USER MANUAL
EuPeco-profiler version 1.0

www.simpple.com / info@simpple.com

Av. Països Catalans, 15C - 43207 Tarragona (Spain)

Tel. +34 977110520 / Fax. +34 977110529

EuPeco-profiler (version 1.0)

www.simpple.com

EuPeco-profiler has been developed under the LiMaS Project www.limas-eup.eu

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Database of EuPeco-profiler**:**

Contents

1.- INTRODUCTION

EuP_{eco-profiler} is a **Life Cycle Assessment** (ISO 14040/44) **tool for Energy-using Products (EuPs)**. It follows rules and criteria of **MEEuP Methodology** - *developed by VHK for the European Commission (MEEuP Methodology Report, Final / 28.11.2005 / VHK for EC) -*. This is a tool for supporting **Eco-Innovation in SMEs of EuP sector** and it allows identifying, quantifying and communicating the **environmental profile** of energy-using products by using the same database and indicators utilised by the European Commission in preparatory studies of the EuP Directive (Directive 2005/32/EC repealed by the new ErP Directive 2009/125/EC).

The following figure shows the **applicability** of **EuP_{eco-profiler}**: identification and quantification of the most significant environmental aspects of an EuP considering all its life cycle phases.
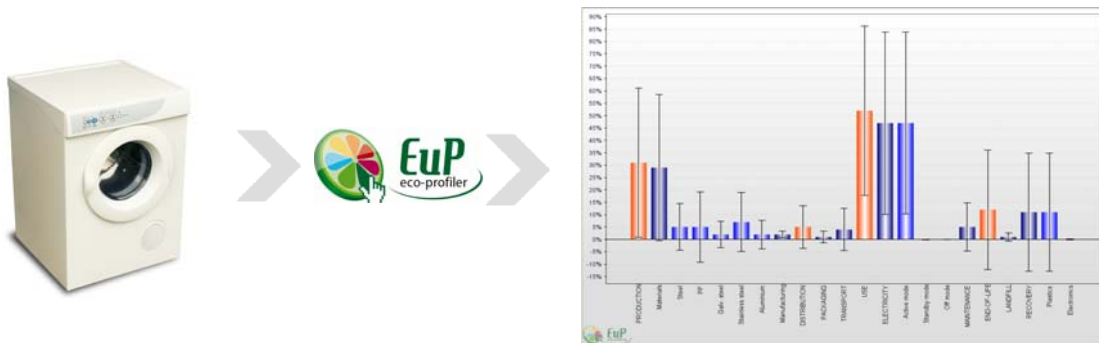
EuP_{eco-profiler} is organised in the following **calculation steps**:

1. Characterisation: data entry for the EuP to be assessed

2. Indicators: selection of indicators to be calculated

3. Results: automatic calculation of impact results

4. Graphics: user definition of graphics to be displayed

❀ Each calculation step has a complete menu of functions to facilitate its use (*see **section 4***).

The main **characteristics** of **EuP_{eco-profiler}** are the following:

- ❀ user-friendly tool for technicians, not required to be an LCA expert
- ❀ easy modification and creation of new products/processes to be assessed
- ❀ user decides the level of detail of data entry/results
- ❀ easy interpretation of results through menus, tables and graphics
- ❀ direct exportation of results to spreadsheets and image format
- ❀ it is possible to use other databases rather than MEEuP
- ❀ other users could share and access to the same information
- ❀ tool development based in MEEuP and LCA ISO standards (14040/44:2006)
- ❀ the tool could be customised by SIMPPLE to specifics needs

2.- HOW TO INSTAL

SIMPPLE, S.L. grants you **FREE OF CHARGE** a non-exclusive license of **EuPeco-profiler** for personal and/or internal use in your company / organisation / institution, including academic institutions. **It is explicitly excluded of this licence the use of EuPeco-profiler for consultancy services to third parties** without prior written authorisation of SIMPPLE, S.L.

Registration is always required for downloading the tool. The **terms and conditions of the freeware license agreement should be accepted before installing EuPeco-profiler**.

The following section describes the steps to be followed for installing **EuPeco-profiler**.

1.- Go to the **LiMaS Project** website (www.limas-eup.eu).

LiMaS Project website (www.limas-eup.eu)

2.- Go to the **EuPeco-profiler** section of the LiMaS website.

3.- Fill in and send the **user's registration** form.

4.- You will receive an email with a **link** for downloading the tool.

5.- With this link you will have access to the download area of **EuPeco-profiler**. Chose your preferred language and **download the installer to your computer**.

6.- Once you have downloaded the installer, the installation process could start by double-clicking on the installer. Answer all the formulated questions during the installation.

Once the tool has been installed, you can realise that inside "*My documents*" folder a new folder called "*EuPeco-profiler*" has been created. This folder contains two folders: "*DB*" and "*CASE STUDIES*". The first one contains the databases (Inventory & Impacts) and the second one is for storing your "*case studies*". Initially, the "*CASE STUDIES*" folder contains, as examples, the assessment project or "*case study*" of an "*Electric laundry dryer*" and a "*Template*" for case studies.

System requirements for EuPeco-profiler:

- 🍀 EuPeco-profiler 1.0 is a desktop application subjected to a freeware license.
- 🍀 It requires 11.6 MB of free space on the hard disk.
- 🍀 It requires Java 6 (http://www.java.com/en/).
- 🍀 Java 6 requires 100 MB approx. of free space on the hard disk.
- 🍀 It supports Windows XP, Vista and 7.
- 🍀 Export format: Excel.

3.- HOW TO START

EuP_{eco-profiler} can be opened by double-clicking on the shortcut of your desktop or through the "*Start*" menu of your computer. Once the tool is opened, this first screen of the tool shows on its left side the available "*case studies*".

*Initial screen of **EuP_{eco-profiler}***

The tool contains, as examples, the assessment project or "*case study*" of an "*Electric laundry dryer*" and a "*Template*" for case studies, both can be opened by double-clicking on them.

Example of case study

The **Menu bar** of **EuP_{eco-profiler}** includes the following menus: **Case study**, **Characterisation**, **Indicators**, **Results** and **Graphics**. The following section describes these menus.
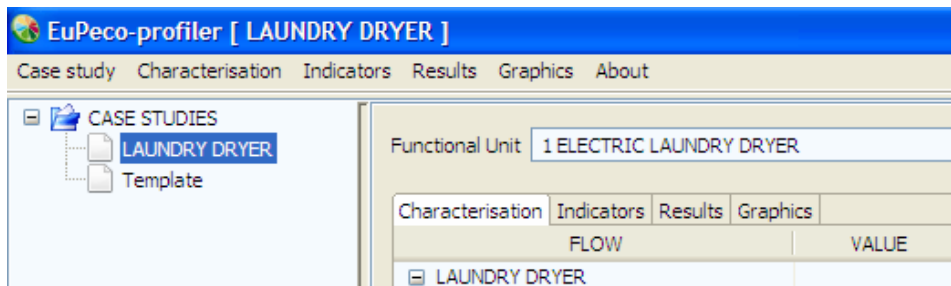
*Menu bar of **EuP_{eco-profiler}***

4.- MENU BAR

4.1.- CASE STUDY MENU

A "*case study*" can be defined as an environmental assessment project of a product or process. "*Case studies*" are created and stored in the "*CASE STUDIES*" folder inside the "*EuPeco-profiler*" folder which is located in "*My documents*". Initially, the "*CASE STUDIES*" folder contains the assessment or "*case study*" of an "*Electric laundry dryer*" and a "*Template*" for case studies. Both examples of "*case studies*" have been created following rules and criteria of MEEuP Methodology (*see* **ANNEX 1 –** *We strongly recommend you to read and consult this annex for a proper use of the tool*).

The "*Case study*" menu includes the following functions (*see* **Figure 1**):
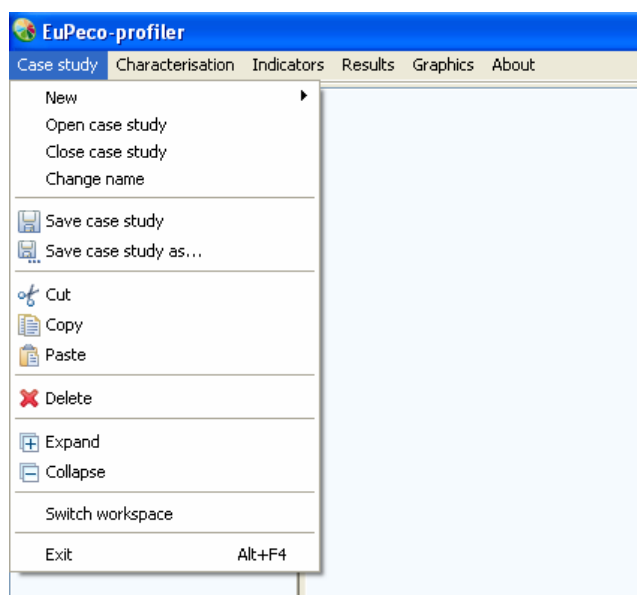
Figure 1.- Functions of "*Case study*" menu

This menu contains the following functions:

- New folder, sub-folder or case study.
- Open case study.
- Close case study.
- Change name: it allows changing the name of folders, sub-folders or case studies.
- Save case study.
- Save case study as…
- Cut a folder, sub-folder or case study.
- Copy a folder, sub-folder or case study.
- Paste a folder, sub-folder or case study.
- Delete a folder, sub-folder or case study.
- Expand / Collapse folders and case studies tree.
- Switch workspace: it allows having the folder: "*EuPeco-profiler*" - with its "*DB*" and "*CASE STUDIES*" *sub-folders* - where the user prefers. This folder can be also placed in a server and be shared by different users. Users can have different workspaces and switch to the required one at any time. New folder/s "*EuPeco-profiler*" can adopt any name, but they must always contain "*DB*" and "*CASE STUDIES*" sub-folders. This function allows creating new workspaces or selecting existing ones (*see* **Figure 2**).
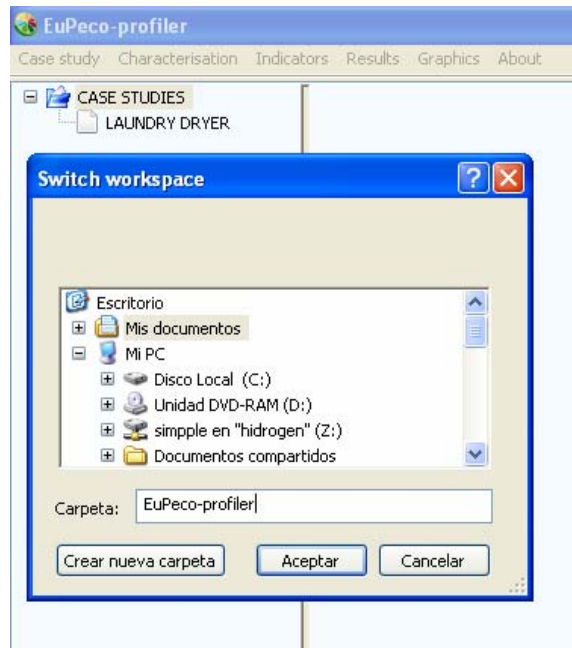
Figure 2.- "*Switch workspace*" function

- ▪ For <u>creating a new workspace</u>: select the destination folder for the new workspace. A new folder called "*EuPeco-profiler*" - *with* <u>empty</u> *"BD" and "CASE STUDIES" sub-folders* - will be automatically created inside it. Copy or move your case studies and databases to these sub-folders.
- ▪ For <u>selecting an existing workspace</u>: select the requierd workspace folder. This folder must contain "*BD*" and "*CASE STUDIES*" sub-folders.

▪ <u>Exit</u> the software tool.

Figure 3 shows an example of structure for folders, sub-folders and case studies. Users can organise their folders/sub-folders/case studies according to their needs and preferences.
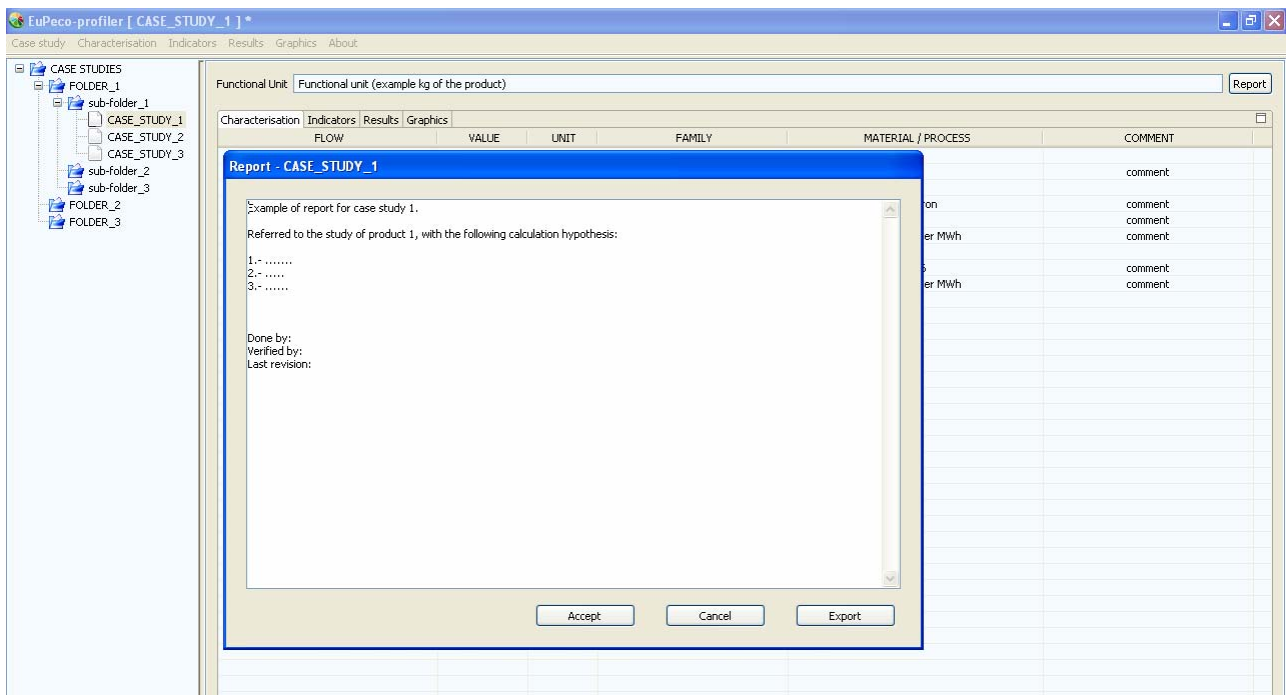
Figure 3.- Example of structure for folders, sub-folders and case studies

⓵ Blank spaces cannot be directly typed in case studies/folders names. They can be used if names are directly changed in the "*CASE STUDIES*" folder, placed in "*My documents*".

Unit/s of product/process under assessment should be specified in "*Functional Unit*" field.

Notes/comments about case studies can be stored in "*Report*" (i.e. product characteristics, process description, calculation hypothesis, date of last revision, etc.). Any change in "*Report*" will be saved with the option "*Accept*". The report can be exported to "*.txt*" with "*Export*".

⓵ The opened "*case study*" has changes to be saved when its name appears in the left upper part of the screen followed by an asterisk " *".

4.2.- CHARACTERISATION MENU

The "*Characterisation*" step is the most important and laborious one. In this step the whole product or process life cycle must be reproduced. All material and process "*flows*" participating along the product's life cycle should be defined and quantified, considering its functional unit.

The "*Characterisation*" menu has the following functions (*see **Figure 4***):
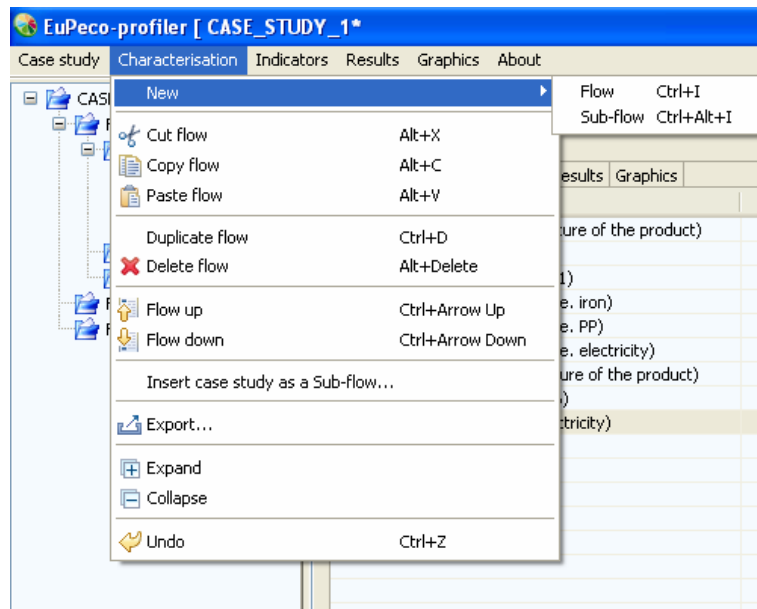
Figure 4.- Functions of "*Characterisation*" menu

This menu allows "*characterising*" products/processes with material and process "*flows/sub-flows*" that the user should define and quantify with the help of the following functions:

- New flow or sub-flow.
- Cut flow or sub-flow.
- Copy flow or sub-flow.
- Paste flow or sub-flow.
- Duplicate flow or sub-flow.
- Delete flow or sub-flow.
- Flow up / Flow down: for moving up/down flows or sub-flows.

- Insert case study as a Sub-flow: this function allows taking advantage of existing "*case studies*" (or parts of them). A "*case study*" can be inserted as a "*sub-flow*" into the structure of a new/existing "*case study*" by following these steps: i) select the "*case study*" that will be inserted in, ii) select the destination position or "*flow*" and iii) apply this function, indicating the number of units to be inserted in.
- Export the content of the "*Characterisation*" screen to an Excel file.
- Expand / Collapse flows or columns.
- Undo last changes made in a "*case study*".

A similar menu will be displayed by using the right button of the mouse.

"*FLOW*" and "*COMMENTS*" columns allow entering the most useful info for users.

Cells of the "*FAMILY*" column have a pop-up menu. The most appropriate family for each defined "*flow*" should be selected (i.e. plastics, metals, manufacturing, etc.). Once the "*FAMILY*" has been fixed, the same procedure should be followed in the "*MATERIAL / PROCESS*" column, for selecting the most appropriate material or process for each "*flow*" (*see* **ANNEX 1** *for knowing available families and materials/processes*).

Once the "*FAMILY*" and the "*MATERIAL / PROCESS*" have been fixed, the tool will automatically display the units for each "*flow*" in the "*UNITS*" column. These units must be used for expressing the required quantity of each "*flow*" in the cells of the "*VALUE*" column. These quantities must be also consistent with the "*case study*" functional unit (*see* **Figure 5**).

FLOW	VALUE	UNIT	FAMILY	MATERIAL / PROCESS	COMMENT
LAUNDRY DRYER					
PRODUCTION					
Materials					
Steel	22.1352	kg	Metals	Steel tube/profile	Ferrous metal
PP	10.1665	kg	Plastics	PP	Plastic
Galv. steel	5.7744	kg	Metals	Steel sheet galvanized	Ferrous metal
Other plastics	3.2617	kg	Plastics	PP	Plastic
Stainless steel	3.0245	kg	Metals	Stainless 18/8 coil	Ferrous metal
ABS	2.7899	kg	Plastics	ABS	Plastic
Copper	0.9361	kg	Metals	Cu winding wire	Non-ferrous metal
Aluminium	0.8612	kg	Metals	Al sheet/extrusion	Non-ferrous metal
PS	0.4979	kg	Plastics	PS	Plastic
Rigid PUR	0.4528	kg	Plastics	PUR (rigid)	Plastic
PA 6	0.2604	kg	Plastics	PA 6	Plastic
PVC	0.1519	kg	Plastics	PVC	Plastic
Al die-cast	0.1100	kg	Metals	Al die-cast	Non-ferrous metal
Cast iron	0.0900	kg	Metals	Cast iron	Ferrous metal
PCB	0.0700	kg	Electronics	PWB 1/2 lay 3,75 kg/m²	Electronics
PMMA	0.0373	kg	Plastics	PMMA	Plastic
Electronics	0.0330	kg	Electronics	SMD/LED's avg.	Electronics
PC	0.0307	kg	Plastics	PC	Plastic
IC	0.0070	kg	Electronics	ICs SMD	Electronics
LEDs	0.0050	kg	Electronics	SMD/LED's avg.	Electronics
Manufacturing					
Plastics	17.6491	kg	Manufacturing	All plastic parts	Manufacturing processes
Foundries Fe	0.0900	kg	Manufacturing	Foundries Fe/Cu/Zn	Manufacturing processes
Foundries Al	0.1100	kg	Manufacturing	Foundries Al	Manufacturing processes
Sheet plant	9.6601	kg	Manufacturing	Sheetmetal plant	Manufacturing processes
Sheet scrap	2.4150	kg	Manufacturing	Sheetmetal scrap	25% of scrap
PCB assembly	0.1150	kg	Manufacturing	PWB assembly	Manufacturing processes
DISTRIBUTION					
PACKAGING	0.3800	m3	Logistics	Packaging (appliance)	Final packaging
TRANSPORT					
LARGE RETAIL					
Transport	0.3800	m3	Logistics	Large retail (appliance)	Distribution to a large retailer
Large retailer	1	u	Logistics	Large retailer activity	Large retailer facilities
RETAIL					
Transport	0.3800	m3	Logistics	Retail (appliance)	Distribution to a retailer
Retailer	1	u	Logistics	Retailer activity	Retailer facilities
USE					
ELECTRICITY					
Active mode	3.409	MWh	Energy	Electricity	Energy consumption (4.49 kWh/cycle)
Standby mode	0.008	MWh	Energy	Electricity	Energy consumption (0.0025 kWh/h)
Off mode	0.005	MWh	Energy	Electricity	Energy consumption (0.00005 kWh/h)
MAINTENANCE					
Transport	160	km	Maintenance / Repairs	Transport (mini-van diesel)	Maintenance service
Repairs					
Materials					
Steel	0.2214	kg	Metals	Steel tube/profile	Ferrous metal - 1% of production
PP	0.1017	kg	Plastics	PP	Plastic - 1% of production
Galv. steel	0.0577	kg	Metals	Steel sheet galvanized	Ferrous metal - 1% of production

Figure 5.- "*Characterisation*" of a product

4.3.- INDICATORS MENU

Once the life cycle of the product has been characterised, the impact "*Indicators*" to be calculated should be selected. MEEuP methodology suggests the calculation of 14 indicators and 2 auxiliary parameters (Electricity requirement and Net calorific value of feedstock). These auxiliary parameters are not as such indicators of environmental impact.

Proposed indicators in MEEuP that can be calculated with **EuPeco-profiler**:

> MEEuP indicators:
> > Gross energy requirement (MJ primary)
> > Process water consumption (ltr. water)
> > Cooling water consumption (ltr. water)
> > Hazardous waste production (g waste)
> > Non-hazardous waste production (g waste)
> > Global warming potential (kg CO_2 eq.)
> > Acidification potential (g SO_2 eq.)
> > Emission of volatile organic compounds (g NMVOCs)
> > Emission of persistent organic compounds (ng I-TEQ)
> > Heavy metals to air (mg Ni eq.)
> > Emission of polycyclic aromatic hydrocarbons (mg Ni eq.)
> > Emission of particulate matter (g PM)
> > Heavy metals to water (mg Hg/20 eq.)
> > Eutrophication (mg PO_4 eq.)

> MEEuP auxiliary parameters:
> > Electricity requirement (MJ primary)
> > Net calorific value of feedstock (MJ primary)

Figure 6 shows the "*Indicators*" screen. The indicators to be calculated should be marked (all or some of them). "*Indicators*" menu only contains the function: "*Empty selection*".
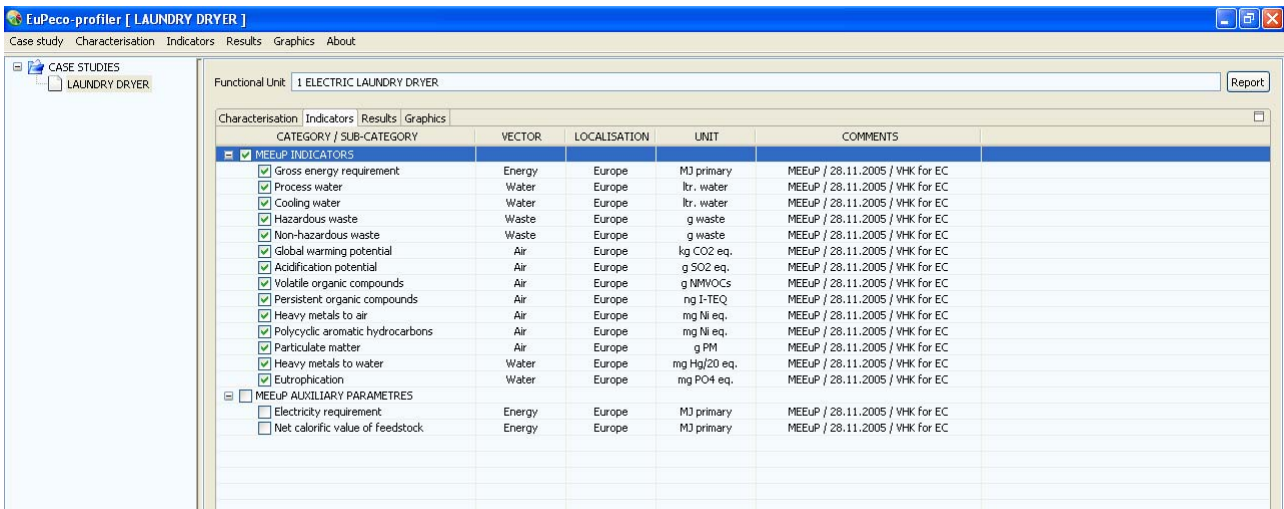
Figure 6.- Available environmental impact indicators

🔔 A selection of indicators will remain unchanged till a new selection is done.

4.4.- RESULTS MENU

Results of the environmental assessment are displayed in a table. This table shows the total score for each indicator (in **bold**) and the contribution of all the characterisation "*flows*". Only indicators previously selected are calculated and displayed in the table (*see* **Figure 7**).

Figure 7.- Example of results

"*Flows*" or columns can be expanded (+) or collapsed (-), according to user's preferences.

Figure 8 shows the functions of "*Results*" menu:

Figure 8.- Functions of "*Results*" menu

- ▪ <u>Initial format</u> of results table.
- ▪ <u>Absolute / Relative percentage</u>: for having results in percentage. If this option is selected, the last two rows of the table will show the average environmental impact of each "*flow*" - *considering an equivalent importance of all selected indicators* - and the standard deviation of this calculation.
- ▪ <u>Show decimals</u>: for having percentage results with two decimals.
- ▪ <u>Significance assessment</u>: it allows performing a significance assessment of results by using three ranges of scores that are highlighted in different colours (red, orange and white).
- ▪ <u>Select / Clear all</u>: for selecting the "*flows*" that will be graphically displayed in "*Graphics*" (☑ ticks on the top of each column). Initially, only second level "*flows*" (production, distribution, use and end-of-life) are pre-selected.
- ▪ <u>Export</u> results to an Excel file.
- ▪ <u>Expand / Collapse</u> results table.

4.5.- GRAPHICS MENU

Graphics are displayed only and always in percentage. Each selected indicator is represented in a separate graphic. The "*environmental profile*" graphic shows the average product environmental impact, considering an equivalent importance of all selected indicators.

Users decide the "*flows*" to be displayed with the option "*Select / Clear all*" of the "*Results*" menu o by ticking ☑ columns of "*Results*" table. **Figure 9** shows an example of graphic.
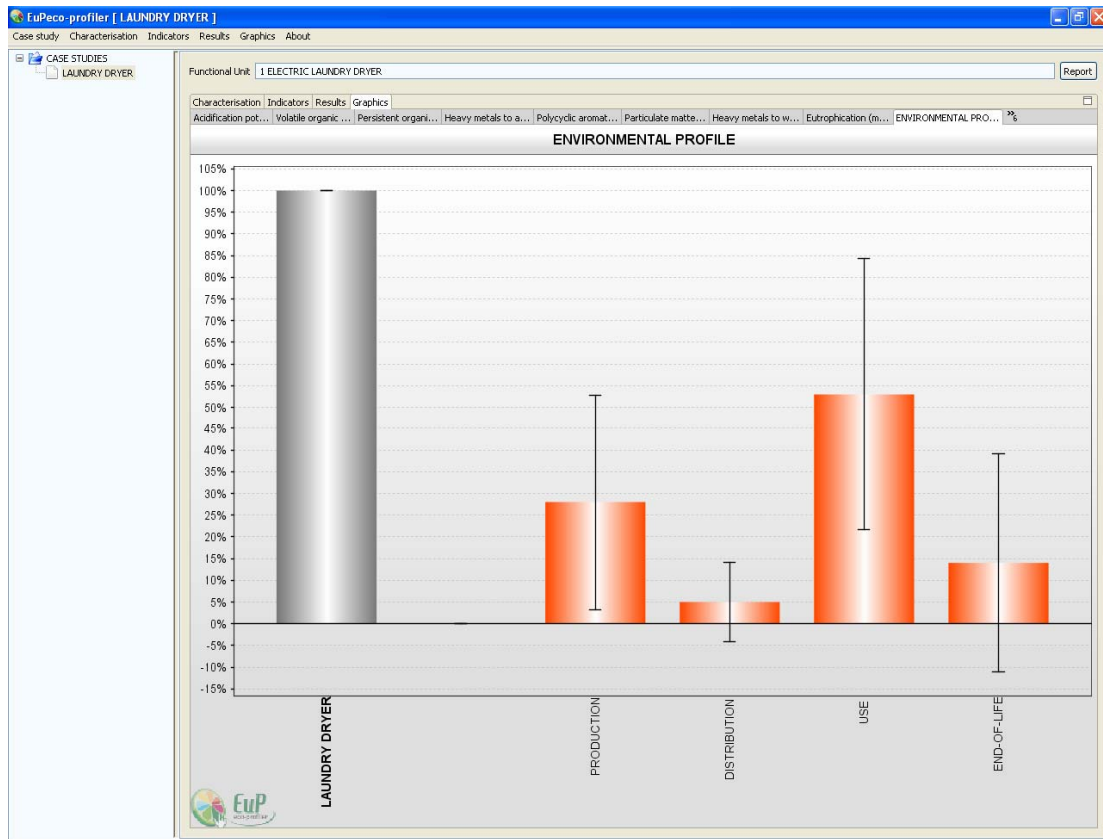
Figure 9.- Example of graphic

🔵 A selection of "*flows*" to be represented will remain unchanged till a new selection is done or a new case study is opened. Any change in previous screens will not affect the selection.

"*Flows*" can be displayed with the same order than in "*Characterisation*" ("*Initial order*", default option), "*Descending order*" or "*Ascending order*" by selecting the corresponding option in the "*Graphics*" menu. Graphics can be exported to "*.jpg*" format (see **Figure 10**).
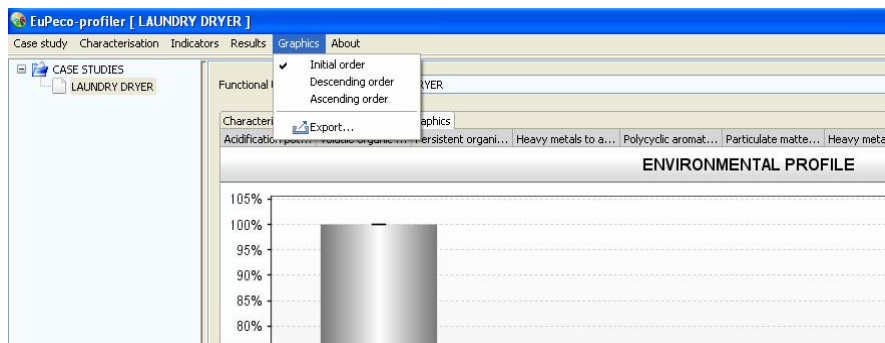
Figure 10.- Functions of "*Graphics*" menu

ANNEX 1: RULES FOR ASSESSING EuPs ACCORDING TO MEEuP

This annex describes how to perform environmental assessments of EuPs with **EuP$_{\text{eco-profiler}}$** and according to rules and criteria of **MEEuP**[1] - *developed by VHK for the European Commission (MEEuP Methodology Report, Final / 28.11.2005 / VHK for EC) -.*

The following figure presents the **structure** that would acquire a product or "case study" in the "CHARACTERISATION" screen of **EuP$_{\text{eco-profiler}}$**. **It is very important that you follow this scheme of structure in yours assessments for avoiding possible mistakes**. **EuP$_{\text{eco-profiler}}$** includes, as examples, a case study of an "*Electric laundry dryer*" and a "*Template*". Both have been created following this structure and MEEuP rules.

The following pages describe **rules and criteria** to be considered for the different "flows" of a case study. If during the selection process of the different *MATERIALS* and *PROCESSES* of the database for your product you may require additional information or details about them, we recommend you to consult MEEuP[1] and in particular **pages 88-100 about MEEuP database**, which is exactly the used database in **EuP$_{\text{eco-profiler}}$**.

Structure of a case study with EuP$_{\text{eco-profiler}}$

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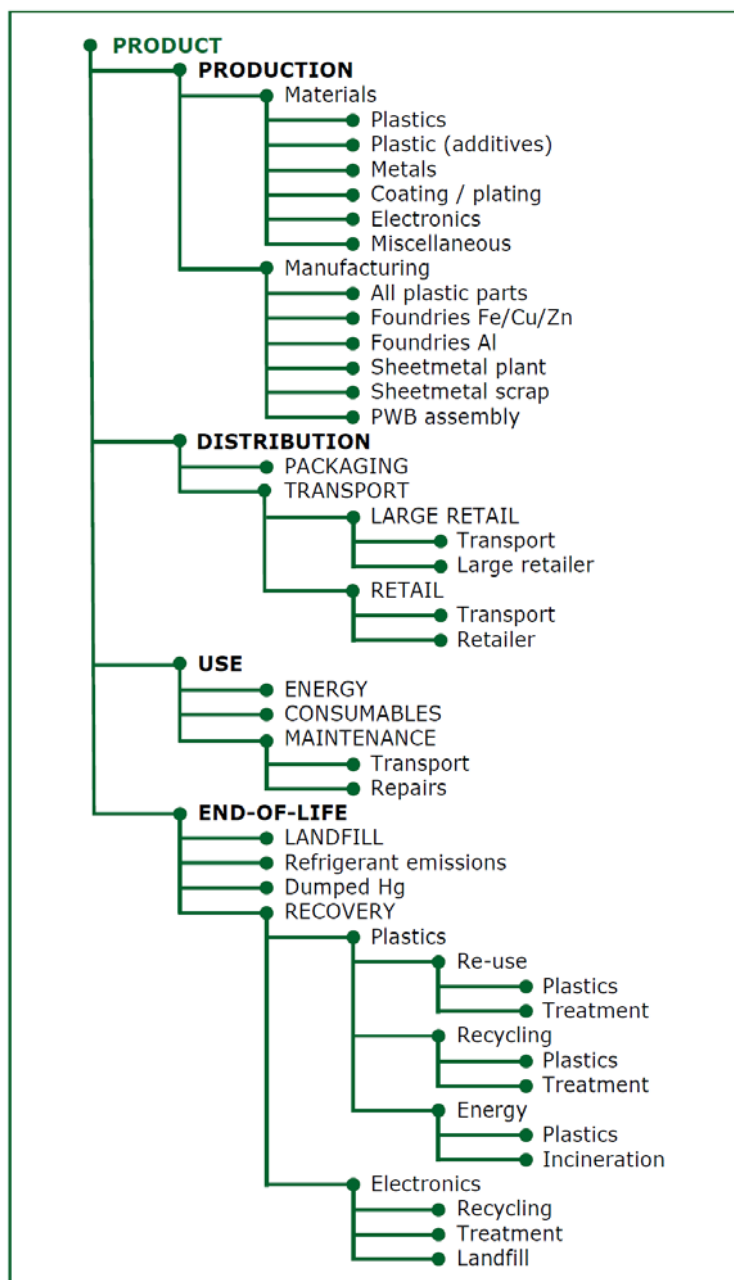
[1] http://ec.europa.eu/energy/efficiency/studies/doc/ecodesign/2005_11_28_methodoly_report.pdf

●PRODUCTION ─●**Materials** ─●**Plastics**
●**Plastic (additives)**
●**Metals**
●**Coating / plating**
●**Electronics**
●**Miscellaneous**

For considering the material product composition, create the needed material *flows*, select for them the appropriate *FAMILY*, then select the specific type of *MATERIAL* and finally indicate their mass (kg) in the column *VALUE*.

FAMILY	MATERIAL
Plastics	ABS
	Epoxy
	EPS
	HDPE
	HI-PS
	LDPE
	LLDPE
	PA 6
	PC
	PMMA
	PP
	PS
	PUR (flex)
	PUR (rigid)
	PVC
	SAN
Plastic (additives)	Aramid fibre
	E-glass fibre reinf
	Talcum filler
Metals	Steel sheet galvanized
	Steel tube/profile
	Cast iron
	Ferrite
	Stainless 18/8 coil
	Al sheet/extrusion
	Al die-cast
	Cu winding wire
	Cu wire
	Cu tube/sheet
	CuZn38 cast
	ZnAl4 cast
	MgZn5 cast
Coating / plating	Au/Pt/Pd
	Cu/Ni/Cr plating
	Pre-coating coil
	Powder coating
Electronics	LCD
	CRT
	Big caps & coils
	Slots / ext. ports
	ICs large
	ICs SMD
	SMD/LED's avg.
	PWB 1/2 lay 3,75 kg/m²
	PWB 6 lay 4,5 kg/m²
	PWB 6 lay 2 kg/m²
	Solder SnAg4Cu0,5
Miscellaneous	Bitumen
	Cardboard
	Glass for lamps
	Concrete
	Office paper

PRODUCTION ─── **Manufacturing** ─── **All plastic parts**
Foundries Fe/Cu/Zn
Foundries Al
Sheetmetal plant
Sheetmetal scrap *(see next section)*
PWB assembly

For considering the different manufacturing processes, create the needed *flows*, select *FAMILY: "Manufacturing"*, then select the needed *PROCESSES* and finally indicate in *VALUE* the total sum of masses (kg) of the materials listed in the following table.

FAMILY	PROCESS	The figure of the column *VALUE* corresponds to the total sum of masses of the following materials, in case that they have been used:
Manufacturing	All plastic parts	ABS Epoxy EPS HDPE HI-PS LDPE LLDPE PA 6 PC PMMA PP PS PUR (flex) PUR (rigid) PVC SAN Aramid fibre E-glass fibre reinf Talcum filler
	Foundries Fe/Cu/Zn	Cast iron CuZn38 cast ZnAl4 cast
	Foundries Al	Al die-cast MgZn5 cast
	Sheetmetal plant	Steel sheet galvanized Ferrite Stainless 18/8 coil Al sheet/extrusion Cu tube/sheet
	PWB assembly	Big caps & coils Slots / ext. ports ICs large ICs SMD SMD/LED's avg. PWB 1/2 lay 3.75 kg/m² PWB 6 lay 4.5 kg/m² PWB 6 lay 2 kg/m² Solder SnAg4Cu0.5

━●PRODUCTION━●Manufacturing━● Sheetmetal scrap

For the specific case of *PROCESS: "Sheetmetal scrap"* of the *FAMILY: "Manufacturing"*, indicate in *VALUE* the total sum of masses (kg) of scrap materials listed in the table, in case that they have been used in the product. If this figure is unknown and it cannot be estimated, consider as scrap the 25% of total weight of materials listed in the table.

FAMILY	PROCESS	The figure of the column *VALUE* corresponds to the total sum of masses of scrap of the following materials, in case that they have been used:
Manufacturing	Sheetmetal scrap	Steel sheet galvanized Ferrite Stainless 18/8 coil Al sheet/extrusion Cu tube/sheet

━●DISTRIBUTION━●PACKAGING

For considering product's packaging, select *FAMILY: "Logistics"*, then select in *MATERIAL* your type of product (*"CE&ICT[2]"* or *"appliance"*) and indicate in *VALUE* the unitary volume (m^3) of your packed product.

FAMILY	MATERIAL
Logistics	Packaging (CE&ICT) or Packaging (appliance)

━●DISTRIBUTION━●TRANSPORT━●LARGE RETAIL━●Transport

If your product is a *"CE&ICT"*, for considering its transport to *LARGE RETAILER*, select *FAMILY: "Logistics"*, then select *PROCESS: "Large retail (CE&ICT)"* and finally indicate in *VALUE* the unitary volume (m^3) of your packed product.

If your product is an *"appliance"*, the procedure is analogous to the above described, but in this case the *PROCESS* to be selected is *"Large retail (appliance)"*.

━●DISTRIBUTION━●TRANSPORT━●LARGE RETAIL━●Large retailer

Independently of your type of product (*"CE&ICT"* or *"appliance"*), for considering the facilities and activity of *LARGE RETAILER*, select *FAMILY: "Logistics"*, then select *PROCESS: "Large retailer activity"* and put "1" in the column *VALUE* (**Note**: this figure corresponds to the number of product units under assessment).

━●DISTRIBUTION━●TRANSPORT━●RETAIL━●Transport

If your product is a *"CE&ICT"*, for considering its transport from *LARGE RETAILER* to *RETAILER*, select *FAMILY: "Logistics"*, then select *PROCESS: "Retail (CE&ICT)"* and finally indicate in *VALUE* the unitary volume (m^3) of your packed product.

If your product is an *"appliance"*, the procedure is analogous to the above described, but in this case the *PROCESS* to be selected is *"Retail (appliance)"*.

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[2] CE&ICT: Consumer Electronics & Information and Communication Technologies

➤●DISTRIBUTION ➤●TRANSPORT ➤●RETAIL ➤●Retailer

Independently of your type of product (*"CE&ICT"* or *"appliance"*), for considering the facilities and activity of *RETAILER*, select *FAMILY: "Logistics"*, then select *PROCESS: "Retailer activity"* and put "1" in the column *VALUE* (**Note**: this figure corresponds to the number of product units under assessment).

➤●USE ➤●ENERGY

For considering the energy consumption of the product along its whole life cycle, select *FAMILY: "Energy"*, then select in *PROCESS* the required type of energy source/s and indicate in *VALUE* the total amount of consumed electricity (MWh) from the grid – *consumption between active, standby and off mode can be distinguished* - or the total generated heat (GJ) for the other types of energy sources.

FAMILY	PROCESS
Energy	Electricity
	Electric, h 96%
	Electric, GSHP, h 288%
	[1] Gas, η 86%, atmospheric
	[1] Gas, η 90%, atmospheric
	[1] Gas, η 101%, condensing
	[1] Gas, η 103%, condensing
	[2] Oil, η 85%, atmospheric
	[2] Oil, η 95%, condensing
	[3] Wood pellets, η 85%
	[3] Wood pellets, η 88%
	[3] Wood logs, η 67%
	[3] Wood logs, η 74%

[1] Add an extra 7% of energy consumption for considering fuel extraction and transport.
[2] Add an extra 10% of energy consumption for considering fuel extraction and transport.
[3] Add an extra 5% of energy consumption for considering fuel extraction and transport.

➤●USE ➤●CONSUMABLES

For considering the use of consumables along the whole product's life cycle, select *FAMILY: "Consumables"*, then select in *MATERIAL* the needed consumable/s and indicate in *VALUE* the consumed total amount of each one (m^3 for water and kg for the other consumables) along product's whole life cycle.

FAMILY	MATERIAL
Consumables	Toner
	Detergent dishwasher
	Rinsing agent dishwasher
	Regen. salt dishwasher
	Water
	Vacuum cleaner bags

➤●USE ➤●MAINTENANCE ➤●Transport

For considering the transport needed by maintenance service along the whole product's life cycle, select *FAMILY: "Maintenance / Repairs"*, then select *PROCESS: "Transport (mini-van diesel)"* and indicate in *VALUE* an estimation of the total driven kilometres (km) of the maintenance service allocable to the product under assessment.

━●USE ━●MAINTENANCE ━●Repairs

For considering required repair parts during product's life cycle, create the needed *flows* and select the required *MATERIALS* and *PROCESSES*, if they are known or could be estimated, within the available datasets. If this data is unknown, add 1% of all the flows (*MATERIALS* and *PROCESSES*) previously considered in *PRODUCTION* and *DISTRIBUTION*.

━●END-OF-LIFE━●LANDFILL

For considering the total amount of product directly landfilled, select *FAMILY: "Disposal"*, then select *PROCESS: "Landfill"* and indicate in *VALUE* the 5% of total sum of masses (kg) of all the materials previously used in *PRODUCTION* (**Note**: the 5% value is a requirement of MEEuP and it cannot be modified by the user).

━●END-OF-LIFE━●Refrigerant emissions

If your product contains a refrigerant gas, for considering the potential emissions to the atmosphere in product's end-of-life, select *FAMILY: "Refrigerant emissions"*, then select in *MATERIAL* your type of refrigerant gas and indicate in *VALUE* an estimation of the total amount (kg) of refrigerant gas emitted to the atmosphere without any treatment.

FAMILY	MATERIAL
Refrigerant emissions	R125
	R134a
	R143a
	R290
	R32
	R404a
	R407a
	R410a
	R744

━●END-OF-LIFE━●Dumped Hg

If your product contains mercury, for considering potential emissions to media in product's end-of-life, select *FAMILY: "Disposal"*, then select *PROCESS: "Dumped Hg"* and indicate in *VALUE* an estimation of the total amount (kg) of dumped mercury without any treatment. If this amount is unknown and could not be estimated, consider as dumped mercury the 20% of total product's Hg content.

> **NOTE:** in following sections about **RECOVERY**, **only destinations should be assigned for Plastics & Electronics** used in the PRODUCTION phase **and not for the other types of materials**. MEEuP datasets for these other types of materials (metals, etc.) already incorporates recovery credits based on European statistical data of WEEE recovery. Consequently, only it is needed to assign RECOVERY destinations for Plastics & Electronics.

━●END-OF-LIFE ━●RECOVERY ━●Plastics ━●Re-use ━┓●Plastics
                                                    ┗●Treatment

For considering the environmental benefit that would imply re-usage of plastics, add one by one the plastic *flows* of the product, then select *FAMILY: "Plastics re-use"*, then select the specific type of plastic *MATERIAL* and indicate for each plastic in *VALUE* the amount (kg) for re-using, taking into consideration that 5% of all materials, including plastics, have been previously sent to landfill. If potential amounts to be re-used are unknown and they could not be estimated, consider that 1% in weight of each type of plastic would be re-used.

For considering the environmental cost that would imply treatment of plastics sent to re-use, add a new flow, then select *FAMILY: "Disposal"*, then select *PROCESS: "Plastics re-use, recycling (env. cost)"* and indicate in *VALUE* the total sum of masses (kg) of plastics sent to re-use.

FAMILY	MATERIAL
Plastics re-use and Plastics recycling and Plastics thermal recycling	ABS
	Epoxy
	EPS
	HDPE
	HI-PS
	LDPE
	LLDPE
	PA 6
	PC
	PMMA
	PP
	PS
	PUR (flex)
	PUR (rigid)
	PVC
	SAN
	Aramid fibre
	E-glass fibre reinf
	Talcum filler

━●END-OF-LIFE ━●RECOVERY ━●Plastics ━●Recycling ━┓●Plastics
                                                        ┗●Treatment

For considering recycling of plastics, the procedure is analogous to the above described for *"Plastics re-use"*, but in this case the *FAMILY* to be selected for each plastic *flow* is *"Plastics recycling"*.

If potential amounts of plastics to be recycled are unknown and cannot be estimated, consider for this destination the 9% in weight of each plastic of the product.

━●END-OF-LIFE ━●RECOVERY ━●Plastics ━●Energy ━┓●Plastics
                                                    ┗●Incineration

For considering energy recovery of plastics, the procedure is similar to the above described for *"Plastics re-use"*. In this case the *FAMILY* to be selected for each plastic *flow* is *"Plastics thermal recycling"* and in the case of the *FAMILY: "Disposal"* the *PROCESS* to be selected is *"Incineration (env. cost)"*.

If potential amounts of plastics to be recovered energetically are unknown and cannot be estimated, consider for this destination the 90% in weight of each plastic of the product.

●END-OF-LIFE ●RECOVERY ●Electronics ● Recycling
Treatment
Landfill

For considering electronics recycling, the user should firstly decide if the **electronic board of the product is easy to disassembly or not**. If it is easy to disassembly, it would be considered that the 50% in weight of the PWB with its components will be recycled and the remaining 50% will be landfilled. If it is not easy to disassembly, it would be considered that the 25% in weight of electronics will be recycled and the remaining 75% will be landfilled.

If the PWB is **easy to disassembly**, create a *flow* named, for example, *"Recycling"* for considering the environmental benefit that would imply electronics recycling, then select *FAMILY: "Electronics recycling"*, then select in *MATERIAL* the specific type of PWB of the product and indicate in *VALUE* the 50% of total sum of masses (kg) of components and materials listed in the following table, taking into consideration that 5% of all product materials, including electronics, have been previously sent to landfill (**Note**: only should be considered the 47.5% of total mass of components and materials: 50% x 0.95 = 47.5%).

Then, create a new *flow* named, for example, *"Treatment"* for considering the environmental cost that would imply the treatment of electronics, then select *FAMILY: "Disposal"*, select *PROCESS: "Incineration (env. cost)"* and indicate in VALUE the 50% of total sum of masses (kg) of components and materials listed in the following table, taking into consideration that 5% of all product materials, including electronics, have been previously sent to landfill.

Finally, create a *flow* named, for example, *"Landfill"*, then select *FAMILY: "Disposal"*, select *PROCESS: "Landfill"* and indicate in *VALUE* the 50% of total sum of masses (kg) of components and materials listed in the following table, taking into consideration that 5% of all product materials, including electronics, have been previously sent to landfill.

If the PWB is **not easy to disassembly**, the procedure is analogous to this presented above, but in this case the percentages are different: 25% in *"Recycling"* and also in *"Treatment"* and 75% in *"Landfill"*.

FAMILY	MATERIAL / PROCESS	Materials to consider for calculation of *VALUE*
Electronics recycling	PWB 1/2 lay 3.75 kg/m² or PWB 6 lay 4.5 kg/m² or PWB 6 lay 2 kg/m²	Big caps & coils Slots / ext. ports ICs large ICs SMD SMD/LED's avg. PWB 1/2 lay 3.75 kg/m² PWB 6 lay 4.5 kg/m² PWB 6 lay 2 kg/m² Solder SnAg4Cu0.5
Disposal	Incineration (env. cost) and Landfill	Big caps & coils Slots / ext. ports ICs large ICs SMD SMD/LED's avg. PWB 1/2 lay 3.75 kg/m² PWB 6 lay 4.5 kg/m² PWB 6 lay 2 kg/m² Solder SnAg4Cu0.5