



Good practice guide for the prevention of Waste Electrical and Electronic Equipment (WEEE) production

ReWeee

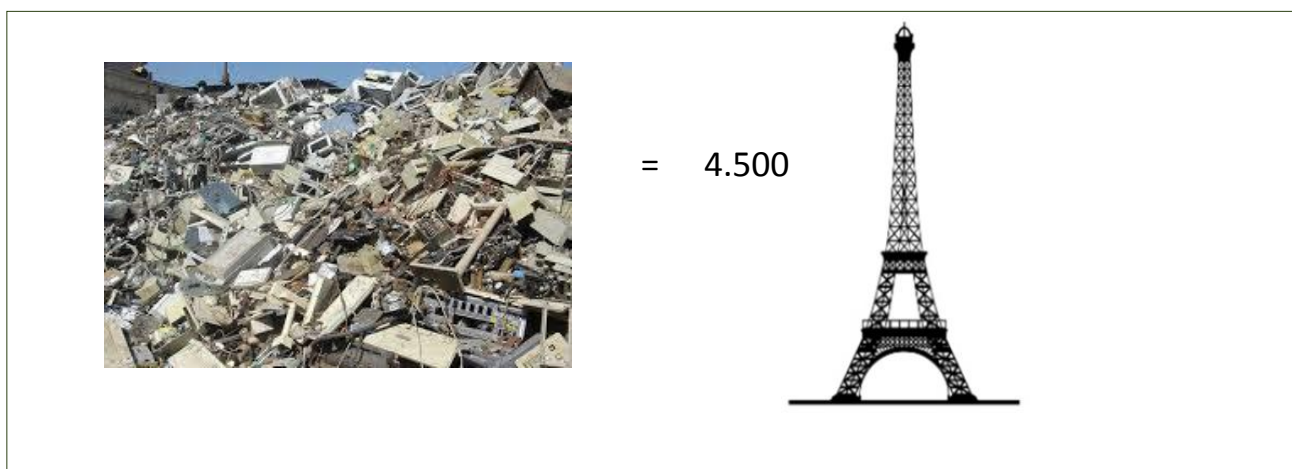
«Development and demonstration of Waste Electrical and Electronic Equipment (WEEE)
prevention and reuse paradigms»

LIFE Project Number: **LIFE14/ENV/GR/000858**

1. Introduction

The constantly increasing amount of WEEE stem from different trends. The growing number of users and rapid technological developments has led to innovative actions and socio - economic development. By 2017, almost half of the world's population is using the internet and the majority of the population has access to wireless networks and services.

For the year 2016, all countries worldwide produced a total of 44.7 million tonnes (Mt) or equivalent 6.1 kg per inhabitant (kg / inh) of WEEE, compared to 5.8 kg / inh in 2014. This quantity is equal to 4.500 Eiffel Towers! The amount of WEEE is expected to increase to 52.2 million tonnes or 6.8 kg / inh until 2021.



1.1. Re-use

Re-use is regarded as a major priority according to the European waste policy, which promotes a transition to a stronger economy and the sustainable use of resources. The circular economy model was developed to increase the life and use of products and hence maintain their value over a longer period of time and thereby reduce the waste generated.

According to Eurostat¹, between 2005 and 2015, the percentage of WEEE prepared for reuse accounts for about 1-2% of the WEEE collected between EU countries over the same period. In addition, Eurobarometer survey for Greece ²showed that:

- About **82%** of respondents **are trying to repair** their damaged appliances before buying new and
- About **66%** of respondents **give / sell items for reuse**

Small tips to increase re-use of EEE and WEEE :

- ❖ **Buy re-used devices**, which are often cheaper and still functional.
- ❖ Prefer buying **devices** which are **designed to be re-used**.
- ❖ **Keep and repair your devices** in order to extend their life span and avoid buying of new ones frequently.
- ❖ **Borrow or share devices** that are not frequently used, such as tools, in order to avoid buying new ones.

¹ Eurostat 2018

² Flash Eurobarometer report 2013

2. General Guidelines – Extending the life of your EEE

Buy certified appliances

- To ensure that your device has the expected lifetime, you should always buy electrical and electronic equipment that **complies with European standards**. Each device must be **CE marked**. The CE marking proves that your product has been tested and meets all European standards for safety, health and environmental protection.

Keep your appliances clean from dust and debris

- Not adequate cleaning of the appliances may affect their performance as well as the frequency of damages. The **dust and debris** on the surface of the EEE **should be cleaned frequently** as they enter the interior of the devices over time, preventing them from functioning properly.

Keep moisture out

- If **moisture** enters the operating mechanism of EEE, the performance of the appliance may be affected, or it can lead to serious damage or even destruction of the device. In addition, if the devices are exposed to moisture, and their outer cover is metallic, they may rust.

Follow the manufacturer's guidelines

- Each appliance has certain operating specifications according to the manufacturer** such as the suitable load (e.g. the kilograms of clothes for your washing machine, or the maximum weight and volume of materials for your blender). By overloading a device or operating it under unsuitable conditions, its components are worn and damages are more likely to occur. In addition, under inappropriate operating conditions appliances may have lower performance (e.g. not very clean clothes, lower speed of a computer etc.).

Keep kids and pets away from your appliances

- Small **children and pets** can cause minor or major damage to your devices at any time, which then affects the performance of your device.

Replace damaged or broken parts

- **Replacing damaged or broken parts** is particularly important for the proper functioning of EEE. The operation of a device with broken parts burdens some other component, leading to faster destruction of the device.

Protect your appliances from fluctuations in power

- The **intense fluctuations in the power supply** can damage your devices. Such fluctuations may arise either due to non-fixed supply from the network itself or due to other incidents such as bad weather (eg lightning) that may affect the operation of the network. If you can predict such an incident (eg from heavy rainfall) it is recommended to **turn off and disconnect electrical appliances**.

Perform regular maintenance according to manufacturer's commendation

- **Regular maintenance of your appliances** will increase their efficiency and lower operating costs, as well as ensures longer life for your equipment.

3. How to extend the life of your *laptop*



1. **Remove dust and debris from the keyboard and the screen** at least once a year. If you don't know how to safely clean the laptop refer to a specialised service/repair center.
2. **Remove the laptop battery at regular** basis in order to clean metal contacts from dust with a dry and clean cloth.
3. Always **transfer** your laptop **in a protective case**.
4. **In order to avoid overheating of the device don't block the air flow and the fan operation**. In addition, don't place the laptop next to heat sources or direct sunlight that may also result in overheating of the device.
5. Make sure you have **enough RAM and Hard Disc Space**.
6. **Unplug any laptop accessories you aren't using**, as they drain power from your battery.
7. **Turn your wireless local area network (WLAN) off if you don't need it**, as it drains power from the battery.
8. **Use your laptop in the best possible lighting conditions**. In brighter conditions you won't need to set your laptop screen to maximize brightness, so you can save additional battery life.
9. **Defragment the hard drive** in order your system to operate more efficiently.
10. **Reduce** the amount of **time your inactive laptop stays on before powering itself down and going to sleep**. This way you save energy.
11. **Run regular** software and operating system **updates**.
12. If your laptop has **Li-Ion battery**, **avoid very deep discharges** and avoid **charging to 100% capacity** (BatteryUniversity 2018, Hoffart 2008). Keep your battery cool during charging (Battery University 2018, TechAdvisor 2018, Hoffart 2008).
13. **Upgrade or replace the laptop's hardware components** that slow down your computer or are broken with REEE components or with new ones (always according to the manufacturer's specifications).

Sources: Hoag et al. 2009, Make Use Of 2013, Dell 2018, Battery University 2018, Tech Advisor 2018, Hoffart 2008, Greenpeace 2017, Treehugger 2016

4. How to extend the life of your *mobile phone*

1. **Remove regularly dust and debris** from the keyboard and the screen.
2. **Use a case and a screen protector for your mobile phone** to prevent scratches and damages when placing the mobile phone in bags or pockets. At the same time the device is protected from dust and dirt.
3. **Adjust the brightness of the screen** properly.
4. **Run regular software updates.**
5. **Connections and signal:** Switch off wireless connection, GPS and Bluetooth when you are not using it so as to save energy.
6. Release space by **deleting the applications you are not using.**
7. To **free up space** on your phone store large files on either a removable memory card or back up older files on an external hard drive and remove them from your phone.
8. **Keep your mobile cool.** Don't place it next to heat sources or direct sunlight that may result in overheating of the device.
9. **When charging, the battery should be kept at a normal temperature.** Protective cases used in mobiles and the charging point are often responsible for increasing the temperature during charging. When charging your phone remove the case and don't place the cellphone between sheets or blankets that may increase the temperature of the device. **Avoid fast charging** (Battery University 2018, Hoffart 2008).
10. If your laptop has **Li-Ion battery, avoid very deep discharges** and avoid **charging to 100% capacity** (BatteryUniversity 2018, Hoffart 2008). A full zero to 100 percent battery recharge (a "charge cycle") is recommended once a month (TechAdvisor 2018).
11. **Replace the battery of your mobile if necessary.** In case you have to recharge your battery very often to get the expected level of performance, in case your mobile is overheated during charging or is discharged very often, although you are not using it intensively, there is significant indication that you have to replace the battery of your phone. Prefer REEE component or a new one (always according to the manufacturer's specifications).
12. **Replace damaged or broken components** with REEE components or with new ones (always according to the manufacturer's specifications).



Sources: Hoag et al. 2009, Make Use Of 2013, Dell 2018, Battery University 2018, Tech Advisor 2018, Hoffart 2008, Greenpeace 2017, Treehugger 2016

5. How to extend the life of your *air-condition*

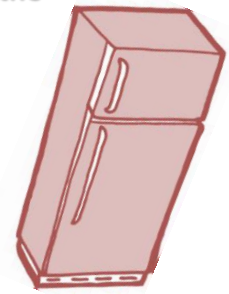
1. **Keep your outdoor unit clean.** Dust or weeds may affect the performance of the air-condition unit.
2. **Check airflow and keep vents clear.** The areas around the vents should be kept clear so that nothing blocks the airflow —on outlets as well as return air grilles. Drapes, coverings or furniture may block airflow.
3. **Clean the filters on your heating/cooling unit.** Wash the filters in the sink with soap and a cloth. Wait for them to dry before reinstalling them. Once a week, you can also remove the filter and remove the dust with your hair dryer or vacuum cleaner.
4. **Clean the grilles of the unit** regularly from dust for better air flow.
5. **Adjust the thermostat** of the device properly. Comfort conditions in a room are between 20 and 27 ° C.
6. **Replace damaged or broken parts** with REEE components or with new ones (always according to the manufacturer's specifications).
7. Perform **scheduled maintenance** in a timely manner by qualified personnel.
8. **When you are going to leave for a long time**, it is advisable to **unplug the air-codition** to protect it from potential power fluctuations.



Sources: SEARS, Hanson Electrical 2017, Fidelity National Home Warranty, RepairClinic, Service Smith

6. How to extend the life of your *refrigerator*

1. When **place items/products** in the doors, place the heaviest of them **closest to the hinge side**.
2. **Keep the seals in the doors clean**. Properly sealed fridge keeps the cold air in and the hot air out. You can use soap and water to clean the seals.
3. **Don't overload the refrigerator and/or freezer** in order to avoid added strain to the machine that reduces its lifespan.
4. Always check the temperature. **The refrigerator thermostat should be set at 4 ° C and the freezer at -18 ° C**.
5. Make sure that there is **enough space between the items** for better air flow in order to achieve the appropriate temperature in the refrigeration room.
6. **Don't block airflow. Move any items around the vents** inside the unit in order to give them adequate space. This way you will have sufficient airflow in the refrigeration room.
7. **Defrost freezers** about once a year (in case derfrosting is not automatic).
8. Make sure that **condenser coils**, which are at the rear of the refrigerator are **a few centimeters away from the wall or other fixed point** where the device will be placed.
9. **Clean the condenser coils** of the fridge every six months. On most cases, the coils are behind a vanity grill at the bottom of the unit.
10. External conditions may affect the performance of the device. **When the outside temperature and humidity is high, turn off the power saver mode**. When activated, the heaters that dry the cooling space and remove moisture do not work.
11. **Don't place the refrigerator near heat-generating devices**.
12. **Empty and clean the refrigerator compartment regularly**.
13. Perform **scheduled maintenance in a timely manner** by qualified personnel.
14. **Replace damaged or broken parts with REEE components or with new ones** (always according to the manufacturer's specifications).
15. **When you are going to leave for a long time**, it is advisable to **empty** the refrigerator and the freezer and **unplug the appliance** to protect it from potential power fluctuations.



Sources: SEARS, WHO 2014, Hanson Electrical 2017, Fidelity National Home Warranty, RepairHome, Appliances Connection Blog 2013, Three Thrifty Guys 2016, RepairClinic, It Is Fixed

7. Second chance

Re-use, according to Law 4042/2012, means any operation by which products or components that are **not waste** are used again for the same purpose for which they were conceived. Hence, a device that is no longer useful to one person, without necessarily having completed its life cycle, can be useful to another person contributing that way in the extension of the device's life span and thus preventing it from the waste stream and simultaneously helping to reduce consumption of raw materials in order to produce a new one.

7.1. Exchange – Donate

This practice is gaining ground every day and new individual and community initiatives and actions are being constantly developed. Different opportunities that citizens have for the exchange or donation of EEE include:

- ✓ **Online exchange platforms**
- ✓ **Bazaars**
- ✓ **Bodies and Institutions**, such as municipalities, orphanages, hostels, etc., who need product donations for their disposal to vulnerable social groups.

① *Devices exchanged or donated must be **fully functional, in good condition and clean.***

Indicative examples

○ **Social exchange of household appliances in Municipality of Maroussi**

Exchange of functional and in good condition household appliances, such as electric stoves, refrigerators, washing machines and other small or large appliances. The appliances are donated by citizens that don't need them and are available to citizens that belong to vulnerable social groups.

○ **Social exchange in the Municipality of Pallini**

New or used clothing and footwear, books, household items, electrical appliances in operation are available for exchange.

○ **Web pages**

- ❖ Xariseto - <https://xariseto.gr/>
- ❖ Antallaxeto - <http://antallaxeto.blogspot.gr/>
- ❖ Trade now - <http://www.tradenow.gr/en/welcome.aspx>

In the framework of the LIFE RE-WEEE project “Development and demonstration of Waste Electrical and Electronic Equipment (WEEE) prevention and reuse paradigms” (LIFE14/ENV/GR/000858) an web-based platform for the donation / exchange of electrical and electronic equipment (EEE) that citizens no longer need is available.

The RE(W)EEE platform provides the opportunity to donate or exchange electrical and electronic appliances that someone no longer needs. Thus, a device that would be left unused on a shelf or would end up in the waste bin could find a "second" life in the hands of another person that actually needs it.

The RE(W)EEE platform is available in the following link:

<https://reweee.hua.gr/el/>

8. Risks from not proper WEEE management

Health issues

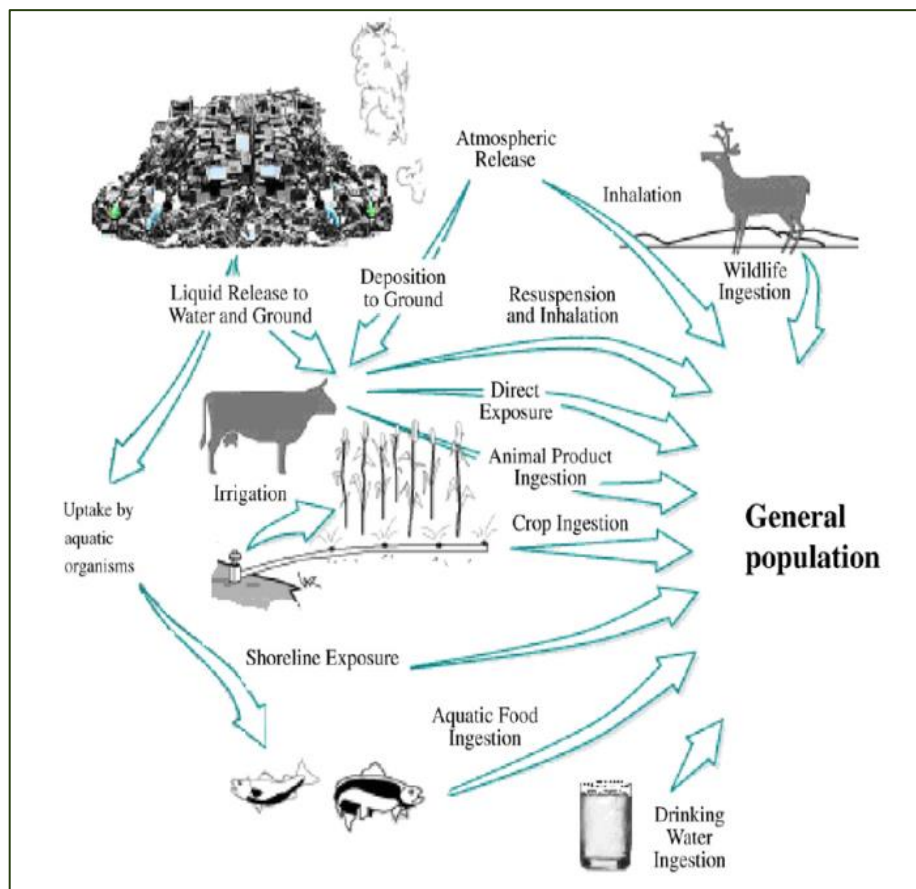
The short as well as long term effects of the exposure to hazardous substances contained in WEEE are being investigated thoroughly as they are not fully known. Studies and research are conducted in order to examine the connection between exposure to WEEE and chemicals and metals found in biological human samples (Perkins et al, 2014). Among the health effects recorded in the literature are changes in respiratory function, children's developmental disorders, endocrine disorders etc.

According to Grant et al. 2013, Perkins et al. 2014 and WEENMODELS LIFE 2016, adverse health implications may include:

- ❖ Changes in **respiratory** function
- ❖ Changes in **thyroid** function and **hormone** expression
- ❖ Changes in temperament, **behaviour**, cognitive development and mental health
- ❖ Spontaneous **abortions, stillbirths**
- ❖ Change in birthweight and **childhood growth rates**
- ❖ **Genotoxicity and carcinogenic** effects
- ❖ **Endocrine** disrupting **properties**

Environmental issues

Exposure of WEEE in weather conditions (e.g. rain, sun, wind) as well as direct contact with soil may result in the leakage of hazardous substances contained in WEEE components such as heavy metals (lead, arsenic, cadmium etc.) and radioactive substances that may cause substantial damage to soil characteristics such as moisture, nutrient content, fertility, and so on as well as to the quality of the aquifer.



All the above may pose adverse effects to the public health due to the contamination of water, soil and air.

In the above picture the routes and behaviour of WEEE related mixture of pollutants in the environment as well as the food chain contamination are presented. (Source: Frazzoli et al, 2010).

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