Environmental Product Declaration

In accordance with ISO 14025 and EN 15804:2012+A2:2019 for:

Gypsum plasterboard

from

KNAUF Praha, spol s r.o.,

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-02601
Publication date:	2021-03-01
Valid until:	2026-28-02

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): PCR 2019:14 Construction products (version1.1), UN CPC: 314 Boards and panels
PCR review was conducted by: The Technical Committee of the International EPD® System. Chair of the PCR review is Claudia A. Peña. The review panel may be contacted via info@environdec.com.
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☐ EPD process certification ☒ EPD verification
Third party verifier: Hüdai Kara, Metsims Sustainability Consulting, United Kingdom, www.metsims.com Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☒ Yes ☐ No
EPD owner: KNAUF Praha, spol. s r.o. Mladoboleslavská 949, 197 00 Praha 9, The Czech Republic, **www.knauf.cz,** Contact person: Martina Malá, **mala.martina@knauf.cz**
LCA author: Doc. Ing. Vladimír Kočí, Ph.D., Ing. Jan Pešta Šárecká 5, 16000 Prague 6, Czech Republic www.lcastudio.cz

The EPD owner has the sole ownership, liability, and responsibility for the EPD.
EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD: KNAUF Praha, spol s r.o.,
Contact: Martina Malá, mala.martina@knauf.cz
Description of the organisation:
KNAUF Praha, s.r.o., has been on the Czech construction market since 1992. These days it is one of the most famous producers of the construction products in the field of production and sale of the gypsum plasterboards and similar systems. Knauf is focused on the production of systems for dry construction, floors, plasters, facades. The systems of dry construction present a synonym for thermal insulation and effective protection against noise and fire. KNAUF brand is always connected with the high quality of the products and top of the range expert service including consultancy and expert formation of its partners.
Product-related or management system-related certifications:
Gypsum plasterboards are manufactured according to DIN 18 180 and EN 520. In the plant, following certificates are applied ISO 9001, ISO 14001, ISO 18001 and ISO 50001
Name and location of production site(s):
KNAUF Počerady, Počerady 17, 440 01 Výškov, the Czech Republic

Product information

Product name and identification:

Table 1 Specific weights for KNAUF Gypsum Plasterboards

Identification DIN 18180	Identification EN 520	Product	Board thickness (mm)	Specific weight (kg/m^2)	Specific weight (kg/m^3)
GKB	**A**	**Knauf WHITE**	9.5	7.9	832
GKB	**A**		12.5	8.8	704
GKB	**A**		15.0	10.3	687
GKF	**DF**	**Knauf RED Piano**	9.5	8.8	926
GKF	**DF**		12.5	10.2	816
GKF	**DF**		15.0	12.3	820
GKF	**DF**		18.0	15.2	844
GKBi	**H2**	**Knauf GREEN**	9.5	8.8	926
GKBi	**H2**		12.5	8.8	704
GKBi	**H2**		15.0	12.4	827
GKFi	**DFH2**	**Knauf RED GREEN**	12.5	10.1	808
GKFi	**DFH2**		15.0	12.4	827
GKFi	**DFH2**		18.0	15.0	833
GKFi	**DFH2R**	**Knauf TOPAS**	12.5	10.2	816
GKFi	**DFH2IR**	**Knauf DIAMANT**	12.5	12.8	1 024
GKFi	**DFH2IR**		15.0	16.0	1 067
GKFi	**DF**	**Knauf MASSIVBAUPLATTE RED**	25.0	21.0	840
GKFi	**DFH2**	**Knauf MASSIVBAUPLATTE RED GREEN**	25.0	21.0	840
GKF	**DF**	**Knauf F146**	12.5	12.5	1 000

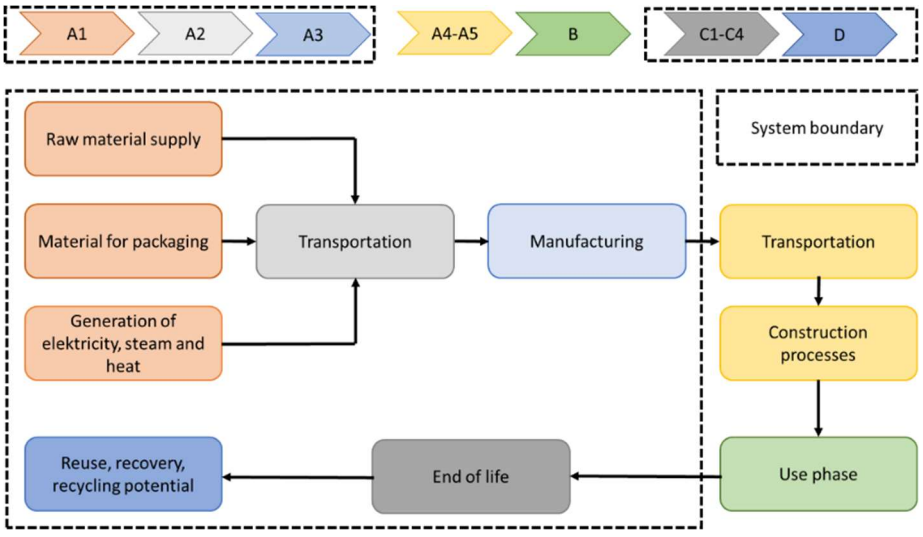
Product description: At present, KNAUF produces 19 basic types of gypsum plasterboards, which are manufactured with thickness 6,5 - 25 mm, width 600 - 1280 mm, length 1750 - 4000 mm and edges individually prepared for the consumer. More details are in Table 1.
As technical and operational characteristics of each product are a huge set of data, the informational sheet of each product is enclosed in the supplement of the study and or is available online in the technical datasheet.

UN CPC code: 314 Boards and panels

LCA information

Functional unit / declared unit: Declared unit is 1 m^2 of gypsum plasterboard.
Reference service life: Reference Service Lives depend on the respective applications.
Time representativeness: Specific data about the manufacturer were based on the 1-year average (the reference year 2019). Time scope less than 10-years were applied for background data. Time scope less than 2-years were applied for specific data.
Database(s) and LCA software used: GaBi software, GaBi database and EcoInvent database
Description of system boundaries:
The system boundary is "Cradle to gate" with modules C1–C4 and module D (A1–A3 + C + D). It covers the production of raw materials, all relevant transport down to factory gate and manufacturing by CIDEM Hranice, a.s., deconstruction, transport on landfill and landfilling. The review framework comprises the following details:

- Raw materials acquisition and transport,
- Further processing of raw materials,
- Production operations,
- Energy and water consumption,
- Waste management,
- Packaging of the final product for delivery,
- Typical deconstruction using heavy equipment,
- Transport and landfilling.



- *Figure 1 System Boundary of the LCA study conducted on gypsum plasterboards produced by KNAUF, spol. s r.o.*

Cut off rules:	The cut-off criterion was chosen based on the used PCR. According to the used PCR, more than 95 % of flows were included.
Allocations:	As a general allocation rule, allocation on 1 m^2 of the product was chosen. No secondary fuels are used in production. The secondary material gypsum as by-product of powerplant is used. Generic process data for gypsum production was used.
Geographical scope:	Europe, Global

System diagram:

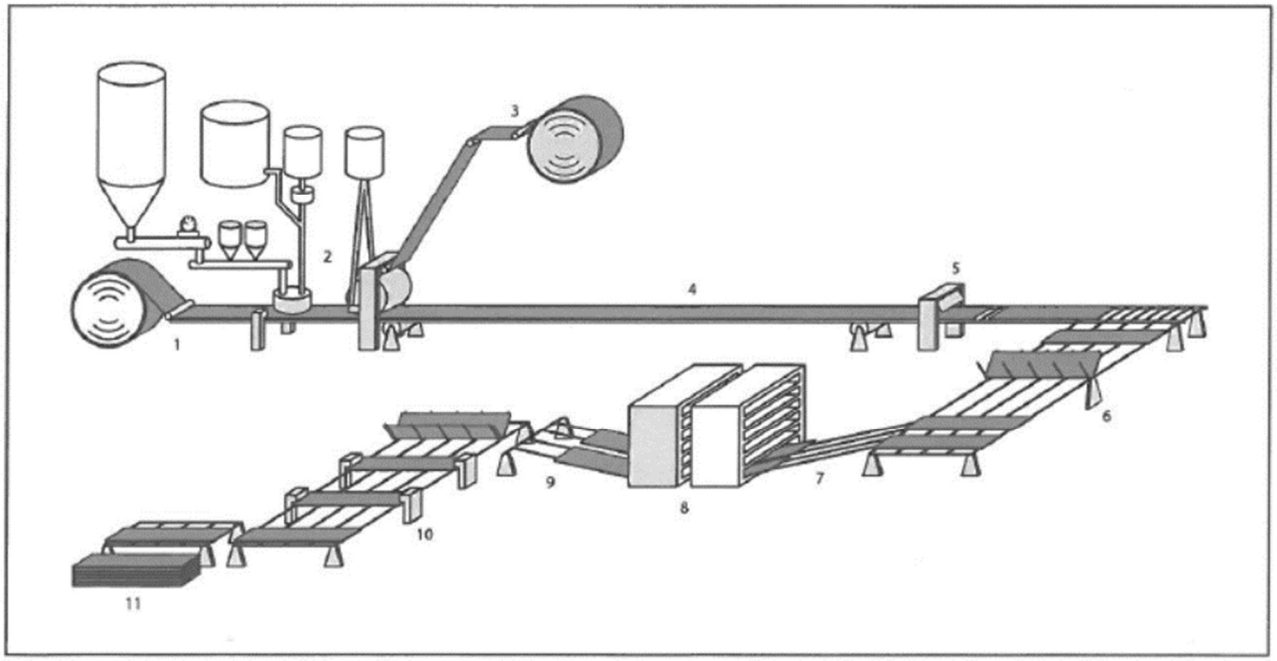
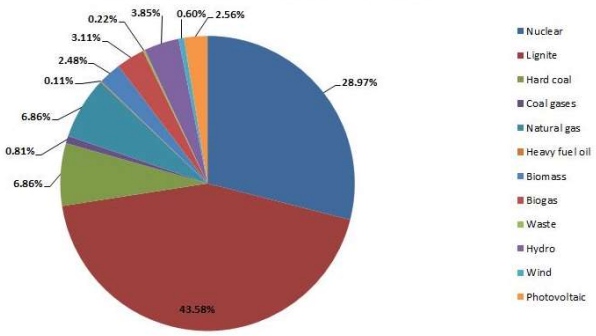


Figure 2 Production schema (1 cardboard, 2 preparation of mixture and layering of boards, 3 cardboard, 4 drying and crystallization, 5 formatting,6 conveyor belt, 7 and 8 drying in the furnace, 9 final formatting, 10 packaging and storage)

More information:
Production of electricity spent within KNAUF production was based on the Czech electricity grid mix.

Figure 3 Czech electricity grid mix from GaBi (Sphera, 2020)



Modules declared, geographical scope, share of specific data (in GWP-GHG indicator) and data variation:

Table 2 Description of the system boundary (X = Declared, Included in LCA, ND = Module Not Declared)

A1 - A3 Product stage	Raw material supply	A1	X
	Transport	A2	X
	Manufacturing	A3	X
A4 - A5 Construction process	Transport from the gate to the site	A4	ND
	Assembly	A5	ND
B1 - B7 Use stage	Use	B1	ND
	Maintenance	B2	ND
	Repair	B3	ND
	Replacement	B4	ND
	Refurbishment	B5	ND
	Operational water use	B6	ND
	Operational energy use	B7	ND
C1 - C4 End of life stage	De-construction	C1	X
	Transport	C2	X
	Waste processing	C3	X
	Disposal	C4	X
D Benefits and loads beyond the system boundaries	Reuse- Recycling - Recovery Potential	D	X

Content information

The gypsum plasterboards produced by KNAUF Praha, s.r.o., consist of gypsum, cardboard, and additives (including starch, glass fibres, foaming agent, sugar, liquefier, glue, ink and other admixtures based on type). All of the constituents of cement-bonded particleboard are not classified as harmful, nor are listed on the list of Substances of Very High Concern (SVHC).

Table 3 Product content declaration

All materials/components	Substances	Volume %	CAS number	Environmental class	Health class
Gypsum	-	Up to 78	-	No	No
Cardboard	-	2 - 4	-	No	No
Starch	-	0.1 – 0.3	-	No	No
Additives and admixtures	-	Max. 26	-	No	No

Environmental Information

Environmental performance

Environmental indicators shown below are calculated according to ISO 14025 and EN 15804+A2:2019. Results per declared unit – 1 m^2 of gypsum plasterboard are presented.

Use of resources

Table 4 represents Life Cycle Inventory Analysis indicator results.

Table 4 Resource use. Summarization of modules A1 – A3, C1-C4 and D.

	RED GREEN 12,5	RED GREEN 15	RED GREEN 18	RED Piano 9,5	RED Piano 12,5	RED Piano 15	RED Piano 18	WHITE 9,5	WHITE 12,5	WHITE 15
Crude oil (MJ)	8.52E-02	1.01E-01	1.19E-01	6.67E-02	1.16E-01	8.40E-02	1.07E-01	5.60E-02	6.10E-02	7.03E-02
Hard coal (MJ)	6.66E-02	7.71E-02	9.02E-02	4.29E-02	5.69E-02	5.65E-02	6.85E-02	4.05E-02	4.51E-02	5.33E-02
Lignite (MJ)	1.53E-01	1.76E-01	2.10E-01	1.20E-01	1.51E-01	1.57E-01	1.93E-01	1.11E-01	1.22E-01	1.39E-01
Natural gas (MJ)	4.45E-01	5.31E-01	6.68E-01	3.72E-01	4.32E-01	4.99E-01	6.10E-01	3.38E-01	3.71E-01	4.23E-01
Gravel (kg)	1.94E-02	2.14E-02	2.19E-02	1.72E-02	2.13E-02	2.13E-02	2.19E-02	1.10E-02	1.11E-02	1.99E-02
Gypsum (natural) (kg)	7.13E-04	8.07E-04	1.83E-03	1.02E-04	1.28E-04	1.35E-04	1.57E-04	7.97E-05	8.60E-05	1.21E-04
Inert rock (kg)	3.57	4.14	4.99	2.64	3.27	3.47	4.24	2.42	2.65	3.03
Natural aggregate (kg)	3.92E-01	4.78E-01	5.77E-01	3.41E-01	3.94E-01	4.72E-01	5.80E-01	3.07E-01	3.41E-01	3.97E-01
Natural mineral filler (kg)	1.72	2.09	2.56	1.41	10.0	1.05	2.49	3.78E-01	4.17E-01	5.16E-01
Soil (kg)	3.87E-01	4.71E-01	5.72E-01	3.25E-01	2.24	2.42E-01	5.67E-01	1.58E-01	1.76E-01	2.06E-01
	DIAMANT 12,5	**DIAMANT 15**	**F 146**	**GREEN 9,5**	**GREEN 12,5**	**GREEN 15**	**MASSIV BAUPLATTE RED 25**	**MASSIVBAUPLATTE RED GREEN 25**	**TOPAS 12,5**	
Crude oil (MJ)	1.05E-01	1.40E-01	8.22E-02	7.15E-02	7.11E-02	9.92E-02	1.50E-01	1.52E-01	8.51E-02	
Hard coal (MJ)	7.88E-02	9.51E-02	6.14E-02	6.11E-02	6.32E-02	7.56E-02	9.31E-02	9.46E-02	5.35E-02	
Lignite (MJ)	1.86E-01	2.34E-01	1.58E-01	1.35E-01	1.39E-01	1.76E-01	3.14E-01	3.15E-01	1.41E-01	
Natural gas (MJ)	5.48E-01	6.75E-01	5.07E-01	3.97E-01	3.97E-01	5.29E-01	8.43E-01	8.44E-01	4.32E-01	
Gravel (kg)	2.23E-02	1.59E-01	1.67E-02	1.10E-02	1.19E-02	1.00E-02	4.37E-02	4.37E-02	2.23E-02	
Gypsum (natural) (kg)	1.46E-04	5.39E-04	1.24E-04	7.18E-04	6.85E-04	1.52E-03	2.47E-04	2.38E-03	1.28E-04	
Inert rock (kg)	4.32	5.46	3.51	3.20	3.25	4.10	6.45	6.47	3.10	
Natural aggregate (kg)	4.92E-01	6.12E-01	4.79E-01	3.43E-01	3.43E-01	4.79E-01	7.97E-01	8.00E-01	3.94E-01	
Natural mineral filler (kg)	2.45	3.45	5.97E-01	4.49E-01	4.50E-01	2.08	4.41	4.50	2.33	
Soil (kg)	5.24E-01	6.47E-01	2.48E-01	1.79E-01	1.81E-01	4.73E-01	8.07E-01	8.15E-01	4.74E-01	

Potential environmental impacts

Environmental impacts per declared unit for each module are reported in the following tables.
In the tables, the following abbreviations are used:

- PERE: Use of renewable primary energy excluding resources used as raw materials,
- PERM: Use of renewable primary energy resources used as raw materials,
- PERT: Total use of renewable primary energy,
- PENRE: Use of non-renewable primary energy excluding resources used as raw materials,
- PENRM: Use of nonrenewable primary energy resources used as raw materials,
- PENRT: Total use of non-renewable primary energy.

Table 5 WHITE 9,5: Parameters describing environmental impact, resource use, waste and outputs

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Climate change - total	kg CO_2 eq.	5.74E-01	2.21E-02	1.60E-02	4.91E-03	6.12E-02	0.00	1.11E-01	0.00
Climate change - fossil	kg CO_2 eq.	5.71E-01	2.19E-02	1.35E-02	5.10E-03	6.08E-02	0.00	1.20E-01	0.00
Climate change - biogenic	kg CO_2 eq.	1.55E-03	-3.66E-05	2.46E-03	-2.24E-04	-1.03E-04	0.00	-9.50E-03	0.00
Climate change - land use and land use change	kg CO_2 eq.	1.96E-03	1.76E-04	3.39E-05	3.96E-05	4.96E-04	0.00	3.45E-04	0.00
Ozone Depletion	kg CFC 11 eq.	6.10E-09	4.00E-18	-1.15E-11	8.98E-19	1.12E-17	0.00	4.49E-16	0.00
Acidification	mol H^+ eq.	2.30E-03	7.39E-05	5.85E-04	2.50E-05	3.53E-04	0.00	8.60E-04	0.00
Eutrophication aquatic freshwater	kg P eq.	3.41E-05	6.64E-08	6.88E-08	1.49E-08	1.87E-07	0.00	2.07E-07	0.00
Eutrophication aquatic marine	kg N eq.	8.26E-04	3.33E-05	2.99E-04	1.16E-05	1.70E-04	0.00	2.21E-04	0.00
Eutrophication terrestrial	mol N eq.	7.83E-03	3.72E-04	3.27E-03	1.28E-04	1.88E-03	0.00	2.43E-03	0.00
Photochemical ozone formation	kg NMVOC eq.	1.49E-03	6.55E-05	9.50E-04	3.24E-05	3.30E-04	0.00	6.70E-04	0.00
Depletion of abiotic resources - minerals and metals	kg Sb eq.	2.63E-06	1.76E-09	6.25E-10	3.96E-10	4.95E-09	0.00	1.08E-08	0.00
Depletion of abiotic resources - fossil fuels	MJ, net calorific value	1.85E+01	2.91E-01	9.33E-02	6.53E-02	8.18E-01	0.00	1.57	0.00
Water use	m^3 world eq. deprived	4.87E-01	2.13E-04	5.39E-04	4.77E-05	5.97E-04	0.00	1.25E-02	0.00
Particulate matter emissions	Disease incidence	2.30E-08	4.18E-10	1.62E-09	2.81E-10	1.34E-09	0.00	1.06E-08	0.00
Ionizing radiation, human health	kBq U235 eq.	3.43E-02	7.94E-05	7.95E-05	1.78E-05	2.23E-04	0.00	1.77E-03	0.00
Ecotoxicity (freshwater)	CTUe	4.31	2.18E-01	6.23E-02	4.89E-02	6.12E-01	0.00	8.98E-01	0.00
Human toxicity, cancer effects	CTUh	1.71E-10	4.50E-12	6.86E-12	1.01E-12	1.26E-11	0.00	1.33E-10	0.00
Human toxicity, noncancer effects	CTUh	1.05E-08	2.58E-10	4.97E-09	5.91E-11	6.81E-10	0.00	1.47E-08	0.00

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Land use related impacts / soil quality	Pt	6.36	1.02E-01	2.46E-02	2.29E-02	2.87E-01	0.00	3.43E-01	0.00
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	1.68	1.68E-02	9.73E-03	3.78E-03	4.73E-02	0.00	2.06E-01	0.00
PERM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	1.68	1.68E-02	9.73E-03	3.78E-03	4.73E-02	0.00	2.06E-01	0.00
PENRE	MJ	1.85E+01	2.92E-01	9.34E-02	6.56E-02	8.21E-01	0.00	1.57	0.00
PENRM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	1.85E+01	2.92E-01	9.34E-02	6.56E-02	8.21E-01	0.00	1.57	0.00
Use of secondary material	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of non-renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water	m^3	1.39E-02	1.96E-05	1.83E-05	4.40E-06	5.51E-05	0.00	3.96E-04	0.00
Hazardous waste disposed	kg	1.06E-07	1.35E-08	2.50E-09	3.03E-09	3.80E-08	0.00	3.80E-08	0.00
Non hazardous waste disposed	kg	1.08E-02	4.63E-05	3.02E-01	1.04E-05	1.30E-04	0.00	1.30E-04	0.00
Radioactive waste disposed	kg	3.50E-04	5.38E-07	5.80E-07	1.21E-07	1.51E-06	0.00	1.51E-06	0.00
Components for reuse	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Material for recycling	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for energy recovery	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy electrical	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy thermal	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 6 WHITE 12,5: Parameters describing environmental impact, resource use, waste and outputs

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Climate change - total	kg CO_2 eq.	6.15E-01	2.21E-02	1.67E-02	5.47E-03	6.82E-02	0.00	1.23E-01	0.00
Climate change - fossil	kg CO_2 eq.	6.11E-01	2.19E-02	1.42E-02	5.68E-03	6.77E-02	0.00	1.34E-01	0.00
Climate change - biogenic	kg CO_2 eq.	1.73E-03	-3.66E-05	2.46E-03	-2.49E-04	-1.15E-04	0.00	-1.06E-02	0.00
Climate change - land use and land use change	kg CO_2 eq.	1.98E-03	1.77E-04	3.39E-05	4.41E-05	5.52E-04	0.00	3.85E-04	0.00
Ozone Depletion	kg CFC 11 eq.	6.22E-09	4.01E-18	-1.15E-11	1.00E-18	1.25E-17	0.00	5.00E-16	0.00
Acidification	mol H^+ eq.	2.47E-03	7.40E-05	6.47E-04	2.78E-05	3.94E-04	0.00	9.58E-04	0.00

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Eutrophication aquatic freshwater	kg P eq.	3.44E-05	6.65E-08	6.88E-08	1.66E-08	2.08E-07	0.00	2.30E-07	0.00
Eutrophication aquatic marine	kg N eq.	8.75E-04	3.34E-05	3.31E-04	1.29E-05	1.90E-04	0.00	2.47E-04	0.00
Eutrophication terrestrial	mol N eq.	8.36E-03	3.73E-04	3.63E-03	1.43E-04	2.10E-03	0.00	2.71E-03	0.00
Photochemical ozone formation	kg NMVOC eq.	1.63E-03	6.56E-05	1.05E-03	3.61E-05	3.67E-04	0.00	7.46E-04	0.00
Depletion of abiotic resources - minerals and metals	kg Sb eq.	2.66E-06	1.76E-09	6.25E-10	4.41E-10	5.52E-09	0.00	1.20E-08	0.00
Depletion of abiotic resources - fossil fuels	MJ, net calorific value	2.02E+01	2.91E-01	9.33E-02	7.27E-02	9.11E-01	0.00	1.75	0.00
Water use	m^3 world eq. deprived	4.88E-01	2.13E-04	5.39E-04	5.32E-05	6.66E-04	0.00	1.39E-02	0.00
Particulate matter emissions	Disease incidence	2.51E-08	4.18E-10	1.75E-09	3.13E-10	1.49E-09	0.00	1.19E-08	0.00
Ionizing radiation, human health	kBq U235 eq.	3.63E-02	7.95E-05	7.95E-05	1.99E-05	2.49E-04	0.00	1.98E-03	0.00
Ecotoxicity (freshwater)	CTUe	4.45	2.18E-01	6.23E-02	5.44E-02	6.81E-01	0.00	1.00	0.00
Human toxicity, cancer effects	CTUh	1.79E-10	4.50E-12	6.86E-12	1.12E-12	1.41E-11	0.00	1.48E-10	0.00
Human toxicity, noncancer effects	CTUh	1.11E-08	2.58E-10	5.45E-09	6.59E-11	7.58E-10	0.00	1.63E-08	0.00
Land use related impacts / soil quality	Pt	6.44	1.02E-01	2.46E-02	2.55E-02	3.20E-01	0.00	3.82E-01	0.00
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	1.73	1.68E-02	9.73E-03	4.21E-03	5.27E-02	0.00	2.30E-01	0.00
PERM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	1.73	1.68E-02	9.73E-03	4.21E-03	5.27E-02	0.00	2.30E-01	0.00
PENRE	MJ	2.02E+01	2.92E-01	9.34E-02	7.30E-02	9.14E-01	0.00	1.75	0.00
PENRM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	2.02E+01	2.92E-01	9.34E-02	7.30E-02	9.14E-01	0.00	1.75	0.00
Use of secondary material	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of non-renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water	m^3	1.40E-02	1.96E-05	1.83E-05	4.90E-06	6.14E-05	0.00	4.41E-04	0.00
Hazardous waste disposed	kg	1.08E-07	1.35E-08	2.50E-09	3.38E-09	4.23E-08	0.00	4.23E-08	0.00
Non hazardous waste disposed	kg	1.10E-02	4.63E-05	3.02E-01	1.16E-05	1.45E-04	0.00	1.45E-04	0.00
Radioactive waste disposed	kg	3.80E-04	5.39E-07	5.80E-07	1.35E-07	1.69E-06	0.00	1.69E-06	0.00

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Components for reuse	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Material for recycling	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for energy recovery	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy electrical	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy thermal	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 7 WHITE 15: Parameters describing environmental impact, resource use, waste and outputs

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Climate change - total	kg CO_2 eq.	8.26E-01	2.57E-02	1.77E-02	6.41E-03	7.98E-02	0.00	1.44E-01	0.00
Climate change - fossil	kg CO_2 eq.	8.17E-01	2.55E-02	1.52E-02	6.65E-03	7.93E-02	0.00	1.56E-01	0.00
Climate change - biogenic	kg CO_2 eq.	7.08E-03	-4.26E-05	2.46E-03	-2.92E-04	-1.34E-04	0.00	-1.24E-02	0.00
Climate change - land use and land use change	kg CO_2 eq.	2.10E-03	2.05E-04	3.39E-05	5.16E-05	6.47E-04	0.00	4.50E-04	0.00
Ozone Depletion	kg CFC 11 eq.	1.92E-08	4.66E-18	-1.15E-11	1.17E-18	1.47E-17	0.00	5.85E-16	0.00
Acidification	mol H^+ eq.	3.80E-03	8.60E-05	7.40E-04	3.26E-05	4.61E-04	0.00	1.12E-03	0.00
Eutrophication aquatic freshwater	kg P eq.	8.61E-05	7.73E-08	6.88E-08	1.94E-08	2.43E-07	0.00	2.69E-07	0.00
Eutrophication aquatic marine	kg N eq.	1.15E-03	3.88E-05	3.80E-04	1.51E-05	2.22E-04	0.00	2.89E-04	0.00
Eutrophication terrestrial	mol N eq.	1.14E-02	4.33E-04	4.16E-03	1.67E-04	2.46E-03	0.00	3.17E-03	0.00
Photochemical ozone formation	kg NMVOC eq.	2.52E-03	7.62E-05	1.21E-03	4.22E-05	4.30E-04	0.00	8.74E-04	0.00
Depletion of abiotic resources - minerals and metals	kg Sb eq.	9.56E-06	2.05E-09	6.25E-10	5.16E-10	6.46E-09	0.00	1.41E-08	0.00
Depletion of abiotic resources - fossil fuels	MJ, net calorific value	2.53E+01	3.38E-01	9.33E-02	8.51E-02	1.07	0.00	2.05	0.00
Water use	m^3 world eq. deprived	5.16E-01	2.47E-04	5.39E-04	6.22E-05	7.79E-04	0.00	1.63E-02	0.00
Particulate matter emissions	Disease incidence	3.56E-08	4.86E-10	1.96E-09	3.67E-10	1.74E-09	0.00	1.39E-08	0.00
Ionizing radiation, human health	kBq U235 eq.	6.67E-02	9.24E-05	7.95E-05	2.32E-05	2.91E-04	0.00	2.31E-03	0.00
Ecotoxicity (freshwater)	CTUe	5.92	2.53E-01	6.23E-02	6.37E-02	7.98E-01	0.00	1.17	0.00
Human toxicity, cancer effects	CTUh	3.31E-10	5.23E-12	6.86E-12	1.32E-12	1.65E-11	0.00	1.74E-10	0.00

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Human toxicity, noncancer effects	CTUh	2.05E-08	3.00E-10	6.17E-09	7.71E-11	8.88E-10	0.00	1.91E-08	0.00
Land use related impacts / soil quality	Pt	6.74	1.19E-01	2.46E-02	2.99E-02	3.74E-01	0.00	4.47E-01	0.00
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	1.93	1.96E-02	9.73E-03	4.92E-03	6.16E-02	0.00	2.69E-01	0.00
PERM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	1.93	1.96E-02	9.73E-03	4.92E-03	6.16E-02	0.00	2.69E-01	0.00
PENRE	MJ	2.53E+01	3.40E-01	9.34E-02	8.55E-02	1.07	0.00	2.05	0.00
PENRM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	2.53E+01	3.40E-01	9.34E-02	8.55E-02	1.07	0.00	2.05	0.00
Use of secondary material	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of non-renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water	m^3	1.48E-02	2.28E-05	1.83E-05	5.74E-06	7.18E-05	0.00	5.16E-04	0.00
Hazardous waste disposed	kg	1.11E-07	1.57E-08	2.50E-09	3.95E-09	4.95E-08	0.00	4.95E-08	0.00
Non hazardous waste disposed	kg	1.14E-02	5.39E-05	3.02E-01	1.35E-05	1.70E-04	0.00	1.70E-04	0.00
Radioactive waste disposed	kg	4.28E-04	6.26E-07	5.80E-07	1.58E-07	1.97E-06	0.00	1.97E-06	0.00
Components for reuse	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Material for recycling	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for energy recovery	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy electrical	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy thermal	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 8 RED Piano 9,5: Parameters describing environmental impact, resource use, waste and outputs

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Climate change - total	kg CO_2 eq.	7.00E-01	4.01E-02	1.67E-02	5.47E-03	6.82E-02	0.00	1.23E-01	0.00
Climate change - fossil	kg CO_2 eq.	6.96E-01	3.98E-02	1.42E-02	5.68E-03	6.77E-02	0.00	1.34E-01	0.00
Climate change - biogenic	kg CO_2 eq.	2.60E-03	-6.68E-05	2.46E-03	-2.49E-04	-1.15E-04	0.00	-1.06E-02	0.00
Climate change - land use and land use change	kg CO_2 eq.	2.07E-03	3.22E-04	3.39E-05	4.41E-05	5.52E-04	0.00	3.85E-04	0.00
Ozone Depletion	kg CFC 11 eq.	1.45E-08	7.30E-18	-1.15E-11	1.00E-18	1.25E-17	0.00	5.00E-16	0.00

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Acidification	mol H^+ eq.	3.10E-03	1.73E-04	6.45E-04	2.78E-05	3.94E-04	0.00	9.58E-04	0.00
Eutrophication aquatic freshwater	kg P eq.	6.77E-05	1.21E-07	6.88E-08	1.66E-08	2.08E-07	0.00	2.30E-07	0.00
Eutrophication aquatic marine	kg N eq.	9.95E-04	8.06E-05	3.30E-04	1.29E-05	1.90E-04	0.00	2.47E-04	0.00
Eutrophication terrestrial	mol N eq.	9.61E-03	8.96E-04	3.62E-03	1.43E-04	2.10E-03	0.00	2.71E-03	0.00
Photochemical ozone formation	kg NMVOC eq.	1.97E-03	1.57E-04	1.05E-03	3.61E-05	3.67E-04	0.00	7.46E-04	0.00
Depletion of abiotic resources - minerals and metals	kg Sb eq.	6.97E-06	3.22E-09	6.25E-10	4.41E-10	5.52E-09	0.00	1.20E-08	0.00
Depletion of abiotic resources - fossil fuels	MJ, net calorific value	2.17E+01	5.31E-01	9.33E-02	7.27E-02	9.11E-01	0.00	1.75	0.00
Water use	m^3 world eq. deprived	5.42E-01	3.88E-04	5.39E-04	5.32E-05	6.66E-04	0.00	1.39E-02	0.00
Particulate matter emissions	Disease incidence	2.88E-08	8.05E-10	1.75E-09	3.13E-10	1.49E-09	0.00	1.19E-08	0.00
Ionizing radiation, human health	kBq U235 eq.	5.48E-02	1.45E-04	7.95E-05	1.99E-05	2.49E-04	0.00	1.98E-03	0.00
Ecotoxicity (freshwater)	CTUe	5.49	3.97E-01	6.23E-02	5.44E-02	6.81E-01	0.00	1.00	0.00
Human toxicity, cancer effects	CTUh	2.67E-10	8.21E-12	6.86E-12	1.12E-12	1.41E-11	0.00	1.48E-10	0.00
Human toxicity, noncancer effects	CTUh	1.64E-08	4.59E-10	5.43E-09	6.59E-11	7.58E-10	0.00	1.63E-08	0.00
Land use related impacts / soil quality	Pt	6.73	1.86E-01	2.46E-02	2.55E-02	3.20E-01	0.00	3.82E-01	0.00
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	1.87	3.07E-02	9.73E-03	4.21E-03	5.27E-02	0.00	2.30E-01	0.00
PERM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	1.87	3.07E-02	9.73E-03	4.21E-03	5.27E-02	0.00	2.30E-01	0.00
PENRE	MJ	2.17E+01	5.33E-01	9.34E-02	7.30E-02	9.14E-01	0.00	1.75	0.00
PENRM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	2.17E+01	5.33E-01	9.34E-02	7.30E-02	9.14E-01	0.00	1.75	0.00
Use of secondary material	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of non-renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water	m^3	1.53E-02	3.58E-05	1.83E-05	4.90E-06	6.14E-05	0.00	4.41E-04	0.00
Hazardous waste disposed	kg	1.08E-07	2.47E-08	2.50E-09	3.38E-09	4.23E-08	0.00	4.23E-08	0.00
Non hazardous waste disposed	kg	1.10E-02	8.45E-05	3.02E-01	1.16E-05	1.45E-04	0.00	1.45E-04	0.00
Radioactive waste disposed	kg	3.85E-04	9.83E-07	5.80E-07	1.35E-07	1.69E-06	0.00	1.69E-06	0.00

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Components for reuse	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Material for recycling	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for energy recovery	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy electrical	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy thermal	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 9 RED Piano 12,5: Parameters describing environmental impact, resource use, waste and outputs

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Climate change - total	kg CO_2 eq.	9.00E-01	1.60E-01	1.77E-02	6.34E-03	7.90E-02	0.00	1.43E-01	0.00
Climate change - fossil	kg CO_2 eq.	8.94E-01	1.59E-01	1.52E-02	6.58E-03	7.85E-02	0.00	1.55E-01	0.00
Climate change - biogenic	kg CO_2 eq.	3.58E-03	-2.68E-04	2.46E-03	-2.89E-04	-1.33E-04	0.00	-1.23E-02	0.00
Climate change - land use and land use change	kg CO_2 eq.	2.42E-03	1.29E-03	3.39E-05	5.11E-05	6.40E-04	0.00	4.46E-04	0.00
Ozone Depletion	kg CFC 11 eq.	2.01E-08	2.93E-17	-1.15E-11	1.16E-18	1.45E-17	0.00	5.80E-16	0.00
Acidification	mol H^+ eq.	3.97E-03	8.60E-04	7.41E-04	3.23E-05	4.56E-04	0.00	1.11E-03	0.00
Eutrophication aquatic freshwater	kg P eq.	8.97E-05	4.86E-07	6.88E-08	1.92E-08	2.41E-07	0.00	2.67E-07	0.00
Eutrophication aquatic marine	kg N eq.	1.21E-03	4.12E-04	3.81E-04	1.49E-05	2.20E-04	0.00	2.86E-04	0.00
Eutrophication terrestrial	mol N eq.	1.20E-02	4.56E-03	4.17E-03	1.65E-04	2.43E-03	0.00	3.14E-03	0.00
Photochemical ozone formation	kg NMVOC eq.	2.58E-03	7.99E-04	1.21E-03	4.18E-05	4.26E-04	0.00	8.65E-04	0.00
Depletion of abiotic resources - minerals and metals	kg Sb eq.	9.82E-06	1.29E-08	6.25E-10	5.11E-10	6.40E-09	0.00	1.40E-08	0.00
Depletion of abiotic resources - fossil fuels	MJ, net calorific value	2.66E+01	2.13	9.33E-02	8.43E-02	1.06	0.00	2.03	0.00
Water use	m^3 world eq. deprived	6.01E-01	1.56E-03	5.39E-04	6.16E-05	7.71E-04	0.00	1.62E-02	0.00
Particulate matter emissions	Disease incidence	3.98E-08	3.42E-09	1.96E-09	3.63E-10	1.73E-09	0.00	1.37E-08	0.00
Ionizing radiation, human health	kBq U235 eq.	9.51E-02	5.81E-04	7.95E-05	2.30E-05	2.88E-04	0.00	2.29E-03	0.00
Ecotoxicity (freshwater)	CTUe	7.00	1.59	6.23E-02	6.31E-02	7.90E-01	0.00	1.16	0.00
Human toxicity, cancer effects	CTUh	3.53E-10	3.30E-11	6.86E-12	1.30E-12	1.63E-11	0.00	1.72E-10	0.00

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Human toxicity, noncancer effects	CTUh	2.16E-08	1.79E-09	6.18E-09	7.63E-11	8.79E-10	0.00	1.89E-08	0.00
Land use related impacts / soil quality	Pt	7.47	7.48E-01	2.46E-02	2.96E-02	3.71E-01	0.00	4.42E-01	0.00
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	2.50	1.23E-01	9.73E-03	4.87E-03	6.10E-02	0.00	2.67E-01	0.00
PERM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	2.50	1.23E-01	9.73E-03	4.87E-03	6.10E-02	0.00	2.67E-01	0.00
PENRE	MJ	2.66E+01	2.14	9.34E-02	8.46E-02	1.06	0.00	2.03	0.00
PENRM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	2.66E+01	2.14	9.34E-02	8.46E-02	1.06	0.00	2.03	0.00
Use of secondary material	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of non-renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water	m^3	1.70E-02	1.44E-04	1.83E-05	5.68E-06	7.11E-05	0.00	5.11E-04	0.00
Hazardous waste disposed	kg	1.23E-07	9.89E-08	2.50E-09	3.91E-09	4.90E-08	0.00	4.90E-08	0.00
Non hazardous waste disposed	kg	1.23E-02	3.39E-04	3.02E-01	1.34E-05	1.68E-04	0.00	1.68E-04	0.00
Radioactive waste disposed	kg	5.93E-04	3.94E-06	5.80E-07	1.56E-07	1.95E-06	0.00	1.95E-06	0.00
Components for reuse	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Material for recycling	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for energy recovery	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy electrical	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy thermal	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 10 RED Piano 15: Parameters describing environmental impact, resource use, waste and outputs

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Climate change - total	kg CO_2 eq.	8.89E-01	3.53E-02	1.93E-02	7.65E-03	9.53E-02	0.00	1.72E-01	0.00
Climate change - fossil	kg CO_2 eq.	8.83E-01	3.51E-02	1.68E-02	7.94E-03	9.47E-02	0.00	1.87E-01	0.00
Climate change - biogenic	kg CO_2 eq.	3.89E-03	-5.87E-05	2.46E-03	-3.49E-04	-1.60E-04	0.00	-1.48E-02	0.00
Climate change - land use and land use change	kg CO_2 eq.	2.19E-03	2.83E-04	3.39E-05	6.17E-05	7.72E-04	0.00	5.38E-04	0.00
Ozone Depletion	kg CFC 11 eq.	2.00E-08	6.42E-18	-1.15E-11	1.40E-18	1.75E-17	0.00	6.99E-16	0.00

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Acidification	mol H^+ eq.	4.04E-03	1.42E-04	8.83E-04	3.89E-05	5.50E-04	0.00	1.34E-03	0.00
Eutrophication aquatic freshwater	kg P eq.	8.94E-05	1.07E-07	6.88E-08	2.32E-08	2.91E-07	0.00	3.22E-07	0.00
Eutrophication aquatic marine	kg N eq.	1.23E-03	6.56E-05	4.55E-04	1.80E-05	2.65E-04	0.00	3.45E-04	0.00
Eutrophication terrestrial	mol N eq.	1.22E-02	7.30E-04	4.98E-03	1.99E-04	2.93E-03	0.00	3.79E-03	0.00
Photochemical ozone formation	kg NMVOC eq.	2.67E-03	1.28E-04	1.45E-03	5.05E-05	5.13E-04	0.00	1.04E-03	0.00
Depletion of abiotic resources - minerals and metals	kg Sb eq.	9.79E-06	2.83E-09	6.25E-10	6.16E-10	7.71E-09	0.00	1.68E-08	0.00
Depletion of abiotic resources - fossil fuels	MJ, net calorific value	2.90E+01	4.67E-01	9.33E-02	1.02E-01	1.27	0.00	2.45	0.00
Water use	m^3 world eq. deprived	5.73E-01	3.41E-04	5.39E-04	7.43E-05	9.30E-04	0.00	1.95E-02	0.00
Particulate matter emissions	Disease incidence	3.79E-08	6.96E-10	2.26E-09	4.38E-10	2.08E-09	0.00	1.66E-08	0.00
Ionizing radiation, human health	kBq U235 eq.	7.04E-02	1.27E-04	7.95E-05	2.78E-05	3.47E-04	0.00	2.76E-03	0.00
Ecotoxicity (freshwater)	CTUe	6.52	3.49E-01	6.23E-02	7.61E-02	9.52E-01	0.00	1.40	0.00
Human toxicity, cancer effects	CTUh	3.48E-10	7.22E-12	6.86E-12	1.57E-12	1.97E-11	0.00	2.07E-10	0.00
Human toxicity, noncancer effects	CTUh	2.18E-08	4.07E-10	7.27E-09	9.21E-11	1.06E-09	0.00	2.28E-08	0.00
Land use related impacts / soil quality	Pt	7.16	1.64E-01	2.46E-02	3.57E-02	4.47E-01	0.00	5.33E-01	0.00
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	2.07	2.70E-02	9.73E-03	5.88E-03	7.36E-02	0.00	3.21E-01	0.00
PERM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	2.07	2.70E-02	9.73E-03	5.88E-03	7.36E-02	0.00	3.21E-01	0.00
PENRE	MJ	2.90E+01	4.69E-01	9.34E-02	1.02E-01	1.28	0.00	2.45	0.00
PENRM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	2.90E+01	4.69E-01	9.34E-02	1.02E-01	1.28	0.00	2.45	0.00
Use of secondary material	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of non-renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water	m^3	1.62E-02	3.15E-05	1.83E-05	6.85E-06	8.58E-05	0.00	6.16E-04	0.00
Hazardous waste disposed	kg	1.13E-07	2.17E-08	2.50E-09	4.72E-09	5.91E-08	0.00	5.91E-08	0.00
Non hazardous waste disposed	kg	1.19E-02	7.43E-05	3.02E-01	1.62E-05	2.03E-04	0.00	2.03E-04	0.00
Radioactive waste disposed	kg	4.79E-04	8.64E-07	5.80E-07	1.88E-07	2.36E-06	0.00	2.36E-06	0.00

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Components for reuse	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Material for recycling	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for energy recovery	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy electrical	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy thermal	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 11 RED Piano 18: Parameters describing environmental impact, resource use, waste and outputs

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Climate change - total	kg CO_2 eq.	1.06	5.62E-02	2.16E-02	9.45E-03	1.18E-01	0.00	2.13E-01	0.00
Climate change - fossil	kg CO_2 eq.	1.04	5.59E-02	1.91E-02	9.81E-03	1.17E-01	0.00	2.31E-01	0.00
Climate change - biogenic	kg CO_2 eq.	1.10E-02	-9.39E-05	2.46E-03	-4.31E-04	-1.98E-04	0.00	-1.83E-02	0.00
Climate change - land use and land use change	kg CO_2 eq.	2.35E-03	4.53E-04	3.39E-05	7.62E-05	9.54E-04	0.00	6.64E-04	0.00
Ozone Depletion	kg CFC 11 eq.	2.21E-08	1.03E-17	-1.15E-11	1.73E-18	2.16E-17	0.00	8.64E-16	0.00
Acidification	mol H^+ eq.	4.62E-03	2.57E-04	1.08E-03	4.81E-05	6.80E-04	0.00	1.65E-03	0.00
Eutrophication aquatic freshwater	kg P eq.	9.74E-05	1.70E-07	6.88E-08	2.87E-08	3.59E-07	0.00	3.97E-07	0.00
Eutrophication aquatic marine	kg N eq.	1.36E-03	1.21E-04	5.59E-04	2.23E-05	3.27E-04	0.00	4.26E-04	0.00
Eutrophication terrestrial	mol N eq.	1.37E-02	1.34E-03	6.12E-03	2.46E-04	3.63E-03	0.00	4.68E-03	0.00
Photochemical ozone formation	kg NMVOC eq.	3.14E-03	2.36E-04	1.78E-03	6.23E-05	6.34E-04	0.00	1.29E-03	0.00
Depletion of abiotic resources - minerals and metals	kg Sb eq.	1.10E-05	4.52E-09	6.25E-10	7.61E-10	9.53E-09	0.00	2.08E-08	0.00
Depletion of abiotic resources - fossil fuels	MJ, net calorific value	3.52E+01	7.46E-01	9.33E-02	1.26E-01	1.57	0.00	3.03	0.00
Water use	m^3 world eq. deprived	5.60E-01	5.45E-04	5.39E-04	9.18E-05	1.15E-03	0.00	2.41E-02	0.00
Particulate matter emissions	Disease incidence	4.44E-08	1.15E-09	2.69E-09	5.41E-10	2.57E-09	0.00	2.05E-08	0.00
Ionizing radiation, human health	kBq U235 eq.	8.58E-02	2.04E-04	7.95E-05	3.43E-05	4.29E-04	0.00	3.41E-03	0.00
Ecotoxicity (freshwater)	CTUe	6.95	5.58E-01	6.24E-02	9.40E-02	1.18	0.00	1.73	0.00
Human toxicity, cancer effects	CTUh	3.95E-10	1.15E-11	6.86E-12	1.94E-12	2.43E-11	0.00	2.56E-10	0.00

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Human toxicity, noncancer effects	CTUh	2.50E-08	6.41E-10	8.80E-09	1.14E-10	1.31E-09	0.00	2.82E-08	0.00
Land use related impacts / soil quality	Pt	7.51	2.62E-01	2.46E-02	4.41E-02	5.52E-01	0.00	6.59E-01	0.00
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	2.30	4.31E-02	9.73E-03	7.26E-03	9.10E-02	0.00	3.97E-01	0.00
PERM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	2.30	4.31E-02	9.73E-03	7.26E-03	9.10E-02	0.00	3.97E-01	0.00
PENRE	MJ	3.52E+01	7.49E-01	9.34E-02	1.26E-01	1.58	0.00	3.03	0.00
PENRM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	3.52E+01	7.49E-01	9.34E-02	1.26E-01	1.58	0.00	3.03	0.00
Use of secondary material	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of non-renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water	m^3	1.63E-02	5.03E-05	1.83E-05	8.46E-06	1.06E-04	0.00	7.61E-04	0.00
Hazardous waste disposed	kg	1.25E-07	3.46E-08	2.50E-09	5.83E-09	7.30E-08	0.00	7.30E-08	0.00
Non hazardous waste disposed	kg	1.34E-02	1.19E-04	3.02E-01	2.00E-05	2.50E-04	0.00	2.50E-04	0.00
Radioactive waste disposed	kg	5.96E-04	1.38E-06	5.80E-07	2.32E-07	2.91E-06	0.00	2.91E-06	0.00
Components for reuse	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Material for recycling	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for energy recovery	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy electrical	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy thermal	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 12 GREEN 9,5: Parameters describing environmental impact, resource use, waste and outputs

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Climate change - total	kg CO_2 eq.	7.80E-01	2.60E-02	1.67E-02	5.47E-03	6.82E-02	0.00	1.23E-01	0.00
Climate change - fossil	kg CO_2 eq.	7.55E-01	2.59E-02	1.42E-02	5.68E-03	6.77E-02	0.00	1.34E-01	0.00
Climate change - biogenic	kg CO_2 eq.	2.31E-02	-3.54E-05	2.46E-03	-2.49E-04	-1.15E-04	0.00	-1.06E-02	0.00
Climate change - land use and land use change	kg CO_2 eq.	2.02E-03	1.87E-04	3.39E-05	4.41E-05	5.52E-04	0.00	3.85E-04	0.00
Ozone Depletion	kg CFC 11 eq.	6.46E-09	4.49E-18	-1.15E-11	1.00E-18	1.25E-17	0.00	5.00E-16	0.00

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Acidification	mol H^+ eq.	3.11E-03	1.75E-04	6.45E-04	2.78E-05	3.94E-04	0.00	9.58E-04	0.00
Eutrophication aquatic freshwater	kg P eq.	3.42E-05	7.10E-08	6.88E-08	1.66E-08	2.08E-07	0.00	2.30E-07	0.00
Eutrophication aquatic marine	kg N eq.	9.85E-04	6.09E-05	3.30E-04	1.29E-05	1.90E-04	0.00	2.47E-04	0.00
Eutrophication terrestrial	mol N eq.	9.56E-03	6.75E-04	3.62E-03	1.43E-04	2.10E-03	0.00	2.71E-03	0.00
Photochemical ozone formation	kg NMVOC eq.	1.98E-03	1.41E-04	1.05E-03	3.61E-05	3.67E-04	0.00	7.46E-04	0.00
Depletion of abiotic resources - minerals and metals	kg Sb eq.	1.26E-05	1.94E-09	6.25E-10	4.41E-10	5.52E-09	0.00	1.20E-08	0.00
Depletion of abiotic resources - fossil fuels	MJ, net calorific value	2.25E+01	3.40E-01	9.33E-02	7.27E-02	9.11E-01	0.00	1.75	0.00
Water use	m^3 world eq. deprived	5.38E-01	2.30E-04	5.39E-04	5.32E-05	6.66E-04	0.00	1.39E-02	0.00
Particulate matter emissions	Disease incidence	3.89E-08	2.09E-09	1.75E-09	3.13E-10	1.49E-09	0.00	1.19E-08	0.00
Ionizing radiation, human health	kBq U235 eq.	4.38E-02	8.93E-05	7.95E-05	1.99E-05	2.49E-04	0.00	1.98E-03	0.00
Ecotoxicity (freshwater)	CTUe	5.71	2.53E-01	6.23E-02	5.44E-02	6.81E-01	0.00	1.00	0.00
Human toxicity, cancer effects	CTUh	2.08E-10	5.19E-12	6.86E-12	1.12E-12	1.41E-11	0.00	1.48E-10	0.00
Human toxicity, noncancer effects	CTUh	1.34E-08	2.93E-10	5.43E-09	6.59E-11	7.58E-10	0.00	1.63E-08	0.00
Land use related impacts / soil quality	Pt	6.57	1.08E-01	2.46E-02	2.55E-02	3.20E-01	0.00	3.82E-01	0.00
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	2.35	1.79E-02	9.73E-03	4.21E-03	5.27E-02	0.00	2.30E-01	0.00
PERM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	2.35	1.79E-02	9.73E-03	4.21E-03	5.27E-02	0.00	2.30E-01	0.00
PENRE	MJ	2.25E+01	3.41E-01	9.34E-02	7.30E-02	9.14E-01	0.00	1.75	0.00
PENRM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	2.25E+01	3.41E-01	9.34E-02	7.30E-02	9.14E-01	0.00	1.75	0.00
Use of secondary material	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of non-renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water	m^3	1.52E-02	2.10E-05	1.83E-05	4.90E-06	6.14E-05	0.00	4.41E-04	0.00
Hazardous waste disposed	kg	1.12E-04	1.43E-08	2.50E-09	3.38E-09	4.23E-08	0.00	4.23E-08	0.00
Non hazardous waste disposed	kg	3.38E-02	5.23E-05	3.02E-01	1.16E-05	1.45E-04	0.00	1.45E-04	0.00
Radioactive waste disposed	kg	4.69E-04	6.06E-07	5.80E-07	1.35E-07	1.69E-06	0.00	1.69E-06	0.00

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Components for reuse	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Material for recycling	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for energy recovery	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy electrical	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy thermal	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 13 GREEN 12,5: Parameters describing environmental impact, resource use, waste and outputs

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Climate change - total	kg CO_2 eq.	8.01E-01	2.62E-02	1.67E-02	5.47E-03	6.82E-02	0.00	1.23E-01	0.00
Climate change - fossil	kg CO_2 eq.	7.77E-01	2.60E-02	1.42E-02	5.68E-03	6.77E-02	0.00	1.34E-01	0.00
Climate change - biogenic	kg CO_2 eq.	2.21E-02	-3.61E-05	2.46E-03	-2.49E-04	-1.15E-04	0.00	-1.06E-02	0.00
Climate change - land use and land use change	kg CO_2 eq.	2.04E-03	1.90E-04	3.39E-05	4.41E-05	5.52E-04	0.00	3.85E-04	0.00
Ozone Depletion	kg CFC 11 eq.	7.74E-09	4.53E-18	-1.15E-11	1.00E-18	1.25E-17	0.00	5.00E-16	0.00
Acidification	mol H^+ eq.	3.28E-03	1.70E-04	6.49E-04	2.78E-05	3.94E-04	0.00	9.58E-04	0.00
Eutrophication aquatic freshwater	kg P eq.	3.90E-05	7.19E-08	6.88E-08	1.66E-08	2.08E-07	0.00	2.30E-07	0.00
Eutrophication aquatic marine	kg N eq.	1.03E-03	5.99E-05	3.32E-04	1.29E-05	1.90E-04	0.00	2.47E-04	0.00
Eutrophication terrestrial	mol N eq.	1.01E-02	6.63E-04	3.64E-03	1.43E-04	2.10E-03	0.00	2.71E-03	0.00
Photochemical ozone formation	kg NMVOC eq.	2.10E-03	1.37E-04	1.06E-03	3.61E-05	3.67E-04	0.00	7.46E-04	0.00
Depletion of abiotic resources - minerals and metals	kg Sb eq.	1.26E-05	1.96E-09	6.25E-10	4.41E-10	5.52E-09	0.00	1.20E-08	0.00
Depletion of abiotic resources - fossil fuels	MJ, net calorific value	2.28E+01	3.42E-01	9.33E-02	7.27E-02	9.11E-01	0.00	1.75	0.00
Water use	m^3 world eq. deprived	5.41E-01	2.33E-04	5.39E-04	5.32E-05	6.66E-04	0.00	1.39E-02	0.00
Particulate matter emissions	Disease incidence	4.03E-08	2.00E-09	1.76E-09	3.13E-10	1.49E-09	0.00	1.19E-08	0.00
Ionizing radiation, human health	kBq U235 eq.	4.64E-02	9.01E-05	7.95E-05	1.99E-05	2.49E-04	0.00	1.98E-03	0.00
Ecotoxicity (freshwater)	CTUe	5.88	2.55E-01	6.23E-02	5.44E-02	6.81E-01	0.00	1.00	0.00
Human toxicity, cancer effects	CTUh	2.22E-10	5.23E-12	6.86E-12	1.12E-12	1.41E-11	0.00	1.48E-10	0.00

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Human toxicity, noncancer effects	CTUh	1.41E-08	2.96E-10	5.46E-09	6.59E-11	7.58E-10	0.00	1.63E-08	0.00
Land use related impacts / soil quality	Pt	6.66	1.10E-01	2.46E-02	2.55E-02	3.20E-01	0.00	3.82E-01	0.00
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	2.35	1.82E-02	9.73E-03	4.21E-03	5.27E-02	0.00	2.30E-01	0.00
PERM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	2.35	1.82E-02	9.73E-03	4.21E-03	5.27E-02	0.00	2.30E-01	0.00
PENRE	MJ	2.28E+01	3.44E-01	9.34E-02	7.30E-02	9.14E-01	0.00	1.75	0.00
PENRM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	2.28E+01	3.44E-01	9.34E-02	7.30E-02	9.14E-01	0.00	1.75	0.00
Use of secondary material	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of non-renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water	m^3	1.53E-02	2.12E-05	1.83E-05	4.90E-06	6.14E-05	0.00	4.41E-04	0.00
Hazardous waste disposed	kg	1.06E-04	1.45E-08	2.50E-09	3.38E-09	4.23E-08	0.00	4.23E-08	0.00
Non hazardous waste disposed	kg	3.26E-02	5.28E-05	3.02E-01	1.16E-05	1.45E-04	0.00	1.45E-04	0.00
Radioactive waste disposed	kg	4.78E-04	6.12E-07	5.80E-07	1.35E-07	1.69E-06	0.00	1.69E-06	0.00
Components for reuse	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Material for recycling	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for energy recovery	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy electrical	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy thermal	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 14 GREEN 15: Parameters describing environmental impact, resource use, waste and outputs

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Climate change - total	kg CO_2 eq.	9.50E-01	4.96E-02	1.94E-02	7.71E-03	9.61E-02	0.00	1.74E-01	0.00
Climate change - fossil	kg CO_2 eq.	9.22E-01	4.93E-02	1.69E-02	8.00E-03	9.55E-02	0.00	1.88E-01	0.00
Climate change - biogenic	kg CO_2 eq.	2.65E-02	-7.56E-05	2.46E-03	-3.51E-04	-1.61E-04	0.00	-1.49E-02	0.00
Climate change - land use and land use change	kg CO_2 eq.	2.09E-03	3.80E-04	3.39E-05	6.22E-05	7.78E-04	0.00	5.42E-04	0.00
Ozone Depletion	kg CFC 11 eq.	6.67E-09	8.84E-18	-1.15E-11	1.41E-18	1.77E-17	0.00	7.05E-16	0.00

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Acidification	mol H^+ eq.	3.64E-03	3.06E-04	8.90E-04	3.92E-05	5.55E-04	0.00	1.35E-03	0.00
Eutrophication aquatic freshwater	kg P eq.	3.39E-05	1.43E-07	6.88E-08	2.34E-08	2.93E-07	0.00	3.24E-07	0.00
Eutrophication aquatic marine	kg N eq.	1.12E-03	1.25E-04	4.59E-04	1.82E-05	2.67E-04	0.00	3.47E-04	0.00
Eutrophication terrestrial	mol N eq.	1.11E-02	1.39E-03	5.03E-03	2.01E-04	2.96E-03	0.00	3.82E-03	0.00
Photochemical ozone formation	kg NMVOC eq.	2.47E-03	2.64E-04	1.46E-03	5.09E-05	5.17E-04	0.00	1.05E-03	0.00
Depletion of abiotic resources - minerals and metals	kg Sb eq.	1.21E-05	3.86E-09	6.25E-10	6.21E-10	7.78E-09	0.00	1.70E-08	0.00
Depletion of abiotic resources - fossil fuels	MJ, net calorific value	2.94E+01	6.56E-01	9.33E-02	1.02E-01	1.28	0.00	2.47	0.00
Water use	m^3 world eq. deprived	5.27E-01	4.62E-04	5.39E-04	7.49E-05	9.38E-04	0.00	1.97E-02	0.00
Particulate matter emissions	Disease incidence	4.57E-08	2.51E-09	2.28E-09	4.42E-10	2.10E-09	0.00	1.67E-08	0.00
Ionizing radiation, human health	kBq U235 eq.	5.54E-02	1.76E-04	7.95E-05	2.80E-05	3.50E-04	0.00	2.79E-03	0.00
Ecotoxicity (freshwater)	CTUe	5.94	4.89E-01	6.23E-02	7.67E-02	9.60E-01	0.00	1.41	0.00
Human toxicity, cancer effects	CTUh	2.37E-10	1.01E-11	6.86E-12	1.58E-12	1.99E-11	0.00	2.09E-10	0.00
Human toxicity, noncancer effects	CTUh	1.58E-08	5.57E-10	7.33E-09	9.28E-11	1.07E-09	0.00	2.30E-08	0.00
Land use related impacts / soil quality	Pt	6.69	2.20E-01	2.46E-02	3.60E-02	4.50E-01	0.00	5.38E-01	0.00
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	2.50	3.63E-02	9.73E-03	5.93E-03	7.42E-02	0.00	3.24E-01	0.00
PERM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	2.50	3.63E-02	9.73E-03	5.93E-03	7.42E-02	0.00	3.24E-01	0.00
PENRE	MJ	2.94E+01	6.58E-01	9.34E-02	1.03E-01	1.29	0.00	2.47	0.00
PENRM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	2.94E+01	6.58E-01	9.34E-02	1.03E-01	1.29	0.00	2.47	0.00
Use of secondary material	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of non-renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water	m^3	1.53E-02	4.24E-05	1.83E-05	6.91E-06	8.65E-05	0.00	6.21E-04	0.00
Hazardous waste disposed	kg	1.06E-04	2.91E-08	2.50E-09	4.76E-09	5.96E-08	0.00	5.96E-08	0.00
Non hazardous waste disposed	kg	3.37E-02	1.03E-04	3.02E-01	1.63E-05	2.04E-04	0.00	2.04E-04	0.00
Radioactive waste disposed	kg	5.98E-04	1.19E-06	5.80E-07	1.90E-07	2.37E-06	0.00	2.37E-06	0.00

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Components for reuse	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Material for recycling	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for energy recovery	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy electrical	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy thermal	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 15 RED GREEN 12,5: Parameters describing environmental impact, resource use, waste and outputs

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Climate change - total	kg CO_2 eq.	9.62E-01	4.81E-02	1.77E-02	6.28E-03	7.83E-02	0.00	1.42E-01	0.00
Climate change - fossil	kg CO_2 eq.	9.36E-01	4.78E-02	1.52E-02	6.52E-03	7.77E-02	0.00	1.53E-01	0.00
Climate change - biogenic	kg CO_2 eq.	2.34E-02	-7.29E-05	2.46E-03	-2.86E-04	-1.32E-04	0.00	-1.21E-02	0.00
Climate change - land use and land use change	kg CO_2 eq.	2.19E-03	3.67E-04	3.39E-05	5.06E-05	6.34E-04	0.00	4.42E-04	0.00
Ozone Depletion	kg CFC 11 eq.	1.79E-08	8.55E-18	-1.15E-11	1.15E-18	1.44E-17	0.00	5.74E-16	0.00
Acidification	mol H^+ eq.	4.26E-03	2.90E-04	7.36E-04	3.19E-05	4.52E-04	0.00	1.10E-03	0.00
Eutrophication aquatic freshwater	kg P eq.	7.95E-05	1.39E-07	6.88E-08	1.91E-08	2.39E-07	0.00	2.64E-07	0.00
Eutrophication aquatic marine	kg N eq.	1.24E-03	1.17E-04	3.78E-04	1.48E-05	2.18E-04	0.00	2.83E-04	0.00
Eutrophication terrestrial	mol N eq.	1.23E-02	1.30E-03	4.14E-03	1.64E-04	2.41E-03	0.00	3.11E-03	0.00
Photochemical ozone formation	kg NMVOC eq.	2.71E-03	2.49E-04	1.20E-03	4.14E-05	4.22E-04	0.00	8.57E-04	0.00
Depletion of abiotic resources - minerals and metals	kg Sb eq.	1.79E-05	3.73E-09	6.25E-10	5.06E-10	6.33E-09	0.00	1.38E-08	0.00
Depletion of abiotic resources - fossil fuels	MJ, net calorific value	2.71E+01	6.35E-01	9.33E-02	8.35E-02	1.05	0.00	2.01	0.00
Water use	m^3 world eq. deprived	6.08E-01	4.47E-04	5.39E-04	6.10E-05	7.64E-04	0.00	1.60E-02	0.00
Particulate matter emissions	Disease incidence	4.75E-08	2.47E-09	1.95E-09	3.60E-10	1.71E-09	0.00	1.36E-08	0.00
Ionizing radiation, human health	kBq U235 eq.	7.17E-02	1.70E-04	7.95E-05	2.28E-05	2.85E-04	0.00	2.27E-03	0.00
Ecotoxicity (freshwater)	CTUe	7.32	4.74E-01	6.23E-02	6.25E-02	7.82E-01	0.00	1.15	0.00

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Human toxicity, cancer effects	CTUh	3.38E-10	9.75E-12	6.86E-12	1.29E-12	1.62E-11	0.00	1.70E-10	0.00
Human toxicity, noncancer effects	CTUh	2.13E-08	5.41E-10	6.14E-09	7.56E-11	8.70E-10	0.00	1.87E-08	0.00
Land use related impacts / soil quality	Pt	7.13	2.12E-01	2.46E-02	2.93E-02	3.67E-01	0.00	4.38E-01	0.00
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	2.59	3.51E-02	9.73E-03	4.83E-03	6.04E-02	0.00	2.64E-01	0.00
PERM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	2.59	3.51E-02	9.73E-03	4.83E-03	6.04E-02	0.00	2.64E-01	0.00
PENRE	MJ	2.71E+01	6.37E-01	9.34E-02	8.38E-02	1.05	0.00	2.01	0.00
PENRM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	2.71E+01	6.37E-01	9.34E-02	8.38E-02	1.05	0.00	2.01	0.00
Use of secondary material	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of non-renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water	m^3	1.70E-02	4.09E-05	1.83E-05	5.62E-06	7.04E-05	0.00	5.06E-04	0.00
Hazardous waste disposed	kg	1.06E-04	2.81E-08	2.50E-09	3.88E-09	4.85E-08	0.00	4.85E-08	0.00
Non hazardous waste disposed	kg	3.30E-02	9.93E-05	3.02E-01	1.33E-05	1.66E-04	0.00	1.66E-04	0.00
Radioactive waste disposed	kg	5.30E-04	1.15E-06	5.80E-07	1.54E-07	1.93E-06	0.00	1.93E-06	0.00
Components for reuse	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Material for recycling	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for energy recovery	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy electrical	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy thermal	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 16 RED GREEN 15: Parameters describing environmental impact, resource use, waste and outputs

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Climate change - total	kg CO_2 eq.	1.09	5.34E-02	1.94E-02	7.71E-03	9.61E-02	0.00	1.74E-01	0.00
Climate change - fossil	kg CO_2 eq.	1.07	5.31E-02	1.69E-02	8.00E-03	9.55E-02	0.00	1.88E-01	0.00
Climate change - biogenic	kg CO_2 eq.	2.65E-02	-8.09E-05	2.46E-03	-3.51E-04	-1.61E-04	0.00	-1.49E-02	0.00
Climate change - land use and land use change	kg CO_2 eq.	2.26E-03	4.08E-04	3.39E-05	6.22E-05	7.78E-04	0.00	5.42E-04	0.00

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Ozone Depletion	kg CFC 11 eq.	2.07E-08	9.50E-18	-1.15E-11	1.41E-18	1.77E-17	0.00	7.05E-16	0.00
Acidification	mol H^+ eq.	4.87E-03	3.29E-04	8.89E-04	3.92E-05	5.55E-04	0.00	1.35E-03	0.00
Eutrophication aquatic freshwater	kg P eq.	9.07E-05	1.54E-07	6.88E-08	2.34E-08	2.93E-07	0.00	3.24E-07	0.00
Eutrophication aquatic marine	kg N eq.	1.39E-03	1.33E-04	4.59E-04	1.82E-05	2.67E-04	0.00	3.47E-04	0.00
Eutrophication terrestrial	mol N eq.	1.39E-02	1.48E-03	5.02E-03	2.01E-04	2.96E-03	0.00	3.82E-03	0.00
Photochemical ozone formation	kg NMVOC eq.	3.15E-03	2.82E-04	1.46E-03	5.09E-05	5.17E-04	0.00	1.05E-03	0.00
Depletion of abiotic resources - minerals and metals	kg Sb eq.	2.05E-05	4.14E-09	6.25E-10	6.21E-10	7.78E-09	0.00	1.70E-08	0.00
Depletion of abiotic resources - fossil fuels	MJ, net calorific value	3.20E+01	7.05E-01	9.33E-02	1.02E-01	1.28	0.00	2.47	0.00
Water use	m^3 world eq. deprived	6.33E-01	4.96E-04	5.39E-04	7.49E-05	9.38E-04	0.00	1.97E-02	0.00
Particulate matter emissions	Disease incidence	5.47E-08	2.77E-09	2.28E-09	4.42E-10	2.10E-09	0.00	1.67E-08	0.00
Ionizing radiation, human health	kBq U235 eq.	8.26E-02	1.89E-04	7.95E-05	2.80E-05	3.50E-04	0.00	2.79E-03	0.00
Ecotoxicity (freshwater)	CTUe	8.06	5.26E-01	6.23E-02	7.67E-02	9.60E-01	0.00	1.41	0.00
Human toxicity, cancer effects	CTUh	3.87E-10	1.08E-11	6.86E-12	1.58E-12	1.99E-11	0.00	2.09E-10	0.00
Human toxicity, noncancer effects	CTUh	2.46E-08	6.00E-10	7.32E-09	9.28E-11	1.07E-09	0.00	2.30E-08	0.00
Land use related impacts / soil quality	Pt	7.39	2.36E-01	2.46E-02	3.60E-02	4.50E-01	0.00	5.38E-01	0.00
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	2.80	3.90E-02	9.73E-03	5.93E-03	7.42E-02	0.00	3.24E-01	0.00
PERM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	2.80	3.90E-02	9.73E-03	5.93E-03	7.42E-02	0.00	3.24E-01	0.00
PENRE	MJ	3.20E+01	7.08E-01	9.34E-02	1.03E-01	1.29	0.00	2.47	0.00
PENRM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	3.20E+01	7.08E-01	9.34E-02	1.03E-01	1.29	0.00	2.47	0.00
Use of secondary material	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of non-renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water	m^3	1.77E-02	4.55E-05	1.83E-05	6.91E-06	8.65E-05	0.00	6.21E-04	0.00
Hazardous waste disposed	kg	1.19E-04	3.12E-08	2.50E-09	4.76E-09	5.96E-08	0.00	5.96E-08	0.00
Non hazardous waste disposed	kg	3.62E-02	1.10E-04	3.02E-01	1.63E-05	2.04E-04	0.00	2.04E-04	0.00

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Radioactive waste disposed	kg	6.02E-04	1.28E-06	5.80E-07	1.90E-07	2.37E-06	0.00	2.37E-06	0.00
Components for reuse	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Material for recycling	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for energy recovery	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy electrical	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy thermal	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 17 RED GREEN 18: Parameters describing environmental impact, resource use, waste and outputs

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Climate change - total	kg CO_2 eq.	1.29	5.96E-02	2.23E-02	9.33E-03	1.16E-01	0.00	2.10E-01	0.00
Climate change - fossil	kg CO_2 eq.	1.25	5.92E-02	1.98E-02	9.68E-03	1.15E-01	0.00	2.28E-01	0.00
Climate change - biogenic	kg CO_2 eq.	3.35E-02	-9.03E-05	2.46E-03	-4.25E-04	-1.95E-04	0.00	-1.80E-02	0.00
Climate change - land use and land use change	kg CO_2 eq.	2.32E-03	4.55E-04	3.39E-05	7.52E-05	9.42E-04	0.00	6.56E-04	0.00
Ozone Depletion	kg CFC 11 eq.	2.27E-08	1.06E-17	-1.15E-11	1.71E-18	2.14E-17	0.00	8.53E-16	0.00
Acidification	mol H^+ eq.	5.53E-03	3.72E-04	1.14E-03	4.74E-05	6.71E-04	0.00	1.63E-03	0.00
Eutrophication aquatic freshwater	kg P eq.	9.75E-05	1.72E-07	6.88E-08	2.83E-08	3.54E-07	0.00	3.92E-07	0.00
Eutrophication aquatic marine	kg N eq.	1.54E-03	1.52E-04	5.92E-04	2.20E-05	3.23E-04	0.00	4.20E-04	0.00
Eutrophication terrestrial	mol N eq.	1.56E-02	1.68E-03	6.48E-03	2.43E-04	3.58E-03	0.00	4.62E-03	0.00
Photochemical ozone formation	kg NMVOC eq.	3.69E-03	3.21E-04	1.89E-03	6.15E-05	6.26E-04	0.00	1.27E-03	0.00
Depletion of abiotic resources - minerals and metals	kg Sb eq.	2.27E-05	4.62E-09	6.25E-10	7.51E-10	9.41E-09	0.00	2.05E-08	0.00
Depletion of abiotic resources - fossil fuels	MJ, net calorific value	3.94E+01	7.87E-01	9.33E-02	1.24E-01	1.55	0.00	2.99	0.00
Water use	m^3 world eq. deprived	6.19E-01	5.53E-04	5.39E-04	9.06E-05	1.13E-03	0.00	2.38E-02	0.00
Particulate matter emissions	Disease incidence	6.27E-08	3.09E-09	2.83E-09	5.34E-10	2.54E-09	0.00	2.02E-08	0.00
Ionizing radiation, human health	kBq U235 eq.	9.51E-02	2.11E-04	7.95E-05	3.38E-05	4.24E-04	0.00	3.37E-03	0.00
Ecotoxicity (freshwater)	CTUe	8.56	5.87E-01	6.24E-02	9.28E-02	1.16	0.00	1.71	0.00

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Human toxicity, cancer effects	CTUh	4.36E-10	1.21E-11	6.86E-12	1.92E-12	2.40E-11	0.00	2.53E-10	0.00
Human toxicity, noncancer effects	CTUh	2.84E-08	6.67E-10	9.29E-09	1.12E-10	1.29E-09	0.00	2.78E-08	0.00
Land use related impacts / soil quality	Pt	7.46	2.63E-01	2.46E-02	4.35E-02	5.45E-01	0.00	6.50E-01	0.00
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	3.01	4.35E-02	9.73E-03	7.17E-03	8.98E-02	0.00	3.92E-01	0.00
PERM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	3.01	4.35E-02	9.73E-03	7.17E-03	8.98E-02	0.00	3.92E-01	0.00
PENRE	MJ	3.94E+01	7.90E-01	9.34E-02	1.24E-01	1.56	0.00	2.99	0.00
PENRM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	3.94E+01	7.90E-01	9.34E-02	1.24E-01	1.56	0.00	2.99	0.00
Use of secondary material	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of non-renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water	m^3	1.77E-02	5.07E-05	1.83E-05	8.35E-06	1.05E-04	0.00	7.51E-04	0.00
Hazardous waste disposed	kg	1.32E-04	3.48E-08	2.50E-09	5.76E-09	7.21E-08	0.00	7.21E-08	0.00
Non hazardous waste disposed	kg	3.99E-02	1.23E-04	3.02E-01	1.97E-05	2.47E-04	0.00	2.47E-04	0.00
Radioactive waste disposed	kg	7.09E-04	1.43E-06	5.80E-07	2.29E-07	2.87E-06	0.00	2.87E-06	0.00
Components for reuse	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Material for recycling	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for energy recovery	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy electrical	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy thermal	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 18 TOPAS 12,5: Parameters describing environmental impact, resource use, waste and outputs

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Climate change - total	kg CO_2 eq.	8.94E-01	7.27E-02	1.77E-02	6.34E-03	7.90E-02	0.00	1.43E-01	0.00
Climate change - fossil	kg CO_2 eq.	8.82E-01	7.22E-02	1.52E-02	6.58E-03	7.85E-02	0.00	1.55E-01	0.00
Climate change - biogenic	kg CO_2 eq.	9.39E-03	-1.21E-04	2.46E-03	-2.89E-04	-1.33E-04	0.00	-1.23E-02	0.00
Climate change - land use and land use change	kg CO_2 eq.	2.45E-03	5.86E-04	3.39E-05	5.11E-05	6.40E-04	0.00	4.46E-04	0.00

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Ozone Depletion	kg CFC 11 eq.	2.15E-08	1.33E-17	-1.15E-11	1.16E-18	1.45E-17	0.00	5.80E-16	0.00
Acidification	mol H^+ eq.	4.05E-03	3.44E-04	7.36E-04	3.23E-05	4.56E-04	0.00	1.11E-03	0.00
Eutrophication aquatic freshwater	kg P eq.	9.63E-05	2.20E-07	6.88E-08	1.92E-08	2.41E-07	0.00	2.67E-07	0.00
Eutrophication aquatic marine	kg N eq.	1.24E-03	1.63E-04	3.78E-04	1.49E-05	2.20E-04	0.00	2.86E-04	0.00
Eutrophication terrestrial	mol N eq.	1.22E-02	1.81E-03	4.14E-03	1.65E-04	2.43E-03	0.00	3.14E-03	0.00
Photochemical ozone formation	kg NMVOC eq.	2.64E-03	3.17E-04	1.20E-03	4.18E-05	4.26E-04	0.00	8.65E-04	0.00
Depletion of abiotic resources - minerals and metals	kg Sb eq.	1.06E-05	5.85E-09	6.25E-10	5.11E-10	6.40E-09	0.00	1.40E-08	0.00
Depletion of abiotic resources - fossil fuels	MJ, net calorific value	2.62E+01	9.65E-01	9.33E-02	8.43E-02	1.06	0.00	2.03	0.00
Water use	m^3 world eq. deprived	5.87E-01	7.06E-04	5.39E-04	6.16E-05	7.71E-04	0.00	1.62E-02	0.00
Particulate matter emissions	Disease incidence	3.75E-08	1.50E-09	1.95E-09	3.63E-10	1.73E-09	0.00	1.37E-08	0.00
Ionizing radiation, human health	kBq U235 eq.	7.58E-02	2.64E-04	7.95E-05	2.30E-05	2.88E-04	0.00	2.29E-03	0.00
Ecotoxicity (freshwater)	CTUe	6.65	7.22E-01	6.23E-02	6.31E-02	7.90E-01	0.00	1.16	0.00
Human toxicity, cancer effects	CTUh	3.60E-10	1.49E-11	6.86E-12	1.30E-12	1.63E-11	0.00	1.72E-10	0.00
Human toxicity, noncancer effects	CTUh	2.21E-08	8.26E-10	6.14E-09	7.63E-11	8.79E-10	0.00	1.89E-08	0.00
Land use related impacts / soil quality	Pt	7.93	3.39E-01	2.46E-02	2.96E-02	3.71E-01	0.00	4.42E-01	0.00
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	2.24	5.58E-02	9.73E-03	4.87E-03	6.10E-02	0.00	2.67E-01	0.00
PERM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	2.24	5.58E-02	9.73E-03	4.87E-03	6.10E-02	0.00	2.67E-01	0.00
PENRE	MJ	2.62E+01	9.69E-01	9.34E-02	8.46E-02	1.06	0.00	2.03	0.00
PENRM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	2.62E+01	9.69E-01	9.34E-02	8.46E-02	1.06	0.00	2.03	0.00
Use of secondary material	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of non-renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water	m^3	1.69E-02	6.51E-05	1.83E-05	5.68E-06	7.11E-05	0.00	5.11E-04	0.00
Hazardous waste disposed	kg	1.33E-07	4.48E-08	2.50E-09	3.91E-09	4.90E-08	0.00	4.90E-08	0.00
Non hazardous waste disposed	kg	1.33E-02	1.54E-04	3.02E-01	1.34E-05	1.68E-04	0.00	1.68E-04	0.00

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Radioactive waste disposed	kg	4.60E-04	1.79E-06	5.80E-07	1.56E-07	1.95E-06	0.00	1.95E-06	0.00
Components for reuse	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Material for recycling	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for energy recovery	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy electrical	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy thermal	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 19 DIAMANT 12,5: Parameters describing environmental impact, resource use, waste and outputs

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Climate change - total	kg CO_2 eq.	1.12	6.02E-02	1.98E-02	7.96E-03	9.92E-02	0.00	1.79E-01	0.00
Climate change - fossil	kg CO_2 eq.	1.09	5.98E-02	1.73E-02	8.26E-03	9.85E-02	0.00	1.94E-01	0.00
Climate change - biogenic	kg CO_2 eq.	2.42E-02	-9.20E-05	2.46E-03	-3.63E-04	-1.67E-04	0.00	-1.54E-02	0.00
Climate change - land use and land use change	kg CO_2 eq.	2.29E-03	4.62E-04	3.39E-05	6.42E-05	8.04E-04	0.00	5.60E-04	0.00
Ozone Depletion	kg CFC 11 eq.	2.20E-08	1.07E-17	-1.15E-11	1.46E-18	1.82E-17	0.00	7.28E-16	0.00
Acidification	mol H^+ eq.	5.00E-03	3.69E-04	9.20E-04	4.05E-05	5.72E-04	0.00	1.39E-03	0.00
Eutrophication aquatic freshwater	kg P eq.	9.57E-05	1.74E-07	6.88E-08	2.41E-08	3.02E-07	0.00	3.35E-07	0.00
Eutrophication aquatic marine	kg N eq.	1.40E-03	1.52E-04	4.75E-04	1.87E-05	2.76E-04	0.00	3.59E-04	0.00
Eutrophication terrestrial	mol N eq.	1.40E-02	1.68E-03	5.20E-03	2.07E-04	3.05E-03	0.00	3.94E-03	0.00
Photochemical ozone formation	kg NMVOC eq.	3.18E-03	3.19E-04	1.51E-03	5.25E-05	5.34E-04	0.00	1.09E-03	0.00
Depletion of abiotic resources - minerals and metals	kg Sb eq.	2.14E-05	4.68E-09	6.25E-10	6.41E-10	8.03E-09	0.00	1.75E-08	0.00
Depletion of abiotic resources - fossil fuels	MJ, net calorific value	3.32E+01	7.95E-01	9.33E-02	1.06E-01	1.32	0.00	2.55	0.00
Water use	m^3 world eq. deprived	6.38E-01	5.61E-04	5.39E-04	7.73E-05	9.68E-04	0.00	2.03E-02	0.00
Particulate matter emissions	Disease incidence	5.62E-08	2.96E-09	2.34E-09	4.56E-10	2.17E-09	0.00	1.72E-08	0.00
Ionizing radiation, human health	kBq U235 eq.	8.74E-02	2.13E-04	7.95E-05	2.89E-05	3.62E-04	0.00	2.88E-03	0.00
Ecotoxicity (freshwater)	CTUe	8.30	5.94E-01	6.23E-02	7.92E-02	9.91E-01	0.00	1.46	0.00

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Human toxicity, cancer effects	CTUh	4.03E-10	1.22E-11	6.86E-12	1.64E-12	2.05E-11	0.00	2.16E-10	0.00
Human toxicity, noncancer effects	CTUh	2.56E-08	6.75E-10	7.56E-09	9.58E-11	1.10E-09	0.00	2.38E-08	0.00
Land use related impacts / soil quality	Pt	7.51	2.67E-01	2.46E-02	3.71E-02	4.65E-01	0.00	5.55E-01	0.00
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	2.91	4.41E-02	9.73E-03	6.12E-03	7.66E-02	0.00	3.35E-01	0.00
PERM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	2.91	4.41E-02	9.73E-03	6.12E-03	7.66E-02	0.00	3.35E-01	0.00
PENRE	MJ	3.32E+01	7.98E-01	9.34E-02	1.06E-01	1.33	0.00	2.55	0.00
PENRM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	3.32E+01	7.98E-01	9.34E-02	1.06E-01	1.33	0.00	2.55	0.00
Use of secondary material	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of non-renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water	m^3	1.79E-02	5.15E-05	1.83E-05	7.13E-06	8.93E-05	0.00	6.41E-04	0.00
Hazardous waste disposed	kg	1.22E-04	3.53E-08	2.50E-09	4.91E-09	6.15E-08	0.00	6.15E-08	0.00
Non hazardous waste disposed	kg	3.70E-02	1.25E-04	3.02E-01	1.68E-05	2.11E-04	0.00	2.11E-04	0.00
Radioactive waste disposed	kg	6.33E-04	1.45E-06	5.80E-07	1.96E-07	2.45E-06	0.00	2.45E-06	0.00
Components for reuse	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Material for recycling	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for energy recovery	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy electrical	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy thermal	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 20 DIAMANT 15: Parameters describing environmental impact, resource use, waste and outputs

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Climate change - total	kg CO_2 eq.	3.24	1.15E-01	2.23E-02	9.95E-03	1.24E-01	0.00	2.24E-01	0.00
Climate change - fossil	kg CO_2 eq.	3.20	1.14E-01	1.98E-02	1.03E-02	1.23E-01	0.00	2.43E-01	0.00
Climate change - biogenic	kg CO_2 eq.	4.22E-02	-1.81E-04	2.46E-03	-4.53E-04	-2.08E-04	0.00	-1.92E-02	0.00
Climate change - land use and land use change	kg CO_2 eq.	4.13E-03	8.96E-04	3.39E-05	8.02E-05	1.00E-03	0.00	6.99E-04	0.00

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Ozone Depletion	kg CFC 11 eq.	2.04E-07	2.06E-17	-1.15E-11	1.82E-18	2.28E-17	0.00	9.09E-16	0.00
Acidification	mol H^+ eq.	2.06E-02	5.91E-04	1.14E-03	5.06E-05	7.16E-04	0.00	1.74E-03	0.00
Eutrophication aquatic freshwater	kg P eq.	8.23E-04	3.38E-07	6.88E-08	3.02E-08	3.78E-07	0.00	4.18E-07	0.00
Eutrophication aquatic marine	kg N eq.	4.63E-03	2.49E-04	5.92E-04	2.34E-05	3.45E-04	0.00	4.48E-04	0.00
Eutrophication terrestrial	mol N eq.	4.78E-02	2.76E-03	6.48E-03	2.59E-04	3.82E-03	0.00	4.92E-03	0.00
Photochemical ozone formation	kg NMVOC eq.	1.24E-02	5.15E-04	1.89E-03	6.56E-05	6.68E-04	0.00	1.36E-03	0.00
Depletion of abiotic resources - minerals and metals	kg Sb eq.	1.18E-04	9.04E-09	6.25E-10	8.01E-10	1.00E-08	0.00	2.19E-08	0.00
Depletion of abiotic resources - fossil fuels	MJ, net calorific value	7.26E+01	1.52	9.33E-02	1.32E-01	1.66	0.00	3.18	0.00
Water use	m^3 world eq. deprived	1.52	1.09E-03	5.39E-04	9.66E-05	1.21E-03	0.00	2.54E-02	0.00
Particulate matter emissions	Disease incidence	1.61E-07	4.41E-09	2.83E-09	5.70E-10	2.71E-09	0.00	2.16E-08	0.00
Ionizing radiation, human health	kBq U235 eq.	4.60E-01	4.10E-04	7.95E-05	3.61E-05	4.52E-04	0.00	3.59E-03	0.00
Ecotoxicity (freshwater)	CTUe	3.15E+01	1.13	6.24E-02	9.90E-02	1.24	0.00	1.82	0.00
Human toxicity, cancer effects	CTUh	2.36E-09	2.34E-11	6.86E-12	2.04E-12	2.56E-11	0.00	2.70E-10	0.00
Human toxicity, noncancer effects	CTUh	1.44E-07	1.31E-09	9.29E-09	1.20E-10	1.38E-09	0.00	2.97E-08	0.00
Land use related impacts / soil quality	Pt	1.40E+01	5.19E-01	2.46E-02	4.64E-02	5.81E-01	0.00	6.94E-01	0.00
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	5.79	8.56E-02	9.73E-03	7.65E-03	9.57E-02	0.00	4.18E-01	0.00
PERM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	5.79	8.56E-02	9.73E-03	7.65E-03	9.57E-02	0.00	4.18E-01	0.00
PENRE	MJ	7.27E+01	1.53	9.34E-02	1.33E-01	1.66	0.00	3.19	0.00
PENRM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	7.27E+01	1.53	9.34E-02	1.33E-01	1.66	0.00	3.19	0.00
Use of secondary material	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of non-renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water	m^3	3.88E-02	9.98E-05	1.83E-05	8.91E-06	1.12E-04	0.00	8.02E-04	0.00
Hazardous waste disposed	kg	1.49E-04	6.86E-08	2.50E-09	6.14E-09	7.69E-08	0.00	7.69E-08	0.00
Non hazardous waste disposed	kg	4.34E-02	2.39E-04	3.02E-01	2.10E-05	2.63E-04	0.00	2.63E-04	0.00

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Radioactive waste disposed	kg	7.84E-04	2.78E-06	5.80E-07	2.45E-07	3.06E-06	0.00	3.06E-06	0.00
Components for reuse	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Material for recycling	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for energy recovery	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy electrical	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy thermal	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 21 MASSIVBAUPLATTE RED 25: Parameters describing environmental impact, resource use, waste and outputs

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Climate change - total	kg CO_2 eq.	1.47	9.07E-02	2.64E-02	1.31E-02	1.63E-01	0.00	2.94E-01	0.00
Climate change - fossil	kg CO_2 eq.	1.53	9.01E-02	2.39E-02	1.35E-02	1.62E-01	0.00	3.19E-01	0.00
Climate change - biogenic	kg CO_2 eq.	-6.11E-02	-1.52E-04	2.46E-03	-5.95E-04	-2.73E-04	0.00	-2.52E-02	0.00
Climate change - land use and land use change	kg CO_2 eq.	3.24E-03	7.31E-04	3.39E-05	1.05E-04	1.32E-03	0.00	9.18E-04	0.00
Ozone Depletion	kg CFC 11 eq.	4.01E-08	1.66E-17	-1.15E-11	2.39E-18	2.99E-17	0.00	1.19E-15	0.00
Acidification	mol H^+ eq.	7.51E-03	4.48E-04	1.51E-03	6.64E-05	9.39E-04	0.00	2.29E-03	0.00
Eutrophication aquatic freshwater	kg P eq.	1.74E-04	2.75E-07	6.88E-08	3.96E-08	4.96E-07	0.00	5.49E-07	0.00
Eutrophication aquatic marine	kg N eq.	2.25E-03	2.12E-04	7.86E-04	3.07E-05	4.52E-04	0.00	5.88E-04	0.00
Eutrophication terrestrial	mol N eq.	2.23E-02	2.36E-03	8.61E-03	3.40E-04	5.01E-03	0.00	6.46E-03	0.00
Photochemical ozone formation	kg NMVOC eq.	4.65E-03	4.13E-04	2.51E-03	8.61E-05	8.76E-04	0.00	1.78E-03	0.00
Depletion of abiotic resources - minerals and metals	kg Sb eq.	1.93E-05	7.31E-09	6.25E-10	1.05E-09	1.32E-08	0.00	2.88E-08	0.00
Depletion of abiotic resources - fossil fuels	MJ, net calorific value	5.08E+01	1.21	9.33E-02	1.74E-01	2.17	0.00	4.18	0.00
Water use	m^3 world eq. deprived	9.51E-01	8.81E-04	5.39E-04	1.27E-04	1.59E-03	0.00	3.33E-02	0.00
Particulate matter emissions	Disease incidence	6.90E-08	1.89E-09	3.63E-09	7.48E-10	3.55E-09	0.00	2.83E-08	0.00
Ionizing radiation, human health	kBq U235 eq.	1.36E-01	3.29E-04	7.95E-05	4.74E-05	5.93E-04	0.00	4.72E-03	0.00
Ecotoxicity (freshwater)	CTUe	1.32E+01	9.02E-01	6.24E-02	1.30E-01	1.63	0.00	2.39	0.00

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Human toxicity, cancer effects	CTUh	6.35E-10	1.87E-11	6.86E-12	2.68E-12	3.36E-11	0.00	3.54E-10	0.00
Human toxicity, noncancer effects	CTUh	3.89E-08	1.03E-09	1.22E-08	1.57E-10	1.81E-09	0.00	3.90E-08	0.00
Land use related impacts / soil quality	Pt	1.15E+01	4.23E-01	2.46E-02	6.09E-02	7.63E-01	0.00	9.11E-01	0.00
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	3.94	6.97E-02	9.73E-03	1.00E-02	1.26E-01	0.00	5.49E-01	0.00
PERM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	3.94	6.97E-02	9.73E-03	1.00E-02	1.26E-01	0.00	5.49E-01	0.00
PENRE	MJ	5.08E+01	1.21	9.34E-02	1.74E-01	2.18	0.00	4.18	0.00
PENRM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	5.08E+01	1.21	9.34E-02	1.74E-01	2.18	0.00	4.18	0.00
Use of secondary material	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of non-renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water	m^3	2.62E-02	8.12E-05	1.83E-05	1.17E-05	1.46E-04	0.00	1.05E-03	0.00
Hazardous waste disposed	kg	1.28E-07	5.60E-08	2.50E-09	8.06E-09	1.01E-07	0.00	1.01E-07	0.00
Non hazardous waste disposed	kg	1.52E-02	1.92E-04	3.02E-01	2.76E-05	3.46E-04	0.00	3.46E-04	0.00
Radioactive waste disposed	kg	9.50E-04	2.23E-06	5.80E-07	3.21E-07	4.02E-06	0.00	4.02E-06	0.00
Components for reuse	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Material for recycling	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for energy recovery	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy electrical	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy thermal	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 22 MASSIVBAUPLATTE RED GREEN 25: Parameters describing environmental impact, resource use, waste and outputs

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Climate change - total	kg CO_2 eq.	3.96	6.99E-02	9.73E-03	1.00E-02	1.26E-01	0.00	5.49E-01	0.00
Climate change - fossil	kg CO_2 eq.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Climate change - biogenic	kg CO_2 eq.	3.96	6.99E-02	9.73E-03	1.00E-02	1.26E-01	0.00	5.49E-01	0.00
Climate change - land use and land use change	kg CO_2 eq.	5.10E+01	1.21	9.34E-02	1.74E-01	2.18	0.00	4.18	0.00

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Ozone Depletion	kg CFC 11 eq.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acidification	mol H^+ eq.	5.10E+01	1.21	9.34E-02	1.74E-01	2.18	0.00	4.18	0.00
Eutrophication aquatic freshwater	kg P eq.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eutrophication aquatic marine	kg N eq.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eutrophication terrestrial	mol N eq.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Photochemical ozone formation	kg NMVOC eq.	2.62E-02	8.15E-05	1.83E-05	1.17E-05	1.46E-04	0.00	1.05E-03	0.00
Depletion of abiotic resources - minerals and metals	kg Sb eq.	1.29E-07	5.62E-08	2.50E-09	8.06E-09	1.01E-07	0.00	1.01E-07	0.00
Depletion of abiotic resources - fossil fuels	MJ, net calorific value	1.54E-02	1.92E-04	3.02E-01	2.76E-05	3.46E-04	0.00	3.46E-04	0.00
Water use	m^3 world eq. deprived	9.59E-04	2.24E-06	5.80E-07	3.21E-07	4.02E-06	0.00	4.02E-06	0.00
Particulate matter emissions	Disease incidence	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ionizing radiation, human health	kBq U235 eq.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ecotoxicity (freshwater)	CTUe	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Human toxicity, cancer effects	CTUh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Human toxicity, noncancer effects	CTUh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Land use related impacts / soil quality	Pt	1.15E+01	4.25E-01	2.46E-02	6.09E-02	7.63E-01	0.00	9.11E-01	0.00
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	1.22E+01	6.99E-02	9.73E-03	1.00E-02	1.26E-01	0.00	5.49E-01	0.00
PERM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	1.22E+01	6.99E-02	9.73E-03	1.00E-02	1.26E-01	0.00	5.49E-01	0.00
PENRE	MJ	5.04E+01	1.21	9.34E-02	1.74E-01	2.18	0.00	4.18	0.00
PENRM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	5.04E+01	1.21	9.34E-02	1.74E-01	2.18	0.00	4.18	0.00
Use of secondary material	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of non-renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water	m^3	2.53E-02	8.15E-05	1.83E-05	1.17E-05	1.46E-04	0.00	1.05E-03	0.00
Hazardous waste disposed	kg	1.50E-07	5.62E-08	2.50E-09	8.06E-09	1.01E-07	0.00	1.01E-07	0.00
Non hazardous waste disposed	kg	1.13E-02	1.92E-04	3.02E-01	2.76E-05	3.46E-04	0.00	3.46E-04	0.00

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Radioactive waste disposed	kg	1.01E-03	2.24E-06	5.80E-07	3.21E-07	4.02E-06	0.00	4.02E-06	0.00
Components for reuse	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Material for recycling	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for energy recovery	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy electrical	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy thermal	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 23 F 146: Parameters describing environmental impact, resource use, waste and outputs

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Climate change - total	kg CO_2 eq.	8.40E-01	2.48E-02	1.95E-02	7.77E-03	9.68E-02	0.00	1.75E-01	0.00
Climate change - fossil	kg CO_2 eq.	8.37E-01	2.47E-02	1.70E-02	8.07E-03	9.62E-02	0.00	1.90E-01	0.00
Climate change - biogenic	kg CO_2 eq.	1.89E-04	-4.12E-05	2.46E-03	-3.54E-04	-1.63E-04	0.00	-1.50E-02	0.00
Climate change - land use and land use change	kg CO_2 eq.	2.16E-03	1.99E-04	3.39E-05	6.27E-05	7.85E-04	0.00	5.46E-04	0.00
Ozone Depletion	kg CFC 11 eq.	1.34E-08	4.51E-18	-1.15E-11	1.42E-18	1.78E-17	0.00	7.10E-16	0.00
Acidification	mol H^+ eq.	3.64E-03	8.32E-05	8.94E-04	3.95E-05	5.59E-04	0.00	1.36E-03	0.00
Eutrophication aquatic freshwater	kg P eq.	6.41E-05	7.48E-08	6.88E-08	2.36E-08	2.95E-07	0.00	3.27E-07	0.00
Eutrophication aquatic marine	kg N eq.	1.16E-03	3.75E-05	4.61E-04	1.83E-05	2.69E-04	0.00	3.50E-04	0.00
Eutrophication terrestrial	mol N eq.	1.14E-02	4.19E-04	5.05E-03	2.03E-04	2.98E-03	0.00	3.85E-03	0.00
Photochemical ozone formation	kg NMVOC eq.	2.42E-03	7.37E-05	1.47E-03	5.13E-05	5.22E-04	0.00	1.06E-03	0.00
Depletion of abiotic resources - minerals and metals	kg Sb eq.	6.47E-06	1.99E-09	6.25E-10	6.26E-10	7.84E-09	0.00	1.71E-08	0.00
Depletion of abiotic resources - fossil fuels	MJ, net calorific value	2.84E+01	3.28E-01	9.33E-02	1.03E-01	1.29	0.00	2.49	0.00
Water use	m^3 world eq. deprived	5.29E-01	2.39E-04	5.39E-04	7.55E-05	9.45E-04	0.00	1.98E-02	0.00
Particulate matter emissions	Disease incidence	3.67E-08	4.70E-10	2.29E-09	4.45E-10	2.12E-09	0.00	1.68E-08	0.00
Ionizing radiation, human health	kBq U235 eq.	5.79E-02	8.94E-05	7.95E-05	2.82E-05	3.53E-04	0.00	2.81E-03	0.00
Ecotoxicity (freshwater)	CTUe	5.78	2.45E-01	6.23E-02	7.73E-02	9.68E-01	0.00	1.42	0.00

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
Human toxicity, cancer effects	CTUh	2.86E-10	5.07E-12	6.86E-12	1.60E-12	2.00E-11	0.00	2.11E-10	0.00
Human toxicity, noncancer effects	CTUh	1.79E-08	2.90E-10	7.36E-09	9.36E-11	1.08E-09	0.00	2.32E-08	0.00
Land use related impacts / soil quality	Pt	7.14	1.15E-01	2.46E-02	3.63E-02	4.54E-01	0.00	5.42E-01	0.00
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	2.05	1.89E-02	9.73E-03	5.97E-03	7.48E-02	0.00	3.27E-01	0.00
PERM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	2.05	1.89E-02	9.73E-03	5.97E-03	7.48E-02	0.00	3.27E-01	0.00
PENRE	MJ	2.84E+01	3.29E-01	9.34E-02	1.04E-01	1.30	0.00	2.49	0.00
PENRM	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	2.84E+01	3.29E-01	9.34E-02	1.04E-01	1.30	0.00	2.49	0.00
Use of secondary material	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Use of non-renewable secondary fuels	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water	m^3	1.53E-02	2.21E-05	1.83E-05	6.96E-06	8.72E-05	0.00	6.26E-04	0.00
Hazardous waste disposed	kg	1.18E-07	1.52E-08	2.50E-09	4.80E-09	6.01E-08	0.00	6.01E-08	0.00
Non hazardous waste disposed	kg	1.23E-02	5.21E-05	3.02E-01	1.64E-05	2.06E-04	0.00	2.06E-04	0.00
Radioactive waste disposed	kg	4.82E-04	6.06E-07	5.80E-07	1.91E-07	2.39E-06	0.00	2.39E-06	0.00
Components for reuse	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Material for recycling	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for energy recovery	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy electrical	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exported energy thermal	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Additional information

In KNAUF Praha, spol. s r.o., gypsum plasterboards are manufactured according to DIN 18 180 and EN 520. In the Počerady plant, the following certificates are applied ISO 9001, ISO 14001, ISO 18001 and ISO 50001.
For recommended use of gypsum plasterboard follow http://www.knauf.cz.

Release of dangerous substances during the use stage

No health and environmental impacts during use is observed.

References

ISO 14020:2000 Environmental labels and declarations — General principles, 2000-09
ISO 14025: EN ISO 14025:2006-11: Environmental labels and declarations - Type III environmental declarations — Principles and procedures
ISO 14040:2006 Environmental management — Life cycle assessment — Principles and framework, 2006-07
ISO 14044:2006 Environmental management — Life cycle assessment — Requirements and guidelines, 2006-07
EN 15804+A2:2019 European Committee for Standardization: Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products, 2019.
General Programme Instructions of The International EPD® System. Version 3.01.
Product Category Rules (PCR) document for Construction Products (PCR 2019:14 Version 1.1, 2020-09-14)
Ecoinvent: Ecoinvent Centre, www.Eco-invent.org
Thinkstep: GaBi software version 9.5, 2020, Sphera solutions.

EPD®

www.environdec.com