Environmental Product Declaration (EPD)
According to ISO 14025 and EN 15804

Insulating glass, triple glazed, coated

Registration number:	EPD-Kiwa-EE-184364-EN
Issue date:	09-12-2024
Valid until:	09-12-2029
Declaration owner:	PLG Haapajärvi Oy
Publisher:	Kiwa-Ecobility Experts
Programme operator:	Kiwa-Ecobility Experts
Status:	verified

1 General information

1.1 PRODUCT

Insulating glass, triple glazed, coated

1.2 REGISTRATION NUMBER

EPD-Kiwa-EE-184364-EN

1.3 VALIDITY

Issue date: 09-12-2024

Valid until: 09-12-2029

1.4 PROGRAMME OPERATOR

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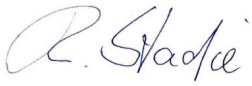
DE

Raoul Mancke

(Head of programme operations, Kiwa-Ecobility Experts)



Dr. Ronny Stadie

(Verification body, Kiwa-Ecobility Experts)

1.5 OWNER OF THE DECLARATION

Manufacturer: PLG Haapajärvi Oy

Address: Konikuja 5, 85800 Haapajärvi, Finland

E-mail: myynti@plg.fi

Website: www.plg.fi

Production location: PLG Haapajärvi Oy

Address production location: Konikuja 5, 85800 Haapajärvi, Finland

1.6 VERIFICATION OF THE DECLARATION

The independent verification is in accordance with the ISO 14025:2011. The LCA is in compliance with ISO 14040:2006 and ISO 14044:2006. The EN 15804:2012+A2:2019 serves as the core PCR.

☐ Internal ☒ External

Kripanshi Gupta, Kiwa GmbH

1.7 STATEMENTS

The owner of this EPD shall be liable for the underlying information and evidence. The programme operator Kiwa-Ecobility Experts shall not be liable with respect to manufacturer data, life cycle assessment data and evidence.

1.8 PRODUCT CATEGORY RULES

Kiwa-Ecobility Experts (Kiwa-EE) – General Product Category Rules (2022-02-14)

EN 17074:2017 Glass in building - Environmental declaration - Product category rules for flat glass products

1.9 COMPARABILITY

In principle, a comparison or assessment of the environmental impacts of different products is only possible if they have been prepared in accordance with EN 15804+A2. For the evaluation of the comparability, the following aspects have to be considered in particular: PCR used, functional or declared unit, geographical reference, the definition of the system boundary, declared modules, data selection (primary or secondary data, background database, data quality), scenarios used for use and disposal phases, and the

1 General information

life cycle inventory (data collection, calculation methods, allocations, validity period). PCRs and general program instructions of different EPD program operators may differ. Comparability needs to be evaluated. For further guidance, see EN 15804+A2 (5.3 Comparability of EPD for construction products) and ISO 14025 (6.7.2 Requirements for comparability).

1.10 CALCULATION BASIS

LCA method R<THINK: Ecobility Experts | EN15804+A2

LCA software*: Simapro 9.1

Characterization method: EN 15804 +A2 Method v1.0

LCA database profiles: EcoInvent version 3.6

Version database: v3.17 (2024-05-22)

** Simapro is used for calculating the characterized results of the Environmental profiles within R<THINK.*

1.11 LCA BACKGROUND REPORT

This EPD is generated on the basis of the LCA background report 'Insulating glass, triple glazed, coated' with the calculation identifier ReTHiNK-84364.

2 Product

2.1 PRODUCT DESCRIPTION

Product

Triple glazed insulation glass units are sealed units that comprise three sheets of flat glass separated by two 16 mm spacer strips, and are sealed around the edge. One glass is selective coated and the two other glasses are clear glass. All glasses have a thickness of 4 mm. The mass of 1 m² product is 31.34 kg.

Main Components	kg/m²
Flat glass, clear, 2 sheets	20.000
Flat glass, coated	10.000
Spacer strip	0.356
Inner sealant	0.044
Outer sealant	0.700
Desiccant	0.170
Filling gas, argon	0.070

A desiccant is applied within the unit to prevent condensation on the inside surfaces.

The units are available in a wide range of dimensions and configurations. This EPD covers the units with 3 pcs of 4 mm glasses with argon gas filling. One glass is coated and the 2 other ones are clear.

The products can be produced with a wide size range, starting from 0.1 m² up to 6 m². A typical size is about 1 m².

The product is used in windows and doors.

Packaging and transportation

The insultating glass units are packed into specialised racks which are re-used numerous times. The racks are circulating between the insulating glass producer and the window and door producer.

The insulating glass units are delivered mainly to the window and door producers ready for installation.

2.2 APPLICATION (INTENDED USE OF THE PRODUCT)

The units will be mounted into window or door frames at the window production factory.

2.3 REFERENCE SERVICE LIFE

RSL PRODUCT

Reference service life 30 years is based on the used PCR and the EPD of flat glass used.

USED RSL (YR) IN THIS LCA CALCULATION:

30

2.4 TECHNICAL DATA

The Insulation glass units fulfill the product standard EN 1279-5:2018 Glass in building. Insulating glass units. Part 5: Product standard. The units are CE-marked according to this standard and according to the AVCP class 3.

The insulating glass units have also a FI-product certificate issued by the certification body Inspecta Sertifiointi Oy.

The glass used in the units fulfills standards EN 572-9:2004 Glass in construction.

The glass also complies the following standards:

- EN 572-1 Glass in construction - Basic products: basic soda-lime silicate glass – Part 1: definition and general physical and mechanical properties;

- EN 572-2 – Glass in construction – Basic products: basic soda-lime silicate glass – Part 2: Float glass.

Declared Properties	Value	Unit
Fire resistance	NPD	
Reaction to fire	NPD	
External fire performance	NPD	
Bullet resistance	NPD	
Explosion resistance	NPD	
Fracture resistance	NPD	
Impact resistance of pendulum body	NPD	
Acoustic attenuation to direct airborne noise	33	dB
Emissivity	NPD	
Thermal properties (U-value)	0.9	W/m²K

2 Product

Declared Properties	Value	Unit
Light transmittance	74	%
Light reflection	18	%
Solar energy transmittance	52	%
Solar energy reflection	29	%
Solar factor	59	g, %

NPD = No Performance Declared

2.5 SUBSTANCES OF VERY HIGH CONCERN

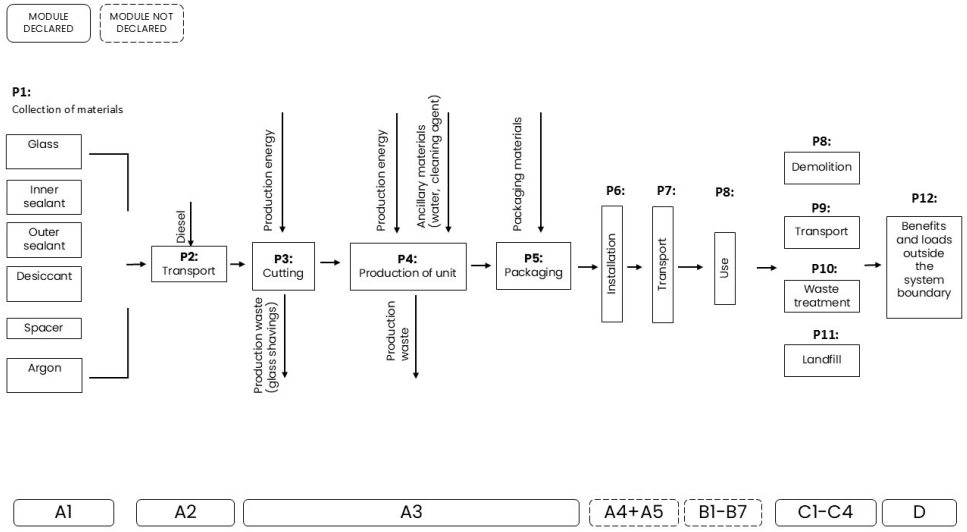
The product contains less than 0.1 % of substances included in the “Candidate list of substances of very high concern for authorisation” (SVHC).

2.6 DESCRIPTION PRODUCTION PROCESS

Manufacturing

To produce insulating glass units three cut size glasses are cut from a sheet and placed on the production line. Desiccant is applied to the spacers along with the inner sealant which is then attached to the glass after being washed.

The three glasses and two spacer strips are pressed into a insulating glass unit and the both spaces between the three glasses are filled with argon gas, then outer sealant is applied into the circumference.



3 Calculation rules

3.1 DECLARED UNIT

1 m² (one square meter of insulating glass unit)

Declared unit: The outside diameter of the calculated unit is 1 m x 1 m and the unit has an U-value of 0.9 W/m²K.

Reference unit: square meter (m2)

3.2 CONVERSION FACTORS

Description	Value	Unit
Reference unit	1	m2
Weight per reference unit	31.340	kg
Conversion factor to 1 kg	0.031908	m2

3.3 SCOPE OF DECLARATION AND SYSTEM BOUNDARIES

This is a Cradle to gate with modules C1-C4 and module D EPD. The life cycle stages included are as shown below:

(X = module included, ND = module not declared)

A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

The modules of the EN15804 contain the following:

Module A1 = Raw material supply	Module B5 = Refurbishment
Module A2 = Transport	Module B6 = Operational energy use
Module A3 = Manufacturing	Module B7 = Operational water use
Module A4 = Transport	Module C1 = De-construction / Demolition
Module A5 = Construction - Installation process	Module C2 = Transport
Module B1 = Use	Module C3 = Waste Processing
Module B2 = Maintenance	Module C4 = Disposal
Module B3 = Repair	Module D = Benefits and loads beyond the product system boundaries
Module B4 = Replacement	

3.4 REPRESENTATIVENESS

This EPD is representative for triple layer insulating glass units consisting of one 4 mm coated glass sheet and two 4 mm clear glass sheets with a spaces of 16 mm + 16 mm filled with argon gas.

The results are representative in Finland.

The EPD is representative for all sizes of the unit, starting from 0.1 m² up to 6 m², because the environmental performance per declared unit will not change when the size is changed.

A typical size is about 1 m².

3 Calculation rules

3.5 CUT-OFF CRITERIA

Product stage (A1-A3)
All input flows (e.g. raw materials, transportation, energy use, packaging, etc.) and output flows (e.g. production waste) are considered in this LCA. The total neglected input flows do therefore not exceed the limit of 5% of energy use and mass.

List of excluded processes:

- Manufacture of equipment used in production, buildings or any other capital goods
- Transport of personnel to the plant;
- Transportation of personnel within the plant
- Research and development activities
- Long-term emissions

End of life stage (C1-C4)
When the end of the life stage of the building is reached, the de-construction/demolition begins. This EPD includes de-construction/demolition (C1), the necessary transport (C2) from the demolition site to the sorting location and distance to final disposal. The end of life stage includes the final disposal to landfill (C4), incineration (C3) and needed recycling processes up to the end-of-waste point (C3). Loads and benefits of recycling, re-use and exported energy are part of module D.

Benefits and loads beyond the system boundary (Module D)
This stage contains the potential loads and benefits of recycling and re-use of raw materials/products. The loads contain the needed recycling processes from end-of-waste point up to the point-of-equivalence of the substituted primary raw material and a load for secondary material that will be lost at the end-of-life stage.

The loads and benefits of recycling and reuse are included in this module. The benefits are calculated based on the primary content and the primary equivalent.

3.6 ALLOCATION

The production-related energy, packaging material and waste data is based on the total annual production rate (m^2). The flows allocated to the products were divided among production rate according to their total produced area. The data for raw material flows is per product, therefore no allocation was needed.

3.7 DATA COLLECTION & REFERENCE PERIOD

The reference period, when the data was collected, is from 2022-01-01 until 2022-12-31.

3.8 ESTIMATES AND ASSUMPTIONS

The production energy consumption per 3 glass insulating glass units is based on allocation, where the total energy consumption of the production site is allocated to 3 glass insulating glass with the factor, which is a percentage of this product type compared to the whole production of different glass units. The production volume is measured in m^2 of insulation glass units.

As no country specific data on the benefits at the end-of-life was available, the Dutch Environmental Database (NMD) scenarios were used.

3.9 DATA QUALITY

Data is provided by the manufacturer and the data was collected from 2022-01-01 until 2022-12-31.

The geographical representativeness is good, because the environmental impact information is partly from Finland and partly from Europe. Three product specific EPD information are used for the main raw material components of the product. The technical representativeness is good, because there exists only one production process and the environmental impact per functional unit does not change, when the size of the product changes. The time representativeness is good: the used Ecoinvent 3.6 database values are updated 2019, and the EPD calculation is based on the production year 2022.

The overall data quality for this EPD can therefore be described as "good".

All relevant process-specific data was collected in the internal controlling.

In all possible cases, primary data from customers was used, which is of good quality. In addition, secondary data from the Ecoinvent database (2019, version 3.6) was used when no primary data could be supplied. The database is checked regularly and, therefore, fulfills the requirements of EN ISO 14040/44 (background data not older than 10 years). The background data meets the requirements of EN 15804+A2.

The quantities of raw materials, consumables and supplies used and the energy were recorded and with this the material usage for the declared unit determined. The general rule that specific data from certain production processes or average data derived from specific processes must have priority when calculating an EPD or LCA, was adhered to. Data for processes over which the manufacturer has no influence were assigned to

3 Calculation rules

generic data/scenarios. When selecting these, the data set/scenario that most realistically represents the processes was selected.

3.10 POWER MIX

A green energy certificate for electric energy is granted by Veni Energia Oy, Finland and, thus, a market-based approach is used.

The electricity dataset E0001-8799 (Strommix PLG medium voltage) has a GWP-total impact of 0.0796 kg CO2 eqv. per kilowatt-hour (kWh).

The composition of the electricity mix is based on the year 2022 and shown in the following table.

Energy source modelling	Percentage	kWh
Solar (Electricity, low voltage (FI) electricity production, photovoltaic 3 kWp slanted-roof-installation)	6.8	0.08
Hydro (Electricity, high voltage (FI), electricity production, hydro, run-of-river)	51.7	0.64
Biomass (Electricity, high voltage (FI), heat and power co-generation, biogas, gas engine)	25.7	0.32
Wind (Electricity, high voltage (FI), electricity production, wind, > 3MW, turbine, onshore)	15.8	0.20

4 Scenarios and additional technical information

4.1 DE-CONSTRUCTION, DEMOLITION (C1)

No inputs are needed for the product at the de-construction / demolition phase

4.2 TRANSPORT END-OF-LIFE (C2)

The following distances and transport conveyance are assumed for transportation during end of life for the different types of waste processing.

Waste Scenario	Transport conveyance	Not removed (stays in work) [km]	Landfill [km]	Incineration [km]	Recycling [km]	Re-use [km]
glass (i.a. flat glass) (NMD ID 28)	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
finishes (adhered to wood, plastic, metal) (NMD ID 2)	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
plastics, via residue (NMD ID 43)	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0
polyolefines (i.a. pe,pp) (i.a. pipes, foils) (NMD ID 57)	Lorry (Truck), unspecified (default) | market group for (GLO)	0	100	150	50	0

The transport conveyance(s) used in the scenario(s) for transport during end of life has the following characteristics.

	Value and unit
Vehicle type used for transport	Lorry (Truck), unspecified (default) | market group for (GLO)
Fuel type and consumption of vehicle	not available
Capacity utilisation (including empty returns)	50 % (loaded up and return empty)
Bulk density of transported products	inapplicable
Volume capacity utilisation factor	1

4.3 END OF LIFE (C3, C4)

The scenario(s) assumed for end of life of the product are given in the following tables.
First the assumed percentages per type of waste processing are displayed, followed by the assumed amounts.

4 Scenarios and additional technical information

Waste Scenario	Region	Not removed (stays in work) [%]	Landfill [%]	Incineration [%]	Recycling [%]	Re-use [%]
glass (i.a. flat glass) (NMD ID 28)	NL	0	30	0	70	0
finishes (adhered to wood, plastic, metal) (NMD ID 2)	NL	0	0	100	0	0
plastics, via residue (NMD ID 43)	NL	0	20	80	0	0
polyolefines (i.a. pe,pp) (i.a. pipes, foils) (NMD ID 57)	NL	0	10	85	5	0

Waste Scenario	Not removed (stays in work) [kg]	Landfill [kg]	Incineration [kg]	Recycling [kg]	Re-use [kg]
glass (i.a. flat glass) (NMD ID 28)	0.000	9.000	0.000	21.000	0.000
finishes (adhered to wood, plastic, metal) (NMD ID 2)	0.000	0.000	0.240	0.000	0.000
plastics, via residue (NMD ID 43)	0.000	0.149	0.595	0.000	0.000
polyolefines (i.a. pe,pp) (i.a. pipes, foils) (NMD ID 57)	0.000	0.036	0.303	0.018	0.000
Total	**0.000**	**9.184**	**1.138**	**21.018**	**0.000**

4.4 BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY (D)

The presented Benefits and loads beyond the system boundary in this EPD are based on the following calculated Net output flows in kilograms and Energy recovery displayed in MJ Lower Heating Value.

Waste Scenario	Net output flow [kg]	Energy recovery [MJ]
glass (i.a. flat glass) (NMD ID 28)	21.000	0.000
finishes (adhered to wood, plastic, metal) (NMD ID 2)	0.000	0.000
plastics, via residue (NMD ID 43)	0.000	0.000
polyolefines (i.a. pe,pp) (i.a. pipes, foils) (NMD ID 57)	0.018	0.000
Total	**21.018**	**0.000**

5 Results

For the impact assessment, the characterization factors of the LCIA method EN 15804 +A2 Method v1.0 are used. Long-term emissions (>100 years) are not considered in the impact assessment. The results of the impact assessment are only relative statements that do not make any statements about end-points of the impact categories, exceedance of threshold values, safety margins or risks. The following tables show the results of the indicators of the impact assessment, of the use of resources as well as of waste and other output flows.

5.1 ENVIRONMENTAL IMPACT INDICATORS PER SQUARE METER

CORE ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
AP	mol H+ eqv.	2.32E-1	2.96E-2	2.30E-2	2.85E-1	0.00E+0	1.67E-3	2.12E-3	3.93E-4	-4.13E-2
GWP-total	kg CO2 eqv.	3.55E+1	3.22E+0	3.45E+0	4.22E+1	0.00E+0	2.89E-1	3.41E+0	6.30E-2	-8.07E+0
GWP-b	kg CO2 eqv.	1.10E-1	1.53E-3	9.62E-2	2.07E-1	0.00E+0	1.33E-4	1.70E-1	1.44E-4	-6.89E-2
GWP-f	kg CO2 eqv.	3.55E+1	3.21E+0	3.35E+0	4.21E+1	0.00E+0	2.89E-1	3.24E+0	6.29E-2	-8.00E+0
GWP-luluc	kg CO2 eqv.	1.34E-2	1.26E-3	7.34E-4	1.54E-2	0.00E+0	1.06E-4	3.28E-4	8.55E-6	-7.25E-3
EP-m	kg N eqv.	4.38E-2	7.76E-3	4.71E-3	5.62E-2	0.00E+0	5.90E-4	6.82E-4	1.55E-4	-5.83E-3
EP-fw	kg P eq	4.25E-4	2.56E-5	1.42E-5	4.65E-4	0.00E+0	2.91E-6	1.26E-5	3.24E-7	-3.34E-4
EP-T	mol N eqv.	5.26E-1	8.62E-2	5.51E-2	6.68E-1	0.00E+0	6.51E-3	6.96E-3	1.62E-3	-9.53E-2
ODP	kg CFC 11 eqv.	1.44E-6	7.38E-7	2.03E-7	2.38E-6	0.00E+0	6.37E-8	9.98E-8	1.94E-8	-3.07E-7
POCP	kg NMVOC eqv.	1.23E-1	2.46E-2	1.35E-2	1.62E-1	0.00E+0	1.86E-3	1.93E-3	4.68E-4	-1.76E-2
ADP-f	MJ	4.45E+2	4.91E+1	4.30E+1	5.37E+2	0.00E+0	4.36E+0	4.25E+0	1.29E+0	-7.04E+1
ADP-mm	kg Sb-eqv.	4.05E-4	5.91E-5	-4.82E-5	4.16E-4	0.00E+0	7.32E-6	1.12E-5	3.62E-7	-9.66E-4
WDP	m3 world eqv.	6.21E+0	1.51E-1	3.64E-1	6.73E+0	0.00E+0	1.56E-2	2.28E-1	5.76E-3	-2.87E+0

AP=Acidification (AP) | **GWP-total**=Global warming potential (GWP-total) | **GWP-b**=Global warming potential - Biogenic (GWP-b) | **GWP-f**=Global warming potential - Fossil (GWP-f) | **GWP-luluc**=Global warming potential - Land use and land use change (GWP-luluc) | **EP-m**=Eutrophication marine (EP-m) | **EP-fw**=Eutrophication, freshwater (EP-fw) | **EP-T**=Eutrophication, terrestrial (EP-T) | **ODP**=Ozone depletion (ODP) | **POCP**=Photochemical ozone formation - human health (POCP) | **ADP-f**=Resource use, fossils (ADP-f) | **ADP-mm**=Resource use, minerals and metals (ADP-mm) | **WDP**=Water use (WDP)

5 Results

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
ETP-fw	CTUe	4.99E+2	3.94E+1	3.15E+1	5.70E+2	0.00E+0	3.88E+0	1.05E+2	8.36E-1	-2.87E+2
PM	disease incidence	1.13E-6	2.52E-7	1.13E-7	1.50E-6	0.00E+0	2.60E-8	2.46E-8	8.35E-9	-3.62E-7
HTP-c	CTUh	4.15E-9	1.28E-9	4.48E-10	5.88E-9	0.00E+0	1.26E-10	1.81E-9	1.57E-11	-2.55E-9
HTP-nc	CTUh	1.23E-7	4.18E-8	9.97E-9	1.75E-7	0.00E+0	4.25E-9	1.57E-8	4.24E-10	-8.90E-8
IR	kBq U235 eqv.	4.25E-1	2.11E-1	4.27E-2	6.79E-1	0.00E+0	1.82E-2	2.05E-2	5.58E-3	-2.51E-1
SQP	Pt	5.99E+1	4.46E+1	6.31E+0	1.11E+2	0.00E+0	3.78E+0	2.85E+0	2.85E+0	-5.20E+1

ETP-fw=Ecotoxicity, freshwater (ETP-fw) | **PM**=Particulate Matter (PM) | **HTP-c**=Human toxicity, cancer (HTP-c) | **HTP-nc**=Human toxicity, non-cancer (HTP-nc) | **IR**=Ionising radiation, human health (IR) | **SQP**=Land use (SQP)

CLASSIFICATION OF DISCLAIMERS TO THE DECLARATION OF CORE AND ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS

ILCD classification	Indicator	Disclaimer
ILCD type / level 1	Global warming potential (GWP)	None
	Depletion potential of the stratospheric ozone layer (ODP)	None
	Potential incidence of disease due to PM emissions (PM)	None
ILCD type / level 2	Acidification potential, Accumulated Exceedance (AP)	None
	Eutrophication potential, Fraction of nutrients reaching freshwater end compartment (EP-freshwater)	None
	Eutrophication potential, Fraction of nutrients reaching marine end compartment (EP-marine)	None
	Eutrophication potential, Accumulated Exceedance (EP-terrestrial)	None
	Formation potential of tropospheric ozone (POCP)	None
	Potential Human exposure efficiency relative to U235 (IRP)	1
ILCD type / level 3	Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)	2
	Abiotic depletion potential for fossil resources (ADP-fossil)	2
	Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	2
	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	2

5 Results

ILCD classification	Indicator	Disclaimer
	Potential Comparative Toxic Unit for humans (HTP-c)	2
	Potential Comparative Toxic Unit for humans (HTP-nc)	2
	Potential Soil quality index (SQP)	2

Disclaimer 1 – This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

5.2 INDICATORS DESCRIBING RESOURCE USE AND ENVIRONMENTAL INFORMATION BASED ON LIFE CYCLE INVENTORY (LCI)

PARAMETERS DESCRIBING RESOURCE USE

Abbr.	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
PERE	MJ	2.49E+1	5.74E-1	2.66E+0	2.82E+1	0.00E+0	5.45E-2	3.46E-1	2.00E-2	-8.43E+0
PERM	MJ	5.07E-1	0.00E+0	4.25E-2	5.49E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	MJ	2.55E+1	5.74E-1	2.70E+0	2.87E+1	0.00E+0	5.45E-2	3.46E-1	2.00E-2	-8.43E+0
PENRE	MJ	4.40E+2	5.21E+1	4.21E+1	5.34E+2	0.00E+0	4.62E+0	4.51E+0	1.37E+0	-7.45E+1
PENRM	MJ	1.64E+1	0.00E+0	1.90E+0	1.83E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-5.06E-1
PENRT	MJ	4.56E+2	5.21E+1	4.40E+1	5.52E+2	0.00E+0	4.62E+0	4.51E+0	1.37E+0	-7.50E+1
SM	Kg	1.70E+0	0.00E+0	1.70E-1	1.87E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
RSF	MJ	1.14E-5	0.00E+0	1.14E-6	1.26E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
NRSF	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
FW	M3	1.71E-1	5.26E-3	1.06E-2	1.87E-1	0.00E+0	5.31E-4	6.74E-3	1.53E-3	-8.30E-2

PERE=renewable primary energy ex. raw materials | **PERM**=renewable primary energy used as raw materials | **PERT**=renewable primary energy total | **PENRE**=non-renewable primary energy ex. raw materials | **PENRM**=non-renewable primary energy used as raw materials | **PENRT**=non-renewable primary energy total | **SM**=use of secondary material | **RSF**=use of renewable secondary fuels | **NRSF**=use of non-renewable secondary fuels | **FW**=use of net fresh water

5 Results

OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

Abbr.	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
HWD	Kg	8.40E-4	1.10E-4	9.29E-5	1.04E-3	0.00E+0	1.10E-5	9.43E-6	1.46E-6	-5.66E-5
NHWD	Kg	2.50E+0	3.29E+0	1.50E+0	7.29E+0	0.00E+0	2.76E-1	7.38E-1	9.18E+0	-8.57E-1
RWD	Kg	7.17E-3	3.32E-4	7.03E-4	8.21E-3	0.00E+0	2.86E-5	2.20E-5	8.74E-6	-2.03E-4

HWD=hazardous waste disposed | **NHWD**=non hazardous waste disposed | **RWD**=radioactive waste disposed

ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS

Abbr.	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
CRU	Kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MFR	Kg	1.63E+0	0.00E+0	2.26E+0	3.89E+0	0.00E+0	0.00E+0	2.10E+1	0.00E+0	0.00E+0
MER	Kg	3.08E-2	0.00E+0	3.08E-3	3.39E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EET	MJ	2.70E-2	0.00E+0	2.70E-3	2.97E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EEE	MJ	1.08E-4	0.00E+0	1.08E-5	1.19E-4	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0

CRU=Components for re-use | **MFR**=Materials for recycling | **MER**=Materials for energy recovery | **EET**=Exported Energy Thermic | **EEE**=Exported Energy Electric

5 Results

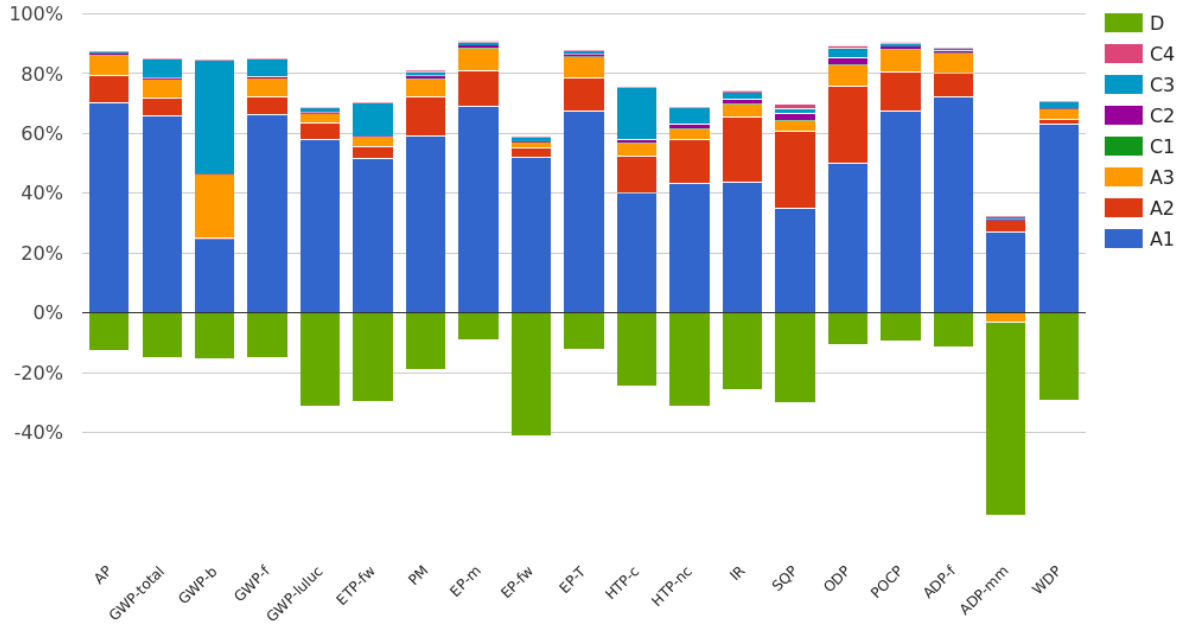
5.3 INFORMATION ON BIOGENIC CARBON CONTENT PER SQUARE METER

BIOGENIC CARBON CONTENT

The following Information describes the biogenic carbon content in (the main parts of) the product at the factory gate per square meter:

Biogenic carbon content	Amount	Unit
Biogenic carbon content in the product	0	kg C
Biogenic carbon content in accompanying packaging	0	kg C

6 Interpretation of results



As shown in the figure, the raw material supply (A1) dominates in most environmental core indicators. The highest influence on the Global Warming Potential (GWP-total) have raw material supply (A1), where the flat glass production is dominating. Transports (A2, C2) and waste processing (C3) have rather a minor impact within all core indicators.

The majority of the CO2 emissions originates from the production of flat glass, including both the coated and the clear flat glass.

Since the module A5, which includes the waste processing of packaging, is not declared, there seems to be a disbalance of biogenic CO2 emissions. If A5 would be declared, this imbalance would disappear.

7 References

ISO 14040
ISO 14040:2006-10, Environmental management - Life cycle assessment - Principles and framework; EN ISO 14040:2006

ISO 14044
ISO 14044:2006-10, Environmental management - Life cycle assessment - Requirements and guidelines; EN ISO 14044:2006

ISO 14025
ISO 14025:2011-10: Environmental labels and declarations — Type III environmental declarations — Principles and procedures

EN 15804+A2
EN 15804+A2: 2019: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

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Kiwa-Ecobility Experts (Kiwa-EE) – General Product Category Rules (2022-02-14)

EN 17074:2017
Glass in building - Environmental declaration - Product category rules for flat glass products

EN 1279-5:2018
Glass in building. Insulating glass units. Part 5: Product standard

EN 572-1 + A1:2016
Glass in construction. Basic products: basic soda-lime silicate glass – Part 1: definition and general physical and mechanical properties

EN 572-2:2012
Glass in construction. Basic products: basic soda-lime silicate glass – Part 2: Float glass

EN 572-9:2004
Glass in construction. Basic soda lime silicate glass products. Part 9: Evaluation of conformity/Product standard

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