Environmental Product Declaration

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

Plywood from pine

from

Saint-Gobain Building Distribution (SGDS)

Program:	The International EPD® System, www.environdec.com
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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

Program information

Program:	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. Version 1.11, date 2021-02-05*

PCR review was conducted by: *The Technical Committee of the International EPD® System. Chair: Claudia A. Peña. Contact 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: *Carl-Otto Nevén, Nevén Miljökonsult (the LCA part), David Althoff Palm, Ramboll (the EPD document)*

Procedure for follow-up of data during EPD validity involves third party verifier:

☒ Yes ☐ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. EPDs made according to EN15804+A1 and EN15804+A2 are not comparable, especially since a majority of the environmental indicators are based on different versions. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD	Saint-Gobain Distribution Sweden
Contact	SGDS - Beriar Maroof (beriar.maroof@sgdsgruppen.se) Optimera - Henrik Björk (henrik.bjork@optimera.se)
Description of the organisation	SGDS Gruppen - specialists in collaboration for more efficient business in construction and installation. SGDS Gruppen AB is the head company of some of Sweden's leading trading companies in construction, sheet metal, tiles and installation. All the companies have a long and solid industry experience and provide most of Sweden's craftsmen with materials for various projects. Customers in different companies can also buy support items from the sister companies in the group, and in selected cases we take joint projects to facilitate the logistics of the supply of goods, which is then often critical for a smooth construction project. • Optimera - construction trade for professional carpenters • Dahl – heat, plumbing and sanitary specialist • Bevego - building sheet metal, ventilation and technical insulation • Kakelspecialisten and Konradsson's Tiles - tiles, tiling and bathroom fittings The company's focus on sales and services with direct contact to about 150,000 customers regularly. Saint-Gobain Distribution Sweden group (SGDS) is owned by Saint-Gobain with presence in 64 countries and having over 190 000 employees worldwide.
Name and location of production site	The plywood is produced by the supplier Palmasola in Brazil: Palmasola S/A Madeiras e Agricultura, Palma Sola, SC - Brazil

Product information

Product name	K-plywood CE2+
Product identification	Uncoated and untreated pine plywood The EPD is a specific EPD for this product and not an average
Product description	Optimeras plywood product is made of pine and is excellent as construction panels, mostly used indoor behind gypsum walls making the wall stronger. Optimeras plywood consists of thin sheets of pine wood which are laid crosswise and glued. Then they are heat-treated and pressed under high pressure and finally the surface is brushed and the plywood is cut into the right size. The plywood is certified (CE) and classed with the standard CE2+.
UN CPC code	HS, 2012 - Code 441239
Use	K-plywood CE2+ is for example excellent as construction panels with applications behind gypsum walls in purpose of making the wall stronger, or for use in roof or floor structures.

Product data

Density: 470 kg/m3.

Bending properties (characteristics)
Technical specification: EN310 type testing

Product type		12 mm	15 mm	18 mm	21 mm
Bending strength (N/mm2) (MOR)	Fk, 0	37,85	30,24	33,46	30,27
	Fk 90	18,17	13,31	16,55	15,13
Bending stiffness (N/mm2) (MOE)	Fk, 0	4138,01	2834,75	4545,80	5096,10
	Fk, 90	1174,06	1121,21	1890,96	1593,78
F/E-class		F 20/10	F20/5	F20/10	F20/10

Emissions data

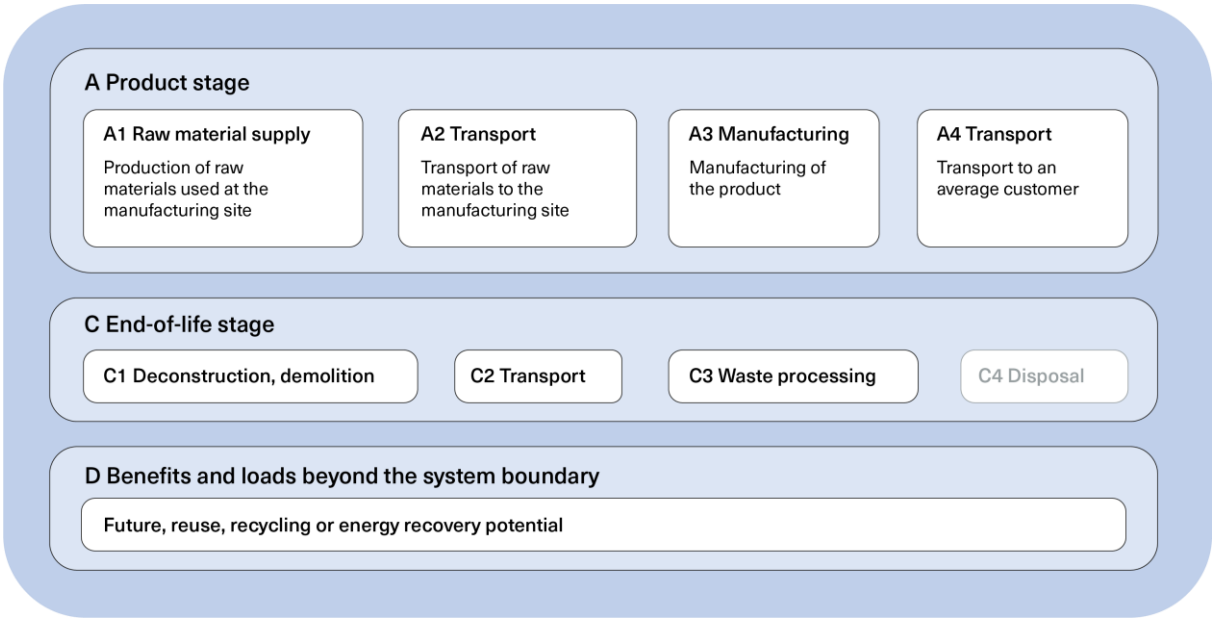
The K-plywood CE2+ meets limits in accordance with current regulations and is measured in accordance with EN 16000-9.

Table over the emission rate carried out over a 28 days' test. Emission test according to standard SS-EN ISO 16000-9:2006/SS-EN ISO 16000-3:2011. Evaluation according to standard EN 16516:2017 (EU-LCI values).

Compounds	**Emissions rate** ($\mu g/m^2h$)	**Concentration in reference room** (wall area scenario) ($\mu g/m^3$)
TVOC	62	130
Σ Carcinogenic VOCs	< 1	< 1
Σ VOC with LCI	125	260
Σ VOC without LCI	< 2	< 5
Σ VVOC	14	29
Formaldehyde	4	8
Σ SVOC	< 2	< 5
R = Σ Ci / LCIi	0.32	0.32

LCA information

Functional unit / declared unit	1 m3 of plywood corresponding to 470 kg
Reference service life	Not applicable
Database(s) and LCA software used	The LCA was modelled using the LCA software GaBi and corresponding database (2021.2) provided by sphera.
System boundaries	Cradle to gate (A1-A3) with modules C1-C4, module D and with optional module A4.



Optimera purchases the plywood from a supplier in Brazil and has no own activities. The plywood manufacturer (Palmasola) uses no fossil fuels (only wood fuels and electricity from hydropower) and since the production of the electricity is accounted for in A1, the plywood manufacturing (A3) has a zero contribution to the fossil climate change and to quite many other indicators as well.

The transport from Brazil to Sweden has been accounted for in A3 and the transport to the Optimera warehouses in Sweden in A4.

The end of life reflects the Swedish market.
The plywood is assumed to be entirely incinerated (C3) and therefore disposal (C4) is not relevant. For the credit for recovered electricity and heat (D), Swedish average conditions have been considered.

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

Life cycle stage	Module		Modules declared (1)	Optimera Plywood, Palmasola		Variation - products	Variation - sites
				Geography	Specific data used		
Product stage	Raw material supply	A1	X	BR (2)	9%	Not relevant since only one product	Not relevant since only one core site
	Transport	A2	X	BR (3)	6%		
	Manufacturing	A3	X	BR (4)	33%		
Construction process stage	Transport	A4	X	SE (5)	2%		
	Construction installation	A5	MND	-	-	-	-
Use stage	Use	B1	MND	-	-	-	-
	Maintenance	B2	MND	-	-	-	-
	Repair	B3	MND	-	-	-	-
	Replacement	B4	MND	-	-	-	-
	Refurbishment	B5	MND	-	-	-	-
	Operational energy use	B6	MND	-	-	-	-
	Operational water use	B7	MND	-	-	-	-
End of life stage	De-construction demolition	C1	X	SE	0%	-	-
	Transport	C2	X	SE	0%	-	-
	Waste processing	C3	X	SE	0%	-	-
	Disposal	C4	MND	Not relevant	-	-	-
Resource recovery stage	Reuse-Recovery-Recycling-potential	D	X	SE	0%	-	-
				Total	**50%**		

(1) Modules included in the EPD (X) and the modules not declared (MND).

(2) The raw materials are mainly wood and the adhesive (phenolic resin) and in A1 also the production of the external electricity (hydro power) is accounted for. Site specific data corresponds to the wood forestry (also for externally purchased wood used as fuel) and the hydro power sourced electricity, while the data applied for the production of adhesive is generic and not included in the percentage above.

(3) All raw material transportation data is specific in terms of distances and transport modes. Relevant transports are within Brazil. Generic data is applied for the fuel use and emissions from the combustion of the fuel.

(4) The plywood manufacturing in BR as well as the transport of the plywood from BR to SE are accounted for in A3. In the manufacturing there are no fossil CO_2 emissions, so the value is entirely associated with the transport from BR to SE. The transportation data is specific in terms of distances and transport modes. Generic data is applied for the fuel use and emissions from the combustion of the fuel.

(5) The transportation data is specific in terms of distances and transport modes (average distance from the port in Varberg to the Optimera warehouses in Sweden (200 km by truck)). Generic data is applied for the fuel use and emissions from the combustion of the fuel.

Data

Site specific data was collected from the supplier of the plywood (use of raw materials, energy use, emissions etc.), the forestry (wood logs for the manufacturing and for energy use) and related transportation (transport type, distances etc.). Generic database data was used for production of

energy (electricity and fuels), transportation and production of other raw materials than wood, such as the adhesive (phenolic resin).

For the end of life (module C) generic data has been used to estimate C1 Deconstruction, C2 Transport (150 km by truck) and for C3 Waste processing, where the plywood is assumed to be incinerated. Generic database data was used for this incineration, but the biogenic CO_2 was adjusted to reflect the biogenic carbon content of the plywood and the same was done for the fossil CO_2 (fossil CO_2 arising from the phenolic resin in the plywood).

Time representativeness

The site specific data used for the product manufacturing corresponds to 2021. The age of data from generic databases varies from 2017 – 2020. No data used is older than 10 years.

Data quality

The data quality for the plywood production and corresponding forestry operations is assessed to be very good since based on site specific data, corresponding to about 50% of the GWP-GHG indicator as declared above. For the production of the adhesive (phenolic resin), which is based on database data, the data quality is probably between fair and good. It would have been desired to use specific supplier data since the phenolic resin is of major importance for the result.

Allocation

No co-product allocation has been applied since no co-products are generated and therefore allocation has not been relevant.

Cut-off criteria

The general rules for the exclusion of inputs and outputs follows the requirements in EN 15804. The raw material flour (mixed with the adhesive and water to make the glue) corresponds to 0.8% of the raw material inputs and could therefore had been considered as negligible. Due to lack of data, data from an EPD was used as input data to the LCA (Molino Grassi 2020), but only for GWP fossil since the EPD was not compliant with the versions of indicators required according to the PCR (and EN15804+A2). This was considered as a better approach than to keep the data gap and the flour contributed with less than 2% to the fossil GWP (A1-A3).

Production of packging material was omitted since corresponds to less than 0.15% in relation to 1 kg of plywood.

Biogenic carbon balance

The biogenic carbon has been accounted for so that the net result is zero for the life cycle by equalizing the “uptake” of biogenic carbon dioxide with the emissions of biogenic carbon dioxide. The uptake of biogenic carbon dioxide is relevant for the plywood raw material in terms of wood logs as well as wood logs for wood chips used as an external fuel in the plywood production. The emissions of biogenic carbon dioxide occur at the plywood production site from combustion of the external wood fuel, but also from the part of the wood logs raw material not becoming plywood, but waste used as internal fuel. Biogenic carbon dioxide emissions are also generated in C3 where the plywood is assumed to be incinerated after use. If the net value for the biogenic GWP is not exactly zero from A1 to C3 this is due to small biogenic CO_2 emissions present in database data, but if focusing on the wood raw material and wood fuel used in A3, the biogenic carbon has been equalized between uptake and emissions throughout the life cycle.

Content declaration

Content

Content declaration [1]	Amount weight-%	Renewable material weight-%	Comment
Wood	86%	86%	As dry wood
Water	8%	8%	Moisture content
Phenolic resin	4%	-	As dry content
Flour	2%	2%	As dry content
Total	*100%*	*96%*	

No substances that appear in the REACH candidate list of SVHC (Candidate List of Substances of Very High Concern) are present or used in the product concerning this EPD.

Information on biogenic carbon content

Biogenic carbon content [1]	Unit per DU	Amount
Biogenic carbon content in product	kg C	2.01E+02
Biogenic carbon content in packaging [2]	kg C	0.00E+00

(1) 1 kg biogenic carbon is equivalent to 44/12 kg CO2.

(2) No renewable materials are used as packaging materials.

Information on energy content

Energy content	Unit per DU	Amount
Energy content in product	MJ	8.58E+03

Environmental Information

Potential environmental impact – mandatory indicators according to EN 15804

Results per functional or declared unit: 1 m3 of plywood corresponding to 470 kg												
Indicator	**Acronyms**	**Unit**	**A1 Raw material supply**	**A2 Transport**	**A3 Manufacturing (including trp BR-SE)**	**Total (A1-A3)**	**A4 Transport to customer**	**C1 Deconstruction**	**C2 Transport**	**C3 Plywood incineration**	**C4 Disposal (not relevant)**	**D Benefits**
Global warming potential (GWP), excl biogenic carbon	GWP-GHG (1)	kg CO2 eq	1,30E+02	1,31E+01	7,06E+01	**2,14E+02**	4,33E+00	1,55E-01	4,16E+00	5,12E+01	0,00E+00	-8,16E+01
Climate Change - total	GWP-total	kg CO2 eq	-2,10E+03	1,35E+01	1,56E+03	**-5,25E+02**	4,92E+00	1,58E-01	4,29E+00	7,90E+02	0,00E+00	-8,55E+01
Climate Change - fossil	GWP-fossil	kg CO2 eq	1,33E+02	1,32E+01	7,14E+01	**2,18E+02**	3,67E+00	1,57E-01	4,20E+00	5,15E+01	0,00E+00	-8,41E+01
Climate Change - biogenic	GWP-biogenic	kg CO2 eq	-2,24E+03	1,33E-01	1,49E+03	**-7,46E+02**	1,23E+00	-2,02E-04	4,24E-02	7,39E+02	0,00E+00	-9,07E-01
Climate Change - land use and land use change	GWP-luluc	kg CO2 eq	1,19E-01	1,41E-01	1,47E-03	**2,61E-01**	1,90E-02	1,30E-03	4,49E-02	5,26E-03	0,00E+00	-5,01E-01
Ozone depletion	ODP	kg CFC-11 eq	3,37E-13	2,16E-15	7,34E-15	**3,47E-13**	5,74E-15	2,02E-17	6,87E-16	5,02E-14	0,00E+00	-3,74E-13
Acidification	AP	mole H+ eq	2,61E-01	1,46E-02	2,82E+00	**3,10E+00**	3,44E-02	9,12E-04	4,78E-03	4,17E-01	0,00E+00	-5,04E-01
Eutrophication aquatic freshwater	EP-freshwater	kg P eq	1,82E-04	9,69E-05	1,60E-05	**2,95E-04**	2,67E-04	4,70E-07	3,09E-05	1,70E-05	0,00E+00	-4,34E-03
Eutrophication aquatic marine	EP-marine	kg N eq	9,72E-02	4,17E-03	7,44E-01	**8,45E-01**	3,33E-03	4,47E-04	1,39E-03	1,90E-01	0,00E+00	-1,88E-01
Eutrophication terrestrial	EP-terrestrial	mole N eq	1,01E+00	5,64E-02	8,14E+00	**9,21E+00**	1,53E-01	4,94E-03	1,87E-02	2,28E+00	0,00E+00	-1,52E+00
Photochemical ozone formation	POCP	kg NMVOC eq	2,82E-01	1,07E-02	2,07E+00	**2,37E+00**	8,93E-03	8,60E-04	3,54E-03	4,86E-01	0,00E+00	-4,00E-01
Depletion of abiotic resources - minerals and metals	ADP-minerals & metals (2)	kg Sb eq	2,27E-05	1,27E-06	2,14E-06	**2,61E-05**	1,15E-06	1,21E-08	4,05E-07	1,27E-06	0,00E+00	-3,25E-05
Depletion of abiotic resources - fossil fuels	ADP-fossil*	MJ	3,36E+03	1,69E+02	8,65E+02	**4,39E+03**	4,56E+01	2,11E+00	5,39E+01	2,29E+02	0,00E+00	-1,87E+03
Water use	WDP	m3	1,46E+01	1,87E-01	1,09E-01	**1,49E+01**	4,08E-01	1,38E-03	5,95E-02	8,55E+01	0,00E+00	-3,47E+01
	Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption										

(1) The GWP-GHG indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.
(2) Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

Use of resources

Results per functional or declared unit: 1 m3 of plywood corresponding to 470 kg												
Indicator	**Acronyms**	**Unit**	**A1 Raw material supply**	**A2 Transport**	**A3 Manufacturing (including trp BR-SE)**	**Total (A1-A3)**	**A4 Transport to customer**	**C1 Deconstruction**	**C2 Transport**	**C3 Plywood incineration**	**C4 Disposal (not relevant)**	**D Benefits**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	MJ	1,15E+04	1,78E+01	2,97E+00	**1,15E+04**	1,90E+01	1,18E-01	5,67E+00	4,24E+01	0,00E+00	-3,81E+03
Use of renewable primary energy resources used as raw materials	PERM	MJ	2,53E+04	0,00E+00	0,00E+00	**2,53E+04**	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PERT	MJ	3,61E+02	1,78E+01	2,97E+00	**3,82E+02**	1,90E+01	1,18E-01	5,67E+00	4,24E+01	0,00E+00	-3,81E+03
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	PENRE	MJ	3,36E+03	1,70E+02	8,66E+02	**4,39E+03**	4,57E+01	2,11E+00	5,40E+01	2,29E+02	0,00E+00	-1,87E+03
Use of non-renewable primary energy resources used as raw materials	PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PENRT	MJ	3,36E+03	1,70E+02	8,66E+02	**4,39E+03**	4,57E+01	2,11E+00	5,40E+01	2,29E+02	0,00E+00	-1,87E+03
Use of secondary material	SM	kg	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of renewable secondary fuels	RSF	MJ	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of non-renewable secondary fuels	NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water	FW	m3	1,85E+00	2,29E-02	4,84E-03	**1,88E+00**	2,01E-02	1,35E-04	7,29E-03	2,05E+00	0,00E+00	-2,49E+00
	Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water										

Waste and output flows

Waste

Results per functional or declared unit: 1 m3 of plywood corresponding to 470 kg												
Indicator	**Acronyms**	**Unit**	**A1 Raw material supply**	**A2 Transport**	**A3 Manufacturing (including trp BR-SE)**	**Total (A1-A3)**	**A4 Transport to customer**	**C1 Deconstruction**	**C2 Transport**	**C3 Plywood incineration**	**C4 Disposal (not relevant)**	**D Benefits**
Hazardous waste disposed	HWD	kg	4,01E-07	8,81E-09	6,71E-09	**4,17E-07**	7,67E-09	1,06E-10	2,81E-09	4,03E-08	0,00E+00	-5,00E-06
Non-hazardous waste disposed	NHWD	kg	1,23E+00	3,88E-02	8,69E-02	**1,36E+00**	8,42E-02	3,14E-04	1,24E-02	5,66E+00	0,00E+00	-4,94E+00
Radioactive waste disposed	RWD	kg	2,23E-02	2,55E-04	9,63E-04	**2,36E-02**	7,58E-04	2,55E-06	8,11E-05	1,55E-02	0,00E+00	-4,44E-01

Output flows

Results per functional or declared unit: 1 m3 of plywood corresponding to 470 kg												
Indicator	**Acronyms**	**Unit**	**A1 Raw material supply**	**A2 Transport**	**A3 Manufacturing (including trp BR-SE)**	**Total (A1-A3)**	**A4 Transport to customer**	**C1 Deconstruction**	**C2 Transport**	**C3 Plywood incineration**	**C4 Disposal (not relevant)**	**D Benefits**
Components for re-use	CRU	kg	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	MFR	kg	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for energy recovery	MER	kg	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported electrical energy	EEE	MJ	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported thermal energy	EET	MJ	0,00E+00	0,00E+00	0,00E+00	**0,00E+00**	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Disclaimers

ILCD classification	Indicator	Disclaimer
ILCD Type 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 2	Acidification potential, Accumulated Exceedance (AP)	None
	Eutrophication potential, Fraction of nutrients reaching	None
	freshwater end compartment (EP-freshwater)	
	Eutrophication potential, Fraction of nutrients reaching	None
	marine end compartment (EP-marine)	
	Eutrophication potential, Accumulated Exceedance	None
	(EP-terrestrial)	
	Formation potential of tropospheric ozone (POCP)	None
	Potential Human exposure efficiency relative to U235 (IRP)	1
ILCD Type 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	2
	water consumption (WDP)	
	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	2
	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.		

References

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Contact information

EPD owner:	Email: tks@sgdsgruppen.com Telephone: +46 20-583000 Address: SGDS gruppen AB, Bryggerivägen 9, 168 67 Bromma
LCA author:	IVL Swedish Environmental Research Institute, Box 210 60 SE-100 31 Stockholm, www.ivl.se. Contact: Lisa Hallberg (lisa.hallberg@ivl.se)
Program operator:	EPD International AB info@environdec.com

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