Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

SixE®

from

HOWE a/s

Programme:	The International EPD® System, www.environdec.com
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EPD type:	**EPD of multiple products, based on a representative product**

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
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Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): PCR 2019:14 Construction products (EN 15804+A2) (1.3.4) PCR 2019:14-c-PCR-021 c-PCR-021 Furniture and components of furniture (c-PCR to PCR 2019:14) (2.0.0) adapted from EPD Norway UN CPC code 38119: Furniture; other seats
PCR review was conducted by: The Technical Committee of the International EPD System. See www.environdec.com for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.
Life Cycle Assessment (LCA)
LCA accountability: *Joanna Zhuravlova, Anna Banach, Bureau Veritas Polska*
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third-party verifier: Vladimír Kočí, LCA.cz Approved by: The International EPD® System
OR
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 registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD: HOWE a/s

Contact: Agnieszka Rafalska-Zięba, arz@howe.com

Description of the organisation: HOWE a/s is a strong international brand and a pioneer in designing and selling multi-functional, space-saving furniture for the contract market. For over 90 years, HOWE has collaborated closely with architects and designers to create beautiful, functional environments that prioritize well-being. Headquartered in Odense, Denmark, HOWE also operates wholly owned subsidiaries in the US, UK, France, and Poland.

Product-related or management system-related certifications: ISO 9001:2015, ISO 14001:2015, testing according to the required EN and BIFMA standards

Name and location of production site(s): Poland and Sweden

Product information

Product name: SixE® family

Products included in this EPD
SixE® 4-leg side chair plastic
SixE® 4-leg side chair upholstery
SixE® 4-leg armchair plastic
SixE® 4-leg armchair upholstery
SixE® sled side chair plastic
SixE® sled side chair upholstery
SixE® sled armchair plastic
SixE® sled armchair upholstery

The EPD is based on a representative product, which is **SixE® 4-leg side chair plastic**. The choice of representative product is based on the highest production volume in the product group.

Product identification: SixE® is a refined mono shell chair family designed by Pearson Lloyd. The name of the chair refers to the six E's that characterizes the chair: Ergonomic, Environmental, Ease of handling, Elegant, Efficient and Economic.

Product description: SixE® is designed to be the most efficient, sturdy, and durable solution to the ubiquitous stacking shell chair. It can be stacked up to 25 chairs high on a dolly. Universal in its application, the SixE family - including 4-leg and sled base variants - adapts seamlessly to a variety of settings: from homes and cafes to educational spaces, offices, and inclusive meeting areas. Built for heavy-duty contract use, SixE comes with HOWE's 10-year warranty.

UN CPC code: 38119: Furniture; other seats.

Geographical scope:

Modules A1-A3: EUR
Modules A4-A5: GLO
Module B and Module C: GLO

LCA information

Functional unit: 1 unit of SixE® chair

Conversion to mass: 1 unit weighs 5,205 kg.

Results for representative product: SixE® 4-leg side chair plastic

Reference service life: 15 years

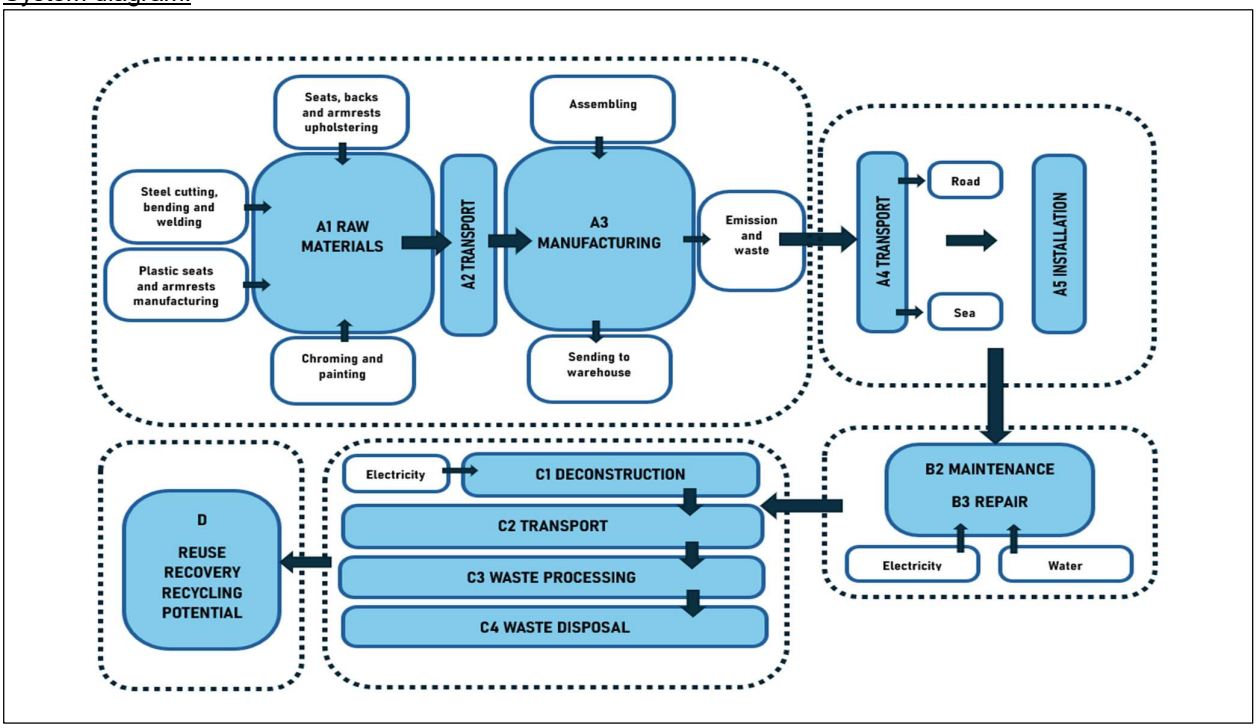
Time representativeness: 2023-01-01 to 2023-12-31

Database(s) and LCA software used: SimaPro 9.6.1 with Ecoinvent 3.10 database. “EN 15804 reference package” based on EF 3.1 has been used for impact calculations.

Description of system boundaries:

Cradle to gate with options, modules C1–C4, module D and with optional modules B2–B3 (A1–A3 + B2-B3 + C + D).

System diagram:



Information about scenarios

A1-A3:

Raw materials were modelled using primary data from the manufacturer, specifying the product composition and material type. Material losses are included in the calculations. They were calculated based on the total manufacturing waste per product.

Transport of raw materials was calculated based on distance and transport mode information from the manufacturer and using own assumptions where necessary.

Transport mode	Transport dataset
Road	Transport, freight, lorry 16-32 metric ton, EURO6 {RER}| transport, freight, lorry 16-32 metric ton, EURO6
Sea	Transport, freight, sea, container ship {GLO}| transport, freight, sea, container ship

Manufacturing activities take place in two locations: in Poland and Sweden. Primary data was used to model energy (electricity and heat) and water use. Manufacturing waste was provided for one unit of product. As a conservative assumption and due to lack of more accurate data, the production waste was assumed to be incinerated and landfilled, according to the stated in PEF Annex C for the EU average scenario. The scenario assumes split 55% for landfill and 45% for incineration.

Energy source of the electricity used in manufacturing processes of module A3

The climate impact of electricity for each location based on residual mix dataset is as follows:

Manufacturing location	Electricity dataset	GWP-GHG impact (kg CO2e/kWh)
Poland	Electricity, medium voltage {PL}| electricity, medium voltage, residual mix	1,087
Sweden	Electricity, medium voltage {SE}| electricity, medium voltage, residual mix	0,044

A4–A5:

Transport from the assembly site to the HOWE warehouse was estimated based on data from the distributor and own calculations using Google Maps. Due to the lack of specific data, distances were estimated from the storage location of the products to the customer based on the stated countries to which HOWE ships its products. Distances were estimated as follows:

- Average distance by ship from Poland to the capital of the specified country: determined using Google Maps.
- Average distance from HOWE's product storage location to the European capitals: road transport was assumed, calculated using distance to site.

Since only manual labour is used to assemble the chairs, this element was not included in the calculations of module A5. However, packaging materials waste treatment was included in the calculations. Due to the global distribution of the chairs, it was not possible to determine the exact distance to the waste management site, so the transport distance to the waste treatment facility was assumed as 100 km.

B2-B3:

In module B2 it is stated that products do not require special maintenance. Cleaning with vacuuming for upholstered chairs and wet wiping is advised accordingly. Therefore, two scenarios were assumed:

- Scenario A: It was assumed that the vacuum cleaner has a power od 1000 watts and vacuum the chair for 5 minutes once a month, hence: assuming vacuuming the chair for 5 minutes once a month, the annual energy consumption will be about 1 kWh.
- Scenario B: It was assumed that water consumption per wash is about 0.2 liters and that the chair is washed once a month. Hence, assuming that the chair is washed with a microfiber cloth once a month and using about 0,2 litres of water each time, the estimated annual water consumption will be about 0,0024 m3.

The choice of scenario depends on the product type. For the representative product **SixE® 4-leg side chair plastic** only scenario B applies, as the product does not require vacuuming.

In module B3, in case of repairing, one scenario was assumed:

- Scenario A: It is assumed that the chair may need a minor repair once a year, for this repair a small set of electric tools with a total power of 500 watts is used, running for about an hour. In that case, annual electricity consumption would be: 0,5 kWh.

C1-C4 End of life stage

In C1 module, it was assessed that dismantling process assumes 50% of manual dismantling and 50% of power tool dismantling, with the tool dismantling consuming 0,05 kWh of electricity.
Since HOWE's products are sold worldwide, the distance to the disposal/waste management site in C2 module was assumed to be 100 km.
A conservative approach has been assumed that the product will not be recycled, hence emissions from preparing the waste for sorting or recycling are not considered in module C3.
In module C4 for the product itself, municipal waste is assumed to be incinerated and landfilled, according to the EU average scenario stated in PEF Annex C. The scenario assumes split 55% for landfill and 45% for incineration. The amount of waste collected separately is the entire weight of the representative product.

D Benefits and loads outside of system boundary

Due to the lack of recyclable materials leaving the system, environmental loads and benefits of recycling are 0 in module D.

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

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	X	X	ND	X	X	ND	ND	ND	ND	X	X	X	X	X
Geography	EUR	EUR	EUR	GLO	GLO	-	GLO	GLO	-	-	-	-	GLO	GLO	GLO	GLO	GLO
Specific data used	83%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products GWP-GHG	31%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	286%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

Excluded lifecycle stages:

Module B1 and Modules B4-B7 are excluded, as they are not relevant for the included products.

Excluded processes:

- Raw materials: product labels are not included due to assumed low significance to the final result
- Production of spare parts (e.g. refractories, machinery tires, conveyer belts) and all material needed for maintenance operations during manufacturing.
- Infrastructure and capital goods, transportation of employees, as determined in PCR

Content information

Content information refers to the representative product **SixE® 4-leg side chair plastic**

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Polymers	2,930	30%	0
Steel	2,232	0	0
Powder Coating	0,034	0	0
Chrome	0,005	0	0
Other	0,001	0	0
TOTAL	5,20	17%	0
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C/kg**
Cardboard	1,53	0,00	0,45
Plastic foil	0,09	0,00	0,00
TOTAL	1,61	0,00	0,45

Dangerous substances from the candidate list of SVHC for Authorisation

There are no dangerous substances used from the candidate list of SVHC.

Results of the environmental performance indicators

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks. The use of the results of modules A1-A3 without considering the results of module C is discouraged.

Mandatory impact category indicators according to EN 15804

Results per functional unit												
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B2**	**B3**	**C1**	**C2**	**C3**	**C4**	**D**	**Variation A1-C4**
GWP-fossil	kg CO_2 eq.	1,65E+01	2,33E+00	5,27E-01	1,08E-08	1,64E-01	1,64E-01	9,89E-02	0,00E+00	1,60E+00	0,00E+00	45%
GWP-biogenic	kg CO_2 eq.	3,05E-01	4,03E-04	3,96E-01	2,29E-11	4,01E-04	4,01E-04	1,79E-05	0,00E+00	1,28E+00	0,00E+00	35%
GWP-luluc	kg CO_2 eq.	4,19E-02	8,84E-04	9,53E-05	2,08E-11	4,99E-04	4,99E-04	3,28E-05	0,00E+00	2,75E-04	0,00E+00	57%
GWP-total	kg CO_2 eq.	1,68E+01	2,33E+00	1,67E+00	1,11E-08	1,70E-01	1,70E-01	9,90E-02	0,00E+00	5,31E+00	0,00E+00	44%
ODP	kg CFC 11 eq.	3,53E-07	4,31E-08	1,29E-09	1,55E-16	3,02E-09	3,02E-09	1,97E-09	0,00E+00	2,21E-09	0,00E+00	93%
AP	mol H^+ eq.	5,95E-02	2,06E-02	4,58E-04	5,79E-11	9,63E-04	9,63E-04	2,06E-04	0,00E+00	1,27E-03	0,00E+00	52%
EP-freshwater	kg P eq.	8,00E-04	1,59E-05	1,04E-05	7,17E-13	1,58E-05	1,58E-05	7,72E-07	0,00E+00	3,29E-05	0,00E+00	56%
EP-marine	kg N eq.	1,34E-02	5,06E-03	7,99E-04	9,50E-12	1,18E-04	1,18E-04	4,82E-05	0,00E+00	2,53E-03	0,00E+00	45%
EP-terrestrial	mol N eq.	1,36E-01	5,62E-02	1,80E-03	1,07E-10	1,35E-03	1,35E-03	5,34E-04	0,00E+00	5,27E-03	0,00E+00	48%
POCP	kg NMVOC eq.	5,83E-02	1,87E-02	6,74E-04	3,55E-11	4,46E-04	4,46E-04	3,42E-04	0,00E+00	1,83E-03	0,00E+00	44%
ADP-minerals&metals*	kg Sb eq.	6,70E-05	6,26E-06	1,92E-07	5,90E-14	2,20E-06	2,20E-06	3,22E-07	0,00E+00	2,98E-07	0,00E+00	68%
ADP-fossil*	MJ	2,90E+02	3,17E+01	9,53E-01	1,93E-07	3,81E+00	3,81E+00	1,39E+00	0,00E+00	1,69E+00	0,00E+00	49%
WDP*	m^3	6,44E+00	1,19E-01	8,13E-02	1,55E-06	4,72E-02	4,72E-02	5,78E-03	0,00E+00	-2,68E-01	0,00E+00	45%
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											

** 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.*

Additional mandatory and voluntary impact category indicators

Results per functional unit												
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B2**	**B3**	**C1**	**C2**	**C3**	**C4**	**D**	**Variation A1-C4**
GWP-GHG*	kg CO_2 eq.	1,65E+01	2,33E+00	5,27E-01	1,08E-08	1,64E-01	1,64E-01	9,89E-02	3,00E+00	1,60E+00	0,00E+00	45%
**This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO2 is set to zero.*												

Resource use indicators

Results per functional unit												
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B2**	**B3**	**C1**	**C2**	**C3**	**C4**	**D**	**Variation A1-C4**
PERE	MJ	5,21E+00	1,23E-01	5,81E-03	1,43E-08	5,31E-01	5,31E-01	6,26E-03	0,00E+00	1,25E-02	0,00E+00	80%
PERM	MJ	1,96E+01	0,00E+00	-1,96E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0%
PERT	MJ	2,48E+01	1,23E-01	-1,96E+01	1,43E-08	5,31E-01	5,31E-01	6,26E-03	0,00E+00	1,25E-02	0,00E+00	80%
PENRE	MJ	2,90E+02	3,17E+01	9,53E-01	1,93E-07	3,81E+00	3,81E+00	1,39E+00	0,00E+00	1,69E+00	0,00E+00	49%
PENRM	MJ	8,26E+01	0,00E+00	-3,70E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-7,51E+01	0,00E+00	0,00E+00	0%
PENRT	MJ	3,73E+02	3,17E+01	-2,75E+00	1,93E-07	3,81E+00	3,81E+00	1,39E+00	-7,51E+01	1,69E+00	0,00E+00	49%
SM	kg	2,24E+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	-1%
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	0%
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	0%
FW	m^3	1,79E-01	3,93E-03	-1,70E-03	3,61E-08	3,29E-03	3,29E-03	1,93E-04	0,00E+00	-5,68E-03	0,00E+00	58%
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 indicators

Results per functional unit												
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B2**	**B3**	**C1**	**C2**	**C3**	**C4**	**D**	**Variation A1-C4**
Hazardous waste disposed	kg	4,41E-03	2,02E-04	7,12E-06	8,24E-13	8,18E-06	8,18E-06	9,37E-06	0,00E+00	1,36E-05	0,00E+00	54%
Non-hazardous waste disposed	kg	2,16E+00	1,20E+00	7,75E-01	1,56E-09	1,23E-02	1,23E-02	6,71E-02	0,00E+00	2,43E+00	0,00E+00	39%
Radioactive waste disposed	kg	7,66E-04	8,73E-06	3,89E-07	1,01E-12	2,70E-05	2,70E-05	4,48E-07	0,00E+00	8,06E-07	0,00E+00	76%

Output flow indicators

Results per functional unit												
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B2**	**B3**	**C1**	**C2**	**C3**	**C4**	**D**	**Variation A1-C4**
Components for re-use	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	0%
Material for recycling	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	0%
Materials for energy recovery	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	0%
Exported energy, electricity	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	0%
Exported energy, thermal	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	0%

References

1) ISO 14040:2006 Environmental management – Life cycle assessment – Principles and Framework
2) ISO 14044:2006 Environmental management - Life cycle assessment - Principles and guidelines
3) ISO 14025:2006, Environmental labels and declarations – Type III Environmental declarations - Principles and procedures
4) EN 15804:2012+A2:2019/AC:2021, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
5) General Programme Instructions of the International EPD® System. Version 4.0
6) PCR 2019:14 Construction products (EN 15804+A2) (1.3.4)
7) NPCR 026, Part B for Furniture and components of furniture (references to EN 150804+A2), version 3,0.
8) Pre Sustainability. SimaPro LCA software. http://www.pre.nl/content/simapro-lca-software
9) Wernet, G., Bauer, C., Steubing, B., Reinhard, J., Moreno-Ruiz, E., and Weidema, B., 2016. The ecoinvent database version 3 (part I): overview and methodology. The International Journal of Life Cycle Assessment, [online] 21(9), pp.1218–1230. Available at: <http://link.springer.com/10.1007/s11367-016- 1087-8>
10) Bureau Veritas Polska Sp. z o.o. LCA report EPD HOWE. Version 1. 2025

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