Environmental Product Declaration

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

Wooden slats acoustic panel G1

from

███████████████████████████████████
███████████████████████

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-08510
Publication date:	202X-XX-YY
Valid until:	202X-XX-YY

*Size:605*2440*22mm*

Weight:10.64kg
weight variation (+-5%)

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

Programme information

Programme operator: EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden, Email: info@environdec.com

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Programme:	The International EPD® System EPD International AB Box 210 60 SE-100 31 Stockholm Sweden www.environdec.com info@environdec.com
LCA author	████████████████████████ ████████
EPD author	██████████████████████ ███████.
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), 2019:14, version 1.2.5 , and UN CPC 314 Product Category Rules (PCR): c-PCR-014 Acoustical ceiling and wall solutions), c-PCR-014 , VERSION: 2022-01-28	
PCR review was conducted by: Martin Erlandsson, IVL Swedish Environmental Research Institute, martin.erlandsson@ivl.se	
Life Cycle Assessment (LCA)	
████████████████████████████████	
Third-party verification	
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by accredited certification body Third-party verification: SGS Italy S.p.A, Via Caldera 21, Milan, Italy, is an approved certification body accountable for the third-party verification The certification body is accredited by: ACCREDIA, Accreditation number: 006H	

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

☒ Yes   ☐ No

Company information

Owner of the EPD: ███████████████████
████████

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Description of the company

██████████████████████████████████████ is
specialized in R&D, design and production of polyester fiber material acoustic products and wood
products. The first phase investment is more than 20 million ████ and covers an area of more
than 5000 square meters. The company introduces international advanced fully automated
production equipment to provide customers with professional sound absorption solutions with
strict quality requirements.

Name and location of production site

██████████████████████████

███

Accountability/ responsibility

██████████████████████████ releases EPD from any non-compliance
with environmental legislation self-declared by the manufacturer. The holder of the declaration will
be responsible for the information and supporting evidence; EPD International declines all
responsibility for the manufacturer's information, data and results of the evaluation of the life cycle
of the product.

Product information

Product

Wooden slats acoustic panel G1

Product description

wooden slats acoustic panel G1 offers luxury quality, state-of-the-art noise reduction wood paneling solutions. This is handcrafted to not only visually transform a project, but also to create a quieter, more comfortable environment. The size of each panel is 605*2440*22 mm with the weight of 10.64 kg. The image of wooden slats acoustic panel G1 is depicted in Figure 1.

Figure 1: Wooden slats acoustic panel G1 from Suzhou Deco Sound New Materials Technology Co., Ltd.

Wooden slats acoustic panel G1 integrates sound-absorbing and decorative properties, and is fire-resistant, heat preservation, and plastic, which can meet the needs of acoustic treatment and decorative aesthetics in different styles and levels. It features as the sound absorption class D with the accordance with ISO11654:1997 and the fire class B-s1, d0 according to EN 13501-1:2018. Products are widely used in cinemas, conference rooms, studios, hotels, concert halls, shopping malls, schools, gyms, etc.

The sound-absorbing products with the brand of ███████ enjoy a good reputation around the world. The company enjoys independent R&D technology patents, has an excellent management team, and strictly implements various quality systems, environmental management systems, and environmental protection systems; Constantly stride forward to a professional, standardized and group enterprise, create the acoustic brand, and serve the global market.

Geographical scope

Table 1 presents details of involved stages and excluded process, including declared modules, geographical scope, share of specific data and variation in betweens products and sites.This EPD covers cradle to gate with modules C1－C4 and module D and details are as follows: A1 (Raw material supply), A2 (Transport) and A3 (Manufacturing), C1 (Deconstruction demolition), C2 (Transport), C3 (Waste processing) and C4 (Disposal), and D (resource recovery stage). The processes in modules A1-A3 and the product's performance of the end-of-life (module C) have been modelled to represent China.

Table 1: Details of declared modules, geographical scope, share of specific data and variation in betweens products and sites.

	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	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	CN	CN	CN	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Specific data used	>90%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note:

Cradle to gate with modules C1–C4 and module D is selected;

the geography site is in China;

the share of the GWP-GHG results in A1-A3 are from specific data, and Ecoinvent 3.8 with regional energy and material mix data coming from adapted ███████ data (1mi1, 2020) therefore is suggested to be used;

no variation in products and sites because it is a single product.

LCA information

Functional Unit

In this study, the functional unit is 1 m^2 of the uncoated Acoustic Wooden Slats Wall Panel G1 production and the weight of it is 7.27kg/m^2. The sound absorption class D is according to ISO11654:1997 and reaction to fire class B-s1, d0 according to EN 13501-1:2018. The LCA results is calculated and reported per functional unit.

Database(s) and LCA software

Most of the general data (e.g., material, energy as well as transportation) requirement was decided during the desktop research and collected using database generated by Ecovane and background dataset such as Ecoinvent 3.8 with regional energy and material mix data coming from adapted ███████ data (1mi1, 2020). The contribution ratio data was processed and modeled in SimaPro 9.1 LCA software where it can be checked for consistency.

Data quality

Steps were taken to ensure that the life cycle inventory data were reliable and representative. The type of data that was used is clearly stated in the Inventory Analysis, being it measured or calculated from primary sources or whether data are from the life cycle inventory databases.Within this study, the data quality requirements were as follows:

- Specific data of the considered system (such as materials or energy flows that enter the production system).

- Generic data related to the life cycle impacts of the material or energy flow that enters the production system. These data were sourced from the databases in SimaPro 9. SimaPro is the world's most widely used LCA software and the data in it comes predominantly from Ecoinvent 3.8 and some other datasets, with the world's most complete and widely used set of data on industrial processes, material production, packaging production, transport and so on.

- Existing LCI data is, at most, 10 years old. Newly collected LCI data is current or up to 3 years old;

- The LCI data is related to the geographical locations where the processes occur.

- The technology represents the average technologies during the period of study.

System diagram

The wooden slats acoustic panel G1 under study are manufactured following the manufacturing processes as shown in Figure 2. The main processes considered in the LCA but are not shown in the flow chart below include:

- Raw and auxiliary material production and transportation;

- Acoustic Wooden Slats Wall Panel G1 manufacturing;

- Waste water, off gas and residue treatment;

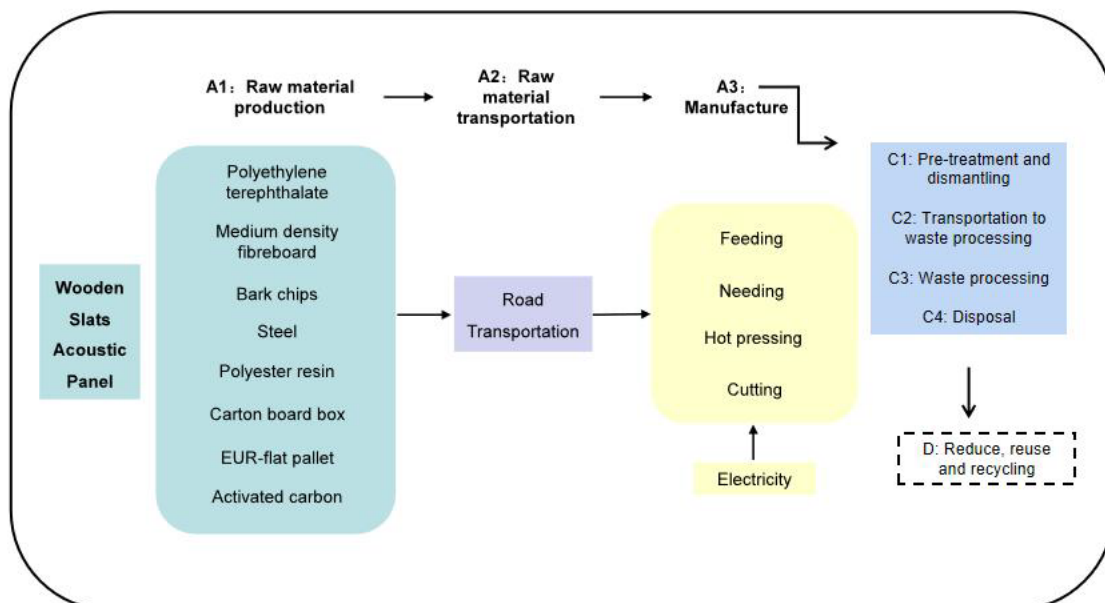- Supply of electricity;

- Disposal and Recycling of waste.

Figure 2: System diagram of wooden slats acoustic panel G1.

Description of system boundaries

The system boundary is cradle-to-gate with modules C1 – C4 and module D. The life cycle stage refers to the following modules:

Upstream module which includes all the processes upstream of the production of the product, including extraction and processing of raw materials (A1), the transportation of the raw material to the factory (A2) and manufacturing of the product (A3) with the supply of the raw material, energy and auxiliary material input, and treatment of off-gas, wastewater and solid wastes during the products'manufacturing;

Downstream module which includes all the relevant processes that take place outside of the control of the organization proposing the EPD. In this study, the downstream processes include de-construction and demolition of the Acoustic Wooden Slats Wall Panel G1 (C1), transport to waste processing (C2), waste processing (C3), and disposal (C4). The benefit and avoided loads are presented in module D.

Excluded life-cycle stages

The following steps/stages are not included in the system boundary due to the reason that the elements below are considered irrelevant or not within the boundary to the LCA study of relevant products：

- Production and disposal of the infrastructure and capital equipment (buildings, machines, transport media, roads, etc.) and their maintenance during products manufacturing.

- Storage phases and sales of products are excluded due to the small impact.

- Product losses due to abnormal damage such as natural disaster or fire accident. These losses would mostly be accidental.

- The domestic water consumption during the Acoustic Wooden Slats Wall Panel G1 production was excluded.

- Lubricating oil which is used for maintenance of the machine was excluded due to the very little amount per year.

Allocation

Allocation refers to partitioning of input or output flows of a process or a product system between the product systems under study and one or more other product systems.

Multi-input processes

For datasets in this study, the allocation of the inputs from coupled processes is generally carried out via the mass. The consumption of raw materials is allocated by mass ratio. The transportation of raw materials is allocated by mass distance.

Multi-output processes

In the production of Acoustic Wooden Slats Wall Panel G1, the total consumption of energy and water during manufacturing is allocated per unit mass of each product.

Content declaration

Products stage (A1-A3)

The main raw materials of the products include polyethylene terephthalate (PET), medium density fibreboard (MDF) (made of virgin material), and bark chips as upstream materials, the input and output materials of which are based on generic data in the Ecoinvent database. The quantity of raw material for production was provided by ███████████████ ████████████████████████████████.The type and ratio of raw materials per m² product are listed in Table 2 below.

Table 2: Detailed information for the raw materials of wooden slats acoustic panel G1 (per m² product).

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
PET	1.41	0	0
MDF	5.60	0	83.3 and 4.66
Bark chips	0.24	0	82.1 and 0.20
Steel	0.21	0	0
Cyclohexane (the main component of the glue)	6.83E-03	0	0
EUR-flat pallet	0.33	0	83.3 and 0.27
Activated carbon	1.95E-4	0	0
TOTAL	7.79	0	/
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C/kg**
Carton board box	0.08	0	0.036
TOTAL	0.08	0	0.036

Note: only material weight over 1% of product will be shown in the table.

According to ████████████████████████████████ all raw materials are sourced from ██████ and delivered by truck. The information related to raw materials and transportation details from distance to transport mode is shown in Table 3.

Table 3: Raw materials transportation for Wooden slats acoustic pane G1(per m² product).

Regions of Raw material supply	Transportation	Transportation distance	Material type	Weight kg
Within the same province of manufacture plant	Transport, freight, lorry >32 metric ton, EURO4 {RER}| transport, freight, lorry >32 metric ton, EURO4	Cut-off, U	400 km	MDF	5.60

	Transport, freight, lorry >32 metric ton, EURO4 {RER}| transport, freight, lorry >32 metric ton, EURO4	Cut-off, U	160 km	bark chips	0.24
	Transport, freight, lorry >32 metric ton, EURO4 {RER}| transport, freight, lorry >32 metric ton, EURO4	Cut-off, U	10 km	steel	0.21
	Transport, freight, light commercial vehicle {GLO}| market group for transport, freight, light commercial vehicle	Cut-off, U	15 km	Carton board box	0.08
	Transport, freight, light commercial vehicle {GLO}| market group for transport, freight, light commercial vehicle	Cut-off, U	15 km	UR-flat pallet	0.33
	Transport, freight, lorry >32 metric ton, EURO4 {RER}| transport, freight, lorry >32 metric ton, EURO4	Cut-off, U	10 km	Activated carbon	1.95E-4

The manufacturing process for Acoustic Wooden Slats Wall Panel G1 mainly includes electricity consumption processes involve raw materials, energy, water, solid waste, and emissions. Since the raw materials are already considered in raw material acquisition, the manufacturing stage model will mainly deal with energy consumption, solid waste, and emissions.

Table 4: Foreground datasets for Acoustic Wooden Slats Wall Panel G1 (per m2 product)

Process	Unit	Generic dataset referred	Value
Input (energy)			
Electricity consumption	kWh	Electricity, low voltage {CN_2018_Huadong}| market for	Alloc Def, U	2.05
Output (emissions)			
Particulates	kg	Particulates, unspecified	1.56E-05
Waste PET	kg	Waste polyethylene terephthalate {RoW}| market for waste polyethylene terephthalate	Cut-off, U	2.47E-01
Waste plastic	kg	Waste plastic, mixture {RoW}| treatment of waste plastic, mixture, sanitary landfill	Cut-off, U	8.65E-03
Waste paperboard	kg	Waste paperboard, unsorted {RoW}| market for waste paperboard, unsorted	Cut-off, U	1.23E-04

The transportation mainly focuses on the upstream of raw material supply. The transportation of raw material and auxiliary supplies are considered in the stage of "raw material acquisition" step. Product transportation is not included in the scope of boundary.

End-of-life (C1-C4)

The end-of-life stage includes four aspects:

C1: Pre-treatment and dismantling;

C2: Transportation to waste processing;

C3: Waste processing;

and C4: Disposal.

After pre-treatments of sorting and dismantling, wasted will be transported to waste processing sites and be disposed subsequently.

Reduce, reuse and recycling D

In the reduce, reuse and recycling stage, the benefit and avoided environmental impacts are assumed based on module C

Environmental performance results

Environmental impacts of per declared unit of Wooden slats acoustic panel G1

Table 5: Environmental impacts of per declared unit of Wooden slats acoustic panel G1.

Impact category	Unit	Upstream			Downstream				
		A1	A2	A3	C1	C2	C3	C4	D
Climate change	kg CO2 eq	4.07E+00	2.17E-01	1.93E+00	4.79E+00	6.55E-02	1.00E+00	1.40E+01	-1.50E+01
Climate change - Fossil	kg CO2 eq	1.14E+01	2.17E-01	1.95E+00	4.77E+00	6.54E-02	2.73E+00	1.12E-01	-2.91E+00
Climate change - Biogenic	kg CO2 eq	-7.32E+00	2.29E-04	-1.45E-02	4.33E-03	6.71E-05	-1.73E+00	1.38E+01	-1.21E+01
Climate change - Land use and LU change	kg CO2 eq	1.61E-02	8.20E-05	3.04E-05	7.41E-03	2.37E-05	1.24E-03	1.21E-04	-1.39E-03
Ozone depletion	kg CFC11 eq	2.19E-05	5.16E-08	1.84E-08	9.82E-07	1.57E-08	2.18E-07	1.67E-08	-2.50E-07
Photochemical ozone formation	kg NMVOC eq	4.53E-02	1.24E-03	4.51E-03	2.80E-02	3.73E-04	9.43E-03	4.10E-03	-1.39E-02
Acidification	mol H+ eq	5.95E-02	1.11E-03	9.82E-03	2.41E-02	3.33E-04	1.82E-02	2.06E-03	-2.06E-02
Eutrophication, freshwater	kg P eq	2.95E-03	1.46E-05	2.18E-04	3.37E-04	4.11E-06	1.15E-03	4.32E-05	-1.19E-03
Eutrophication, marine	kg N eq	1.23E-02	3.77E-04	1.96E-03	8.78E-03	1.14E-04	3.26E-03	7.25E-03	-1.06E-02
Eutrophication, terrestrial	mol N eq	1.40E-01	4.12E-03	1.66E-02	9.57E-02	1.25E-03	3.68E-02	7.99E-03	-4.61E-02
Water use	m3 depriv.	8.37E+00	1.20E-02	6.65E-02	2.12E-01	3.54E-03	6.84E-01	5.53E-02	-7.43E-01
Resource use, fossils	MJ	1.98E+02	3.39E+00	1.68E+01	6.72E+01	1.03E+00	3.13E+01	1.69E+00	-3.40E+01

Resource use, minerals and metals	kg Sb eq	9.95E-05	6.40E-07	4.06E-07	6.27E-06	1.51E-07	2.68E-04	3.99E-07	-2.69E-04
GWP-GHG	kg CO2 eq	1.13E+01	2.16E-01	2.16E+00	4.75E+00	6.52E-02	2.91E+00	1.11E-01	-3.09E+00

Resource use/waste production/outflows

The LCIA results of the primary renewable / non-renewable energy demand, and waste / hazardous waste, water consumption as well as outflows for Acoustic Wooden Slats Wall Panel G1 are depicted in table below.

Table 7: Resource use/waste production/outflows for Acoustic Wooden Slats Wall Panel G1 (per m² product)

Impact category	Unit	Upstream			Downstream				
		A1	A2	A3	C1	C2	C3	C4	D
PENRE	MJ	2.14E+02	3.25E+00	2.35E+01	6.66E+01	9.86E-01	4.12E+01	1.73E+00	-4.39E+01
PERE	MJ	8.31E+01	4.52E-02	1.13E+00	7.62E-01	1.31E-02	1.57E+01	8.77E-02	-1.58E+01
PENRM	MJ	1.01E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERM	MJ	2.23E-01	0.00E+00	5.98E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	2.14E+02	3.25E+00	2.35E+01	6.66E+01	9.86E-01	4.12E+01	1.73E+00	-4.39E+01
PERT	MJ	8.31E+01	4.52E-02	1.13E+00	7.62E-01	1.31E-02	1.57E+01	8.77E-02	-1.58E+01
FW	m3	9.78E+00	4.22E-02	5.39E-02	1.33E+00	1.17E-02	4.96E+00	1.13E-01	-5.09E+00
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
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
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
HWD	kg	0.00E+00	0.00E+00	1.04E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	0.00E+00	0.00E+00	2.60E-01	0.00E+00	0.00E+00	0.00E+00	7.27E+00	-7.27E+00

RWD	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
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
MRF	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
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
ETE	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
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

Caption:
PENRE: Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw material
PERE: Use of renewable primary energy excluding renewable primary energy resources used as raw material
PENRM: Use of non-renewable primary energy resources used as raw material
PERM: Use of renewable primary energy resources used as raw material
PENRT: Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)
PERT: Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)
FW: Net use of fresh water
SM: Use of secondary raw materials
RSF: Use of renewable secondary fuels
NRSF: Use of non-renewable secondary fuels
HWD: Hazardous landfill waste
NHWD: Non-hazardous waste disposed
RWD: Radioactive waste disposed
MER: Materials for energy recovery
MRF: Materials for energy recovery
CRU: Components for reuse
ETE: Exported thermal energy
EEE: Exported electricity energy

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Additional environmental information

Assumptions

The key assumptions of this LCA study are as follows：

- For missing background data, the substitution of missing data using a similar background data approach was taken to shorten the gap. In this study, the second main component of the glue, Cyclohexane is used as the substitute.

- The end-of-life stage is mainly assumed, namely, the de-construction and demolition of the Acoustic Wooden Slats Wall Panel G1 (C1), waste processing (C3), and disposal is assumed to be landfill and incineration (C4).

- During the end-of-life stage, the transportation of the waste to treatment facilities including recycling, landfill, or incineration center is assumed to be 100 km for simplification purposes (C2).

The contribution analysis results of main life cycle stages are demonstrated that A1 has the largest impact, followed by C1 and C3. In terms of the raw materials stage (A1), the consumption of MDF contributes the main environmental impact for the most impact categories, followed by PET. For example, for the impact categories like climate change -biogenic MDF contribute the most impact, which is over 90%. As for the impact category of climate change, ozone depletion, climate change-fossil, resource use, fossils, and resource use, minerals and metals, the biggest impact comes from the consumption of PET.

Cut-off rules

Cut-off criteria were applied to capital equipment production and maintenance. It was assumed that the impacts associated with these aspects were small enough to fall below cut-off threshold when it is scaled down to the declared unit.

The following procedure was followed for the exclusion of inputs and outputs:

- All inputs and outputs to a (unit) process will be included in the calculation for which data is available. Data gaps may be filled by conservative assumptions with average or generic data. Any assumptions for such choices will be documented;

- According to PCR 2019:14 Construction products (EN 15804:A2) (VERSION1.2.5, VALID UNTIL: 2024-12-20), data for elementary flows to and from the product system contributing to a minimum of 99% of the declared environmental impacts shall be included. But in this study, the additives and catalysts are all included.

Electricity mix

Different electricity mix is used based on grid mixes of ███ The electricity inventory is based on the year 2018 for ██████ electricity generation (████ Energy Statistics Yearbook 2019). For both the upstream and core process, the production of Acoustic Wooden Slats Wall Panel G1takes place in Jiangsu province, so the Eastern China grid electricity mix is used.
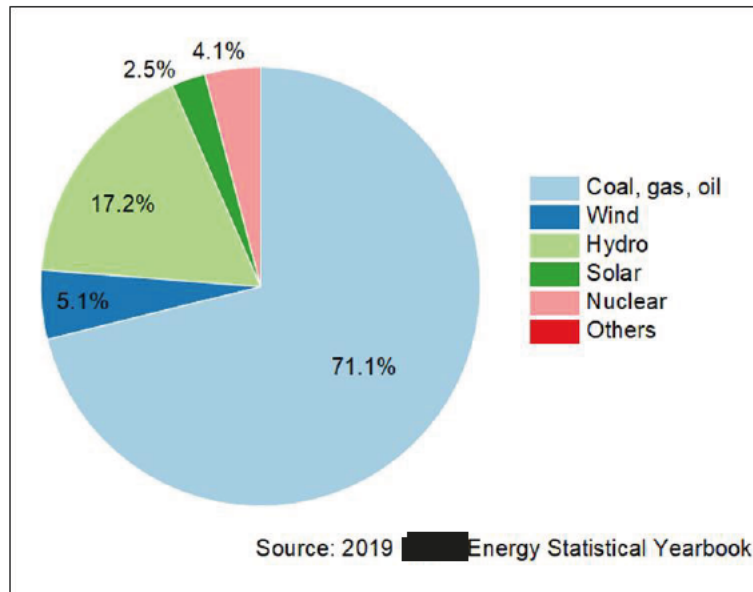

Figure 3: ██████ electricity production mix-2018

Reference

[1] Life cycle assessment (LCA) of wooden slats acoustic panel G1 version3.1. 3rd February 2023.

[2] ISO 14040:2006/Amd 1:2020 Environmental management — Life cycle assessment — Principles and framework — Amendment 1

[3] ISO 14044:2006/Amd 2:2020 Environmental management — Life cycle assessment — Requirements and guidelines — Amendment 2

[4] PCR 2019:14 Construction products (EN 15804:A2) (VERSION 1.2.5, VALID UNTIL: 2024-12-20).

[5] c-PCR-014 Acoustical ceiling and wall solutions (VERSION: 2022-01-28 , VALID UNTIL: 2024-12-20).

[6] Ecoinvent Association, 2021. Ecoinvent Data v3.8 Final Reports. Available from:https://ecoinvent.org/the-ecoinvent-database/data-releases/ecoinvent-3-8/.

[7] EN 15804:2012+A2:2019/AC:2021, Sustainability of construction works — Environmental product declarations — Core rules for the product category of construction products.EN

[8] EPD International (2021) General Programme Instructions for the International EPD® System. Version 4.0. www.environdec.com.