

Environmental Product Declaration

In accordance with ISO14025:2006 and EN15804:2012+A2:2019

Packaged Wood Pellets



Owner of the declaration:

Dansk Træemballage A/S
Banevej 3, Håstrup 5600 Fåborg,
Denmark

Product name:

Packaged Wood Pellets

Declared unit:

1 ton of wood pellets

Product category /PCR:

NPCR 015 version 3.0. PCR – Part B for wood
and wood-based products.

Program holder and publisher:

The Norwegian EPD foundation

Declaration number:

NEPD-6459-5720-EN

Registration number:

NEPD-6459-5720-EN

Issue date: 22.04.2024

Valid to: 22.04.2029

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General information

Product:

Packaged Wood Pellets

Program operator:

The Norwegian EPD Foundation
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Declaration number:

NEPD-6459-5720-EN

This declaration is based on Product Category Rules:

NPCR 015 – Part B for wood and wood-based products.

Statement of liability:

The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer, life cycle assessment data and evidences.

Declared unit:

1 ton of wood pellets

Verification:

Independent verification of the declaration and data, according to ISO14025:2010

Internal

External



Martin Erlandsson,
IVL Swedish Environmental Research Institute

Independent verifier approved by EPD Norway

Owner of the declaration:

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Manufacturer:

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Place of production:

Ørstedvej 71, 6760 Ribe, Denmark

Management system:

ISO 45001 and ISO 50001

Organisation no:

DK 1182 6687

Issue date:

22.04.2024

Valid to:

22.04.2029

Year of study:

2020

Comparability:

EPD of construction products may not be able to compare if they do not comply with EN 15804 and are seen in a building context.

The EPD has been worked out by:

Niras A/S



Approved by Manager of EPD Norway

Product

Product description:

Wood pellets used as burning material for pellet boilers and other pellet-burning appliances in buildings.

Wood pellets	Value	Unit
Declared unit	1	ton
Conversion factor to 1 kg	0.001	-

Product specification:

The wood pellets are produced from wood chips and sawdust from the sawmill at Dansk Træemballage A/S's site in Ribe.

Wood chips are shredded in a hammer mill, after which wood chips and sawdust are transferred into the drying plant, where the moisture content of the material is reduced to about 10%. All the material is once again shredded in the next hammer mill, to a uniform and homogeneous material. Water is added to the material before it enters the pellet mill. At the pellet mill large wheels squeeze the material through pressure channels in the die, thereby creating heat and pressure which releases the lignin into the wood, after which the wood pellets get their shape and stability, and the moisture content is reduced.

The wood pellets are packaged in FFS film of LDPE, stacked on euro pallets and covered with a flexible plastic hood of LDPE as a protective barrier.

All pellets are produced according to ENplus A1. A uniform length of the pellets is secured by using HD technology.

Materials for 1 ton of wood pellets	%	Value	Unit
Sawdust	92.6%	926.0	kg
Moisture in wood pellets	7.4%	74.0	kg
Sum	100.0%	1000	kg

Packaging for 1 ton of wood pellets	Value	Unit
FFS film, LDPE	3.3	kg
Flexible plastic hood, LDPE	0.2	kg
Europallet	1.1	kg
Total sum of wood pellets and packaging	1004.5	kg

Technical data:

The technical specifications for the wood pellets as burning material is listed below.

Materials for 1 ton of wood pellets	Value	Unit
Density	660	kg/m ³
Moisture content	7.4 ± 0.33	%
Net Calorific Value	17.3	MJ/kg

Market:

Denmark

LCA: Calculation rules

Declared unit:

1 ton of wood pellets

Cut-off criteria:

The general rules apply for exclusion of inputs and outputs in the LCA, is in compliance with the rules in EN 15804:2012+A2:2019, 6.3.5, where the omission for input-flows pr. module must be maximum 5 % of energy usage and mass and at most 1 % of renewable and non-renewable primary energy usage and mass for unit processes. In addition, particular care has been taken to include materials and flows known to have the potential to cause significant emissions into air, water and soil related to the environmental indicators assessed in this study. In this respect, conservative assumptions in combination with plausibility considerations and expert judgement has been used to demonstrate compliance with this criterion.

Allocation:

Allocation is done in accordance with the provisions of EN 15804+A2. Throughout this study a principle of separating processes to avoid allocation has been applied where disaggregated data is available. Additionally, a principle of economic allocation has been applied due to a difference in revenue between products greater than 25%. Economic allocation is applied for all materials except for wood and wood-based products.

For the allocation of wood and wood based products, which contains biogenic carbon, an allocation of mass is applied, to keep the balance of biogenic carbon intact. The transportation of the wood is equally allocated by mass.

Data quality:

Product specific data is delivered by Dansk Træemballage A/S. Product specific data is sourced from the production site of Ørstedvej 71, 6760 Ribe, Denmark. Product specific data is from the year of 2020 collected in 2023. Generic data has been sources from Ecoinvent 3.9.1 (2022) – Cut-off by classification.

System boundary:

The system boundary for this EPD is cradle-to-gate with options, where module A1-A3 and A5 is declared. To balance out the flow of biogenic carbon throughout the lifecycle biogenic carbon is also declared in module B6, and all other impact categories are not declared in module B6. See figure 1 for an overview of the declared modules and system boundary.

System boundaries (X=included, MND=module not declared, MNR=module not relevant)

Product stage			Assembly stage		Use stage							End of life stage				Benefits & loads beyond system boundary
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	X	MND	MND	MND	MND	MND	X*	MND	MND	MND	MND	MND	MND

Figure 1: System boundary of declared modules. *For module B6 only GWP-Biogenic is declared

Figure 2 shows the product system and which modules and processes are included in this study.

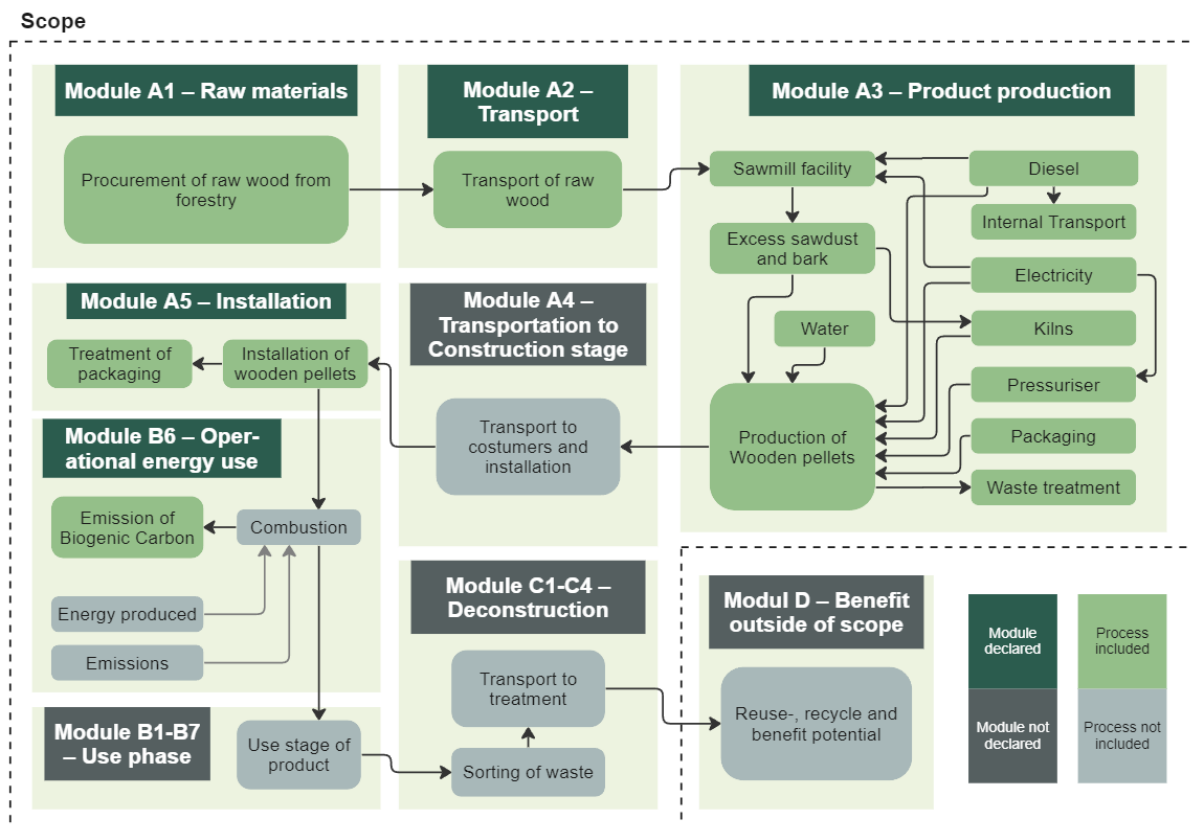


Figure 2: Product system of declared modules and included processes

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

Assembly (A5)

The wood pellets are installed in the pellet-burning appliance, where it is assumed that all pellets can be utilised, resulting in no waste of wood pellets. In this module the emissions of biogenic carbon is included in the calculations, to balance the input and output of biogenic carbon throughout the life cycle. The emissions to air from incinerating the wood pellets is however not included, as this greatly depends on the method of incineration, and would be assessed separately in module B. A theoretical calorific value for 1 ton of wood pellets is also presented.

The product packaging is removed by the customer and is treated by the customer. As Dansk Træemballage sells wooden pellets packaged in bags to private customers, a statistics of how plastic waste is sorted and treated is used for the waste treatment of the product packaging from the report *“Statistik for emballageforsyning og indsamling af emballageaffald 2021 – Emballage statistic 2021”* (The Danish Environmental- and food Ministry, 2023), and the values for modelling the recycling of LDPE plastic packaging is based on the report by The Danish Environmental- and food Ministry, 2019.

Based on the reports 46% of the LDPE is recycled and 54% is incinerated at municipal level. For the Europallet, a conservative estimate is utilised, where 100% of the Europallet is incinerated.

Installation of 1 ton of wood pellets	Unit	Value
Material loss	ton	0
Calorific value	17,300.0	MJ/ton

Waste treatment of packaging per 1 ton of wood pellets	Unit	Value
Recycling of LDPE packaging	kg	1.6
Incineration of LDPE packaging	kg	1.9
Incineration of Europallet	kg	1.1

Operational energy consumption (B6)

In module B6, only the emissions of biogenic carbon is declared to balance out the biogenic carbon throughout the life cycle of the wood pellets. Due to varying emissions during usage in different pellet boilers, the emissions related to incinerating wood pellets and the energy produced thereby is not declared in this module. Therefore, there is referred to generic datasets for incineration of wood in pellets boilers, in accordance with EN 15804:2012+A2:2019.

Emissions during B6 per 1 ton of wood pellets	Unit	Value
Emissions of Biogenic Carbon	kg CO ₂ eq.	1707.0

The following datasets are applicable for usage scenarios in module B6:

- [Usage – pellet boiler 20-120 kW; <20 kW \(en\) en de](#)
- [Usage – pellet boiler <20 kW; <20 kW \(en\) en de](#)

LCA: Results

The following tables show the results of the Life Cycle assessment for 1 ton of Packaged Wood Pellets.

Core environmental impact indicators

Indicator	Unit	A1	A2	A3	A5	B6
GWP - total	kg CO ₂ eq	-1.83E+03	4.66E+01	2.33E+02	9.86E+00	N/A
GWP - fossil	kg CO ₂ eq	3.00E+01	2.31E+01	2.29E+01	4.02E+00	N/A
GWP - biogenic	kg CO ₂ eq	-1.86E+03	2.35E+01	2.10E+02	5.84E+00	1.71E+03*
GWP - luluc	kg CO ₂ eq	2.24E+00	1.50E-02	1.62E-02	4.56E-04	N/A
ODP	kg CFC11 eq	6.02E-07	4.82E-07	2.95E-07	1.01E-08	N/A
AP	molc H+ eq	1.37E-01	1.17E-01	6.70E-01	1.80E-03	N/A
EP- freshwater	kg P eq	3.16E-02	3.19E-03	6.11E-03	1.28E-04	N/A
EP -marine	kg N eq	5.93E-02	3.57E-02	3.09E-01	7.90E-04	N/A
EP - terrestrial	molc N eq	5.37E-01	3.81E-01	3.43E+00	7.38E-03	N/A
POCP	kg NMVOC eq	7.15E-01	1.43E-01	8.47E-01	1.95E-03	N/A
ADP-M&M ²	kg Sb-Eq	7.23E-05	6.12E-05	3.37E-04	1.03E-06	N/A
ADP-fossil ²	MJ	4.21E+02	3.36E+02	4.51E+02	3.72E+00	N/A
WDP ²	m ³	5.30E+00	1.68E+00	7.33E+00	1.44E-01	N/A

GWP-total: Global Warming Potential; **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; See "additional Norwegian requirements" for indicator given as PO₄ eq. **EP-marine:** Eutrophication potential, fraction of nutrients reaching freshwater end compartment; **EP-terrestrial:** Eutrophication potential, Accumulated Exceedance; **POCP:** Formation potential of tropospheric ozone; **ADP-M&M:** Abiotic depletion potential for non-fossil resources (minerals and metals); **ADP-fossil:** Abiotic depletion potential for fossil resources; **WDP:** Water deprivation potential, deprivation weighted water consumption.

*GWP-biogenic is declared for module B6 to balance out the content of biogenic carbon in the life cycle

Additional environmental impact indicators

Indicator	Unit	A1	A2	A3	A5	B6
PM	Disease incidence	1.56E-06	2.16E-06	1.95E-05	1.72E-08	N/A
IRP ¹	kBq U235 eq.	7.26E-01	6.73E-01	3.07E+00	5.36E-02	N/A
ETP-fw ²	CTUe	3.91E+02	1.58E+02	1.88E+02	2.78E+00	N/A
HTP-c ²	CTUh	6.79E-08	1.27E-08	4.55E-08	7.51E-10	N/A
HTP-nc ²	CTUh	1.98E-07	2.33E-07	1.31E-06	1.19E-08	N/A
SQP ²	Dimensionless	9.47E+04	4.24E+02	1.09E+02	3.23E+00	N/A

PM: Particulate matter emissions; **IRP:** Ionising radiation, human health; **ETP-fw:** Ecotoxicity (freshwater); **ETP-c:** Human toxicity, cancer effects; **HTP-nc:** Human toxicity, non-cancer effects; **SQP:** Land use related impacts / soil quality

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.

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

Resource use

Parameter	Unit	A1	A2	A3	A5	B6
RPEE	MJ	1.80E+01	8.01E+00	2.62E+03	1.89E+01	2.07E+04
RPEM	MJ	2.26E+04	0.00E+00	-1.94E+03	-1.67E+01	-2.07E+04
TPE	MJ	2.26E+04	8.01E+00	6.79E+02	2.24E+00	3.24E+00
NRPE	MJ	4.23E+02	3.33E+02	3.64E+02	1.50E+02	N/A
NRPM	MJ	0.00E+00	0.00E+00	1.46E+02	-1.46E+02	N/A
TRPE	MJ	4.23E+02	3.33E+02	5.10E+02	3.72E+00	N/A
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	N/A
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	N/A
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	N/A
W	m ³	2.02E-01	6.06E-02	2.84E-01	8.04E-03	N/A

RPEE Renewable primary energy resources used as energy carrier; *RPEM* Renewable primary energy resources used as raw materials; *TPE* Total use of renewable primary energy resources; *NRPE* Nonrenewable primary energy resources used as energy carrier; *NRPM* Nonrenewable primary energy resources used as materials; *TRPE* Total use of non-renewable primary energy resources; *SM* Use of secondary materials; *RSF* Use of renewable secondary fuels; *NRSF* Use of non-renewable secondary fuels; *W* Use of net fresh water.

End of life – Waste

Parameter	Unit	A1	A2	A3	A5	B6
HW	kg	2.94E-03	1.98E-03	1.26E-03	1.25E-05	N/A
NHW	kg	4.68E+00	2.58E+01	4.93E+00	4.11E-02	N/A
RW	kg	1.77E-04	1.76E-04	7.12E-04	1.26E-05	N/A

HW Hazardous waste disposed; *NHW* Non-hazardous waste disposed; *RW* Radioactive waste disposed.

End of life – output flow

Parameter	Unit	A1	A2	A3	A5	B6
CR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	N/A
MR	kg	0.00E+00	0.00E+00	1.18E-01	1.59E+00	N/A
MER	kg	0.00E+00	0.00E+00	1.68E-01	2.96E+00	N/A
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	N/A
ETE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	N/A

CR Components for reuse; *MR* Materials for recycling; *MER* Materials for energy recovery; *EEE* Exported electric energy; *ETE* Exported thermal energy.

Information describing the biogenic carbon content at the factory gate

Biogenic carbon content	Unit	Value
Biogenic carbon content in product	kg CO ₂ eq.	465.55
Biogenic carbon content in the accompanying packaging	kg CO ₂ eq.	0.50

Additional requirements

Location based electricity mix from the use of electricity in manufacturing

National production mix from import, low voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process (foreground/core) per functional unit.

National electricity grid	Data source	Foreground / core [kWh]	GWP _{total} [kg CO ₂ -eq/kWh]	SUM [kg CO ₂ -eq]
<i>Electricity, medium voltage {DK} market for Cut-off, U</i>	Ecoinvent 3.9.1	156.36	0.22	35.03

Guarantees of origin from the use of electricity in the manufacturing phase

In the production of wood pellets electricity is used to operate the pressuriser and the sawmill. DTE has purchased RECS-certificates for wind energy covering their entire production at the site of Ørstedvej 71, including other wood based products. The purchased RECS-certificates adhere to the requirements defined in CEN/TR 15941:2010 for GoOs (Guarantees of Origin).

Electricity source	Foreground / core [kWh]	GWP _{total} [kg CO ₂ -eq/kWh]	SUM [kgCO ₂ -eq]
Guarantee of origin electricity used in the foreground	156.36	0.02	3.49
Residual mix electricity used in the foreground	0	-	-

The guarantee of origin utilized in this EPD is provided by SEAS-NVE with a guarantee of wind from unspecified danish wind turbines in the time periods 01.09.2019-31.12.21 and 01.01.2022-31.12.2023 which covers an annual consumption of 54.183. 577 kWh and 46.046.612 kWh. Additionally Energi Fyn has provided guarantee of origin from danish wind turbines in the time period 01.01.2024-31.12.2024 which covers an annual consumption of 23.000.000 kWh. Dansk Træemballage A/S's site of Ørstedvej 71 has in the year 2020 consumed 16,911,206.00 kWh, which covers the entire electricity consumption of the site, including wood pellet factory and other wood-based products. As all of the electricity consumed is covered by guarantee of origin certificates, no residual mix is utilised.

Additional environmental impact indicators required for construction products

In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator GWP-IOBC is required as it declares climate impacts calculated according to the principle of instantaneous oxidation. GWP-IOBC is also referred to as GWP-GHG in context to Swedish public procurement legislation.

Parameter	Unit	A1	A2	A3	A5	B6
GWP-IOBC	kg CO ₂ eq.	31.42	23.47	22.92	4.03	N/A

GWP-IOBC Global warming potential calculated according to the principle of instantaneous oxidation.

Hazardous substances

The declaration is based upon reference to threshold values and/or test results and/or material safety data sheets provided to EPD verifiers. Documentation available upon request to EPD owner.

- The product contains no substances given by the REACH Candidate list.
- The product contains substances given by the REACH Candidate list that are less than 0.1 % by weight.
- The product contains dangerous substances, more than 0.1% by weight, given by the REACH Candidate List, see table.
- The product contains no substances given by the REACH Candidate list.
- The product is classified as hazardous waste, see table.

Indoor environment







No assessment has been made for the indoor environment, as this is not relevant for burning materials in wood burning appliances.

Carbon footprint

Carbon footprint has not been worked out for the product.

Bibliography

ISO 14025:2010	Environmental labels and declarations - Type III environmental declarations - Principles and procedures
ISO 14044:2006	Environmental management - Life cycle assessment - Requirements and guidelines
EN 15804:2012+A2:2019	Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products
ISO 21930:2007	Sustainability in building construction - Environmental declaration of building products
NPCR 015:2019 v4.0	Part B for wood and wood-based products, The Norwegian EPD foundation
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LCA report Niras A/S, March 2024	Environmental Product Declaration. Wood Pellets Dansk Træemballage A/S

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