

Motor Operating Devices (MOD)/ Autoreclosing units (AR)

PEP ecopassport®

Product Environmental Profile



Registration number:	ABBG-00675-V01.01-EN	Drafting rules:	PCR-ed4-EN-2021 09 06
Contact information:	EPD_ELSB@abb.com	Supplemented by:	PSR-0005-ed3.1-EN-2023 12 08
Verifier accreditation number:	VH51	Information and reference documents:	www.pep-ecopassport.org
Date of issue:	February-25	Validity period:	5 years
Independent verification of the declaration and data in compliance with ISO 14025: 2006			
Internal:	<input type="checkbox"/>	External:	<input checked="" type="checkbox"/>
The PCR review was conducted by a panel of experts chaired by Julie Orgelet (Ddemailn)			
PEPs are compliant with XP C08-100-1:2016 and EN 50693:2019 or NF E38-500 :2022 The components of the present PEP may not be compared with components from any other program.			
Document complies with ISO 14025:2006 "Environmental labels and declarations. Type III environmental declarations"			





Purpose & Embedding Sustainability

Committed to continually promoting and embedding sustainability across operations and value chain, aspiring to become a role model for others to follow. Focusing with this Purpose on reducing harmful emissions, preserving natural resources championing ethical and humane behaviour.

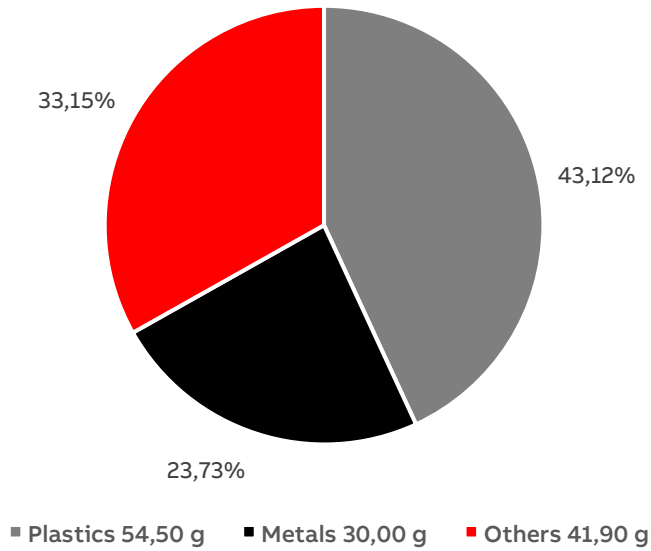


General information

Reference product	<p>The scope of this LCA study is the evaluation of the environmental impacts of the life cycle of the Motor Operating Devices (MOD)/Autoreclosing units (AR).</p> <p>The MOD allow the remote control of the coupled device. The product analysed in this LCA project is the AEG EMP230 article code 2CSS202998R0073, rated voltage 240V AC.</p>
Description of the product	<p>The MOD allow the remote control of the coupled device. They are especially suitable in centralized systems (either large size or difficult to access) and whenever multiple daily intervention are needed. Auto-reclosing units (AR) are used to automatically operate the reclosing of the associated device in case of unwanted tripping (no remote control is provided).</p>
Functional unit	<p>Motor Operating Devices (MODs) allow the remote control of the coupled device. They are particularly suitable in centralized systems (either large size or difficult to access) and whenever multiple daily intervention are needed such as unattended electrical lines, safety lines, unmanned stations.</p> <p>Auto-reclosing units (Ars) are used to automatically operate the reclosing of the associated device in case of unwanted tripping. The PSR category of this product family is "Other Equipment" (PSR @3.15).</p> <p>The Motor Operating Devices (MOD)/ Autoreclosing units (AR) consume energy for its main function therefore- according to PSR @3.15.2.1- they are 'active product' with Category 2 use scenario with RSL of 10 years.</p>
Other products covered	<p>2CSS201998R0073 EMP24 2CSS202998R0073 EMP230 2CSF201998R0074 EREC24 2CSF202998R0074 EREC230 2CSF203998R0074 EREC230D 2CSF201998R0075 ERECH2/30 2CSF202998R0075 ERECH2/300 2CSF203998R0075 ERECH4/30 2CSF204998R0075 ERECH4/300</p>
Manufacturing address	<p>V.le dell'Industria 18, 20009 Vittuone (MI) Italy www.new.abb.com</p>



Constituent Materials



Total weight of reference product and packaging

126,4

g

Plastics as % of weight		Metals as % of weight		Others as % of weight	
Name and CAS number	Weight%	Name and CAS number	Weight%	Name and CAS number	Weight%
PC	18,7	STEEL	9,3	PCBA	11,6
GF	9,1	FERRITE	4,4	CARDBOARD	15,8
PPS	6,7	COPPER	3,7	PAPER+WOOD	4,8
POM	6,0	ALUMINIUM	3,2	MISCELLANEOUS	0,9
PA+PE	2,6	Brass+Ni+Ag+Mn+FeSi	3,1		

Weight of product 99,96 g plus packaging 26,4 g



Additional Information

Manufacturing	The manufacturing stage includes the production and transportation to the manufacturer's last logistic platform of 2CSS202998R0073 and its packaging.
Distribution	The transport from the manufacturing Site to Regional distribution Centres considered is 3500 km by land
Installation	Product installation requires only manual activities and consumes no energy. This phase also includes disposal of the product's packaging
Use	<p>During the use phase, the device 2CSS202998R0073 dissipate some electricity due to power losses.</p> <p>The average power loss of the switch has been calculated following the assumption indicated in the PSR-0005-ed3.1-EN-2023 12 08 :</p> <ul style="list-style-type: none">- Duty Cycle @Stand-by: 99.9857%- Duty Cycle @ON: 0.0143%- ON state duration: 3 Sec- Reference Service Life: 10 Years <p>No maintenance is planned for the product.</p> <p>For disposal, average landfill, incineration, and recycling rates by waste type, data were sourced from Eurostat [17] [18] and OECD database[27]</p>
End of life	The default end-of-life scenario provided by the IEC/TR 62635 [19] document have been adopted, considering the product transport by lorry over 1000 km
Benefits and loads beyond the system boundaries	The potential benefits derives from the impacts prevented by recycling and waste to energy recovery of the packaging in the installation phase



Environmental Impacts

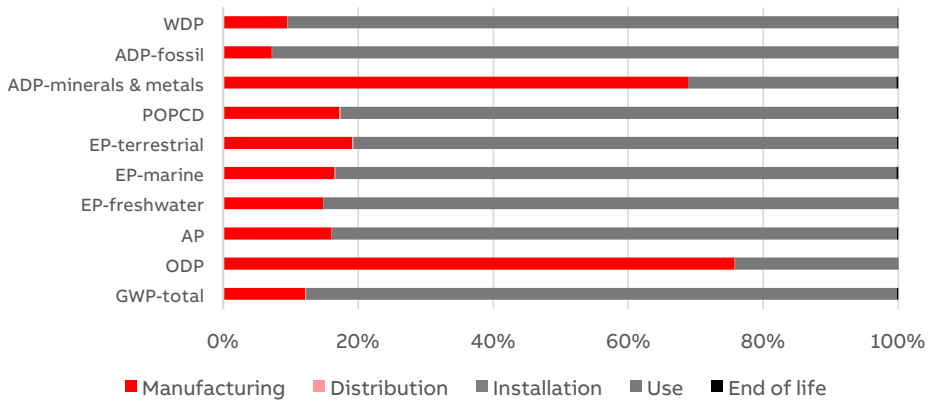
Reference lifetime	10 years
Product category	Motor Operating Devices (MOD) and Auto Reclosing (AR) and other equipment family
Installation elements	No installation materials are required in the life cycle of the product.
Use scenario	The use stage electricity consumption is calculated as follows: $E_{use} [kWh] = (P_{ON} * \%ON + P_{STB} * \%STB * RSL * 8760) / 1000$ No maintenance is planned for the product.
Geographical representativeness	For the use and end-of-life stages of the product, the geographical boundaries of Europe have been considered.
Technological representativeness	Technological representativeness refers to the specific production process for primary data.
Software and database used	SimaPro 9.5.0.0 & Ecoinvent 3.9

Energy model used

Manufacturing	Electricity, medium voltage {PL} market for electricity, medium voltage Cut-off, S The energy-related processes used for the remaining inputs of the manufacturing stage are those included in the ecoinvent 3.9 datasets selected for the analysis
Installation	No energy consumption occur during the installation stage
Use	Electricity, low voltage {Europe without Switzerland} market group for electricity, low voltage Cut-off, S
End of life	The energy-related processes used for the inputs of the end-of life stage are those included in the ecoinvent datasets selected for the analysis

Common base of mandatory indicators

% Environmental Impact per Life Cycle Stage of Reference Product



Environmental impact indicators

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits	
GWP	Total	kg CO2 eq.	5,60E+01	6,81E+00	4,57E-02	4,14E-02	4,91E+01	9,64E-02	-4,24E-01
	Fossil	kg CO2 eq.	5,42E+01	6,78E+00	4,56E-02	2,07E-03	4,73E+01	8,70E-02	-4,47E-01
	Biogenic	kg CO2 eq.	1,68E+00	2,42E-02	3,53E-05	3,94E-02	1,61E+00	9,34E-03	2,42E-02
	Luluc	kg CO2 eq.	1,26E-01	7,88E-03	2,16E-05	8,04E-07	1,18E-01	7,43E-05	-1,02E-03
ODP		kg CFC-11 eq.	3,73E-06	2,83E-06	1,00E-09	4,36E-11	9,01E-07	1,86E-09	-1,22E-08
AP		H+ eq.	3,24E-01	5,21E-02	1,89E-04	1,03E-05	2,71E-01	6,56E-04	-4,53E-03
EP	Freshwater	kg P eq.	5,27E-02	7,82E-03	3,27E-06	2,33E-07	4,48E-02	4,14E-05	-4,30E-04
	Marine	kg N eq.	5,28E-02	8,71E-03	7,18E-05	8,95E-06	4,38E-02	1,60E-04	-5,97E-04
	Terrestrial	mol N eq.	4,93E-01	9,43E-02	7,66E-04	4,18E-05	3,97E-01	9,64E-04	-6,58E-03
POPCD		kg NMVOC eq.	1,55E-01	2,65E-02	2,88E-04	1,62E-05	1,27E-01	3,33E-04	-2,06E-03
ADP	Minerals & metals	kg SB eq.	1,83E-03	1,26E-03	1,24E-07	7,92E-09	5,65E-04	5,46E-06	-7,70E-05
	Fossil	MJ	1,16E+03	8,34E+01	6,71E-01	2,41E-02	1,07E+03	1,03E+00	-5,21E+00
WDP		m³ eq. depr.	1,33E+01	1,26E+00	3,20E-03	1,55E-04	1,20E+01	1,96E-02	-9,88E-02

Resource use indicators

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
PERE	MJ	2,43E+02	8,42E+00	9,83E-03	8,47E-04	2,34E+02	1,12E-01	-7,92E-01
PERM	MJ	4,28E-01	4,28E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	2,43E+02	8,85E+00	9,83E-03	8,47E-04	2,34E+02	1,12E-01	-7,92E-01
PENRE	MJ	1,15E+03	8,22E+01	6,71E-01	2,41E-02	1,07E+03	1,03E+00	-5,21E+00
PENRM	MJ	1,20E+00	1,20E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	1,16E+03	8,34E+01	6,71E-01	2,41E-02	1,07E+03	1,03E+00	-5,21E+00

Common base of mandatory indicators

Use of secondary materials, water, and energy resources

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	9,58E-01	1,10E-01	1,05E-04	7,66E-06	8,47E-01	7,08E-04	-3,40E-03

Waste category indicators

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
HWD	kg	2,32E-03	3,95E-04	4,17E-06	1,48E-07	1,88E-03	3,17E-05	7,67E-05
N-HWD	kg	5,06E+00	6,38E-01	5,89E-02	3,37E-03	4,29E+00	6,70E-02	-6,07E-02
RWD	kg	7,81E-03	1,26E-04	2,05E-07	1,99E-08	7,68E-03	3,05E-06	-5,05E-06

Output flow indicators

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
CfRu	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MfR	kg	1,16E-01	3,73E-02	0,00E+00	2,13E-02	0,00E+00	5,77E-02	0,00E+00
MfER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EE	MJ	8,03E-02	0,00E+00	0,00E+00	1,29E-02	0,00E+00	6,75E-02	0,00E+00

Other indicators

Indicator	Unit	Total
Biogenic Carbon	kg of C	0,00E+00
Product Packaging	kg of C	1,27E-02

Optional indicators

Indicator	Unit	Total	Manufacturing	Distribution	Installation	Use	End of life	Benefits
Tot PE	MJ	1,40E+03	9,23E+01	6,81E-01	2,50E-02	1,30E+03	1,14E+00	-6,00E+00
Efp	Dise inc	1,30E-06	2,95E-07	4,71E-09	1,95E-10	9,90E-07	4,95E-09	-3,39E-08
IrHH	kBq U-235 eq	3,05E+01	5,13E-01	8,47E-04	7,99E-05	2,99E+01	1,19E-02	-2,05E-02
ETX FW	CTUe	3,04E+02	1,23E+02	3,23E-01	2,69E-02	1,80E+02	8,75E-01	-8,15E+00
HTX CE	CTUh	2,99E-08	7,06E-09	1,99E-11	2,18E-12	2,21E-08	7,23E-10	-5,84E-10
HTX N-CE	CTUh	1,14E-06	2,46E-07	4,82E-10	2,83E-11	8,78E-07	1,59E-08	-3,23E-08
IrLS	Pt	2,39E+02	2,87E+01	6,82E-01	1,12E-02	2,09E+02	5,87E-01	-2,99E+00

Extrapolation Factors

For other products than the Reference product covered by this PEP, the environmental impacts for each phase of the lifecycle are obtained by a linear correlation with respect to weight for the production, distribution, and end-of-life phase and with respect to average power loss for the use phase. Each environmental indicator value shall be calculated using the following formulas: $y = anx + bn$

* If the coefficient is 11, the impacts of the phase of the life cycle are assimilated to the Reference product, meaning that the impacts are unchanged in comparison to the Reference product

Impact Category	Manufacturing		Distribution		Installation		Use		End of Life	
	a1	b1	a2	b2	a3	b3	a4	b4	a5	b5
GWP-total	4,41E-02	2,62E+00	3,80E-04	9,53E-03	0,00E+00	4,14E-02	3,26E+01	4,66E-02	1,01E-03	1,38E-08
GWP-fossil	4,39E-02	2,61E+00	3,80E-04	9,51E-03	0,00E+00	2,07E-03	3,15E+01	4,49E-02	9,16E-04	1,24E-08
GWP-biogenic	2,01E-04	5,03E-03	2,94E-07	7,37E-06	0,00E+00	3,94E-02	1,07E+00	1,53E-03	9,83E-05	1,33E-09
GWP-luluc	7,22E-05	1,02E-03	1,80E-07	4,51E-06	0,00E+00	8,04E-07	7,86E-02	1,12E-04	7,82E-07	1,06E-11
ODP	2,96E-08	1,45E-08	8,36E-12	2,09E-10	0,00E+00	4,36E-11	5,99E-07	8,55E-10	1,96E-11	2,66E-16
AP	3,45E-04	1,93E-02	1,58E-06	3,95E-05	0,00E+00	1,03E-05	1,80E-01	2,57E-04	6,91E-06	9,37E-11
EP-freshwater	4,97E-05	3,10E-03	2,72E-08	6,82E-07	0,00E+00	2,33E-07	2,98E-02	4,25E-05	4,36E-07	5,91E-12
EP-marine	6,27E-05	2,75E-03	5,98E-07	1,50E-05	0,00E+00	8,95E-06	2,91E-02	4,16E-05	1,68E-06	2,28E-11
EP-terrestrial	7,40E-04	2,40E-02	6,38E-06	1,60E-04	0,00E+00	4,18E-05	2,64E-01	3,76E-04	1,01E-05	1,38E-10
POCP	2,06E-04	7,00E-03	2,40E-06	6,00E-05	0,00E+00	1,62E-05	8,47E-02	1,21E-04	3,51E-06	4,76E-11
ADPE	1,31E-05	1,26E-05	1,03E-09	2,58E-08	0,00E+00	7,92E-09	3,76E-04	5,36E-07	5,75E-08	7,80E-13
ADPF	5,69E-01	2,94E+01	5,59E-03	1,40E-01	0,00E+00	2,41E-02	7,12E+02	1,02E+00	1,08E-02	1,47E-07
WDP	8,93E-03	4,10E-01	2,67E-05	6,68E-04	0,00E+00	1,55E-04	8,00E+00	1,14E-02	2,06E-04	2,79E-09
CRU	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	1,81E-04	2,01E-02	0,00E+00	0,00E+00	0,00E+00	2,13E-02	0,00E+00	0,00E+00	6,08E-04	8,25E-09
MER	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EE	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,29E-02	0,00E+00	0,00E+00	7,10E-04	9,64E-09
PM	2,72E-09	3,68E-08	3,93E-11	9,83E-10	0,00E+00	1,95E-10	6,58E-07	9,40E-10	5,21E-11	7,08E-16
IRP	4,43E-03	9,23E-02	7,06E-06	1,77E-04	0,00E+00	7,99E-05	1,99E+01	2,84E-02	1,26E-04	1,70E-09
PENRE	5,56E-01	2,93E+01	5,59E-03	1,40E-01	0,00E+00	2,41E-02	7,12E+02	1,02E+00	1,08E-02	1,47E-07
PENRM	1,24E-02	3,05E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	5,69E-01	2,94E+01	5,59E-03	1,40E-01	0,00E+00	2,41E-02	7,12E+02	1,02E+00	1,08E-02	1,47E-07
PERE	5,60E-02	3,10E+00	8,19E-05	2,05E-03	0,00E+00	8,47E-04	1,56E+02	2,22E-01	1,18E-03	1,60E-08
PERM	0,00E+00	4,28E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	5,60E-02	3,53E+00	8,19E-05	2,05E-03	0,00E+00	8,47E-04	1,56E+02	2,22E-01	1,18E-03	1,60E-08
PE	6,25E-01	3,29E+01	5,67E-03	1,42E-01	0,00E+00	2,50E-02	8,67E+02	1,24E+00	1,20E-02	1,63E-07
SM	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	3,41E-04	7,77E-02	8,78E-07	2,20E-05	0,00E+00	7,66E-06	5,63E-01	8,04E-04	7,45E-06	1,01E-10
HWD	3,87E-06	2,72E-05	3,47E-08	8,70E-07	0,00E+00	1,48E-07	1,25E-03	1,79E-06	3,34E-07	4,53E-12
NHWD	4,84E-03	1,78E-01	4,90E-04	1,23E-02	0,00E+00	3,37E-03	2,85E+00	4,07E-03	7,06E-04	9,57E-09
RWD	1,09E-06	2,27E-05	1,71E-09	4,27E-08	0,00E+00	1,99E-08	5,10E-03	7,29E-06	3,21E-08	4,36E-13
ETP-fw	1,20E+00	8,86E+00	2,69E-03	6,73E-02	0,00E+00	2,69E-02	1,20E+02	1,71E-01	9,22E-03	1,25E-07
HTP-c	6,10E-11	1,27E-09	1,65E-13	4,15E-12	0,00E+00	2,18E-12	1,47E-08	2,10E-11	7,61E-12	1,03E-16
HTP-nc	2,07E-09	4,96E-08	4,02E-12	1,01E-10	0,00E+00	2,83E-11	5,83E-07	8,33E-10	1,68E-10	2,28E-15
SQP	1,93E-01	1,04E+01	5,68E-03	1,42E-01	0,00E+00	1,12E-02	1,39E+02	1,99E-01	6,18E-03	8,38E-08
BCProd	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
BCPack	0,00E+00	1,27E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Extrapolation Factors

Product Code	Product Name	Weight [g]	Average power loss [W]
2CSS201998R0073	EMP24	95,00	1,003
2CSS202998R0073	EMP230	95,00	1,503
2CSF201998R0074	EREC24	95,00	1,002
2CSF202998R0074	EREC230	95,00	1,503
2CSF203998R0074	EREC230D	95,00	1,503
2CSF201998R0075	ERECH2/30	130,00	1,503
2CSF202998R0075	ERECH2/300	130,00	1,503
2CSF203998R0075	ERECH4/30	130,00	1,503
2CSF204998R0075	ERECH4/300	130,00	1,503

Glossary

Environmental impact Indicators

GWP-total	Global Warming Potential total (Climate change)
GWP-fossil	Global Warming Potential fossil
GWP-biogenic	Global Warming Potential biogenic
GWP-luluc	Global Warming Potential land use and land use change
ODP	Depletion potential of the stratospheric ozone layer
AP	Acidification potential
EP-freshwater	Eutrophication potential - freshwater compartment
EP-marine	Eutrophication potential - fraction of nutrients reaching marine end compartment
EP-terrestrial	Eutrophication potential - Accumulated Exceedance
POPCD	Formation potential of tropospheric ozone
ADP-m&m	Abiotic Depletion for non-fossil resources potential
ADP-fossil	Abiotic Depletion for fossil resources potential, WDP
WDP	Water deprivation potential

Resource indicators

PENRE	Use of non-renewable primary energy excluding renewable primary energy resources used as raw
PENRM	Use of non-renewable primary energy resources used as raw material
PENRT	Total use of non-renewable primary energy resources (primary energy and primary energy resources
PERE	Use of renewable primary energy excluding non-renewable primary energy resources used as raw
PERM	Use of renewable primary energy resources used as raw material
PERT	Total use of renewable primary energy resources (primary energy and primary energy resources used
PE	Total use of primary energy during the life cycle
BCProd	Biogenic Carbon content product
BCPack	Biogenic Carbon content packaging

Secondary materials, water and energy resources

SM	Use of secondary materials
RSF	Use of renewable secondary fuels
NRSF	Use of non-renewable secondary fuels
FW	Net use of fresh water

Waste category indicators

HWD	Hazardous waste disposed
N-HWD	Non-hazardous waste disposed
RWD	Radioactive waste disposed

Output flow indicators

CfRu	Components for re-use
MfR	Materials for recycling
MfER	Materials for energy recovery
EE	Exported Energy

Optional indicators

Tot PE	Total use of primary energy during the life cycle
Efp	Emissions of Fine particles
IrHH	Ionizing radiation, human health
ETX FW	Ecotoxicity, freshwater
HTX CE	Human toxicity, carcinogenic effects
HTX N-CE	Human toxicity, non-carcinogenic
IrLS	Impact related to Land use / soil quality

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