formally collected:
  - E-waste Imported: n/a kt
  - E-waste Exported: n/a kt

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

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bahamas</td>
<td>13.2</td>
<td>4,900</td>
<td>No</td>
</tr>
<tr>
<td>Barbados</td>
<td>13.7</td>
<td>3,800</td>
<td>No</td>
</tr>
<tr>
<td>Belize</td>
<td>6</td>
<td>2,300</td>
<td>No</td>
</tr>
<tr>
<td>Dominica</td>
<td>7.7</td>
<td>500</td>
<td>No</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>5.8</td>
<td>59,000</td>
<td>No</td>
</tr>
<tr>
<td>Grenada</td>
<td>7.8</td>
<td>800</td>
<td>No</td>
</tr>
<tr>
<td>Guyana</td>
<td>6.1</td>
<td>4,700</td>
<td>No</td>
</tr>
<tr>
<td>Jamaica</td>
<td>5.9</td>
<td>17,000</td>
<td>No</td>
</tr>
<tr>
<td>Saint Kitts and Nevis</td>
<td>12.1</td>
<td>700</td>
<td>No</td>
</tr>
<tr>
<td>Saint Lucia</td>
<td>9.3</td>
<td>1,600</td>
<td>No</td>
</tr>
<tr>
<td>Saint Vincent and the Grenadines</td>
<td>8.3</td>
<td>900</td>
<td>No</td>
</tr>
<tr>
<td>Suriname</td>
<td>9.6</td>
<td>5,400</td>
<td>No</td>
</tr>
<tr>
<td>Trinidad and Tobago</td>
<td>15.8</td>
<td>22,000</td>
<td>No</td>
</tr>
</tbody>
</table>

Source: Global E-waste Monitor 2017
### E-waste quantities:

#### E-waste generation in CARICOM

<table>
<thead>
<tr>
<th>Country</th>
<th>E-waste in kg/inh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trinidad and Tobago</td>
<td>15.8</td>
</tr>
<tr>
<td>Barbados</td>
<td>13.7</td>
</tr>
<tr>
<td>Bahamas</td>
<td>13.2</td>
</tr>
<tr>
<td>Saint Kitts and Nevis</td>
<td>12.1</td>
</tr>
<tr>
<td>Suriname</td>
<td>9.6</td>
</tr>
<tr>
<td>Saint Lucia</td>
<td>9.3</td>
</tr>
<tr>
<td>Saint Vincent and the Grenadines</td>
<td>8.3</td>
</tr>
<tr>
<td>Grenada</td>
<td>7.8</td>
</tr>
<tr>
<td>Dominica</td>
<td>7.7</td>
</tr>
<tr>
<td>Guyana</td>
<td>6.1</td>
</tr>
<tr>
<td>Belize</td>
<td>6</td>
</tr>
<tr>
<td>Jamaica</td>
<td>5.9</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>5.8</td>
</tr>
</tbody>
</table>

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