

**NORWEGIAN INTERIOR WOOD
PANEL
(CRUDE WOOD)**



Figure 1

NEPD nr: 085E

Approved according to ISO 14025, § 8.1.4

Approved 01-02-2010

Valid until 01-02-2013

Svein Fossdal

Verification

Independent verification of data and other environmental information has been carried out by Anne Rønning (Østfoldforskning), in accordance with ISO 21930, § 9.1

Anne Rønning

The declaration has been prepared by:

Catherine Grini, SINTEF Byggeforsk

Catherine Grini

PCR

NPCR 015 Solid wood products, approved by the NEPD verification committee, has been applied.

About EPD

EPD from other program operators than The Norwegian EPD Foundation may not be comparable.

Manufacturer information

Organisation Treindustrien
 Adress Forskningsveien 3 B, 0373 Oslo
 Contact person Knut Einar Fjulsrud
 Organisation no. 980 308 952
 ISO 14001/EMAS: _____

Product information

Scope of assessment cradle to grave
 Functional unit (FU) 1 m² of planed interior cladding, installed and maintained with an expected average service life of 30 years. Calculations are based on a thickness of 14mm. Conversion to other thicknesses has to be done in proportion to volume. All figures in this document refers to 1 functional unit (FU).
 Expected service life 30 years
 Year of study 2009, with data collection representing 2007
 Production area Norway
 Expected market area Norway

Product description
 Interior wood panel is a name for planed timber products used as interior cladding on walls or on roof. The EPD for Norwegian interior wood panel is based on timbers/sawn dried timbers used in Norway. Companies that procure data collection are producing interior wood panel of spruce and pine with moisture content of 10-14%, 14-18% and 18-20%. It has been assumed 5% wastage on the building site and 5% replacement during the use stage. Interior wood panels have usually tongue and groove and do not require overlap. Nails are not included.

Origin of round timber 95% of round timbers used in the production of interior wood panel in Norway are certified in accordance with PEFC's standard.

Environmental indicators

Global warming	0,4 kg CO ₂ -eq.
Energy consumption	32 MJ
Amount of renewable materials	100 %
Indoor classification (according to EN 15251:2007)	not measured

Product specification

Composition of final product

Table 1

Material	Unit	Quantity	Part [%]	Data quality
Wood	m ³	0,014	100 %	Specific data
SUM	m ³	0,014	100 %	

Resource consumption

Material resources

Table 2

Material resources	Raw materials	Production	Building site	Use stage	Demolition	Transport	Total
New, renewable resources							
Timber (without bark) [m ³]	0,0162	0	0	0	0	0	0,0162
Bark [m ³]	0,0018	0	0	0	0	0	0,0018
Water (fresh) [kg]	7,29	0,38	0,02	0,01	0,02	0,04	7,75
Air [kg]	0,02	0,07	0,01	0,01	0,01	0,03	0,15
Other [kg]	9,2E-07	5,6E-04	5,2E-06	2,6E-06	4,9E-06	5,7E-05	6,3E-04
New, non-renewable resources							
Crude oil [kg]	2,26E-03	1,00E-02	8,94E-05	3,80E-05	7,25E-05	1,27E-01	1,40E-01
Inert rock [kg]	2,00E-04	2,00E-02	4,45E-03	2,22E-03	4,24E-03	1,49E-02	4,60E-02
Natural gas [kg]	1,10E-04	7,24E-03	3,77E-04	1,88E-04	3,59E-04	6,80E-03	1,51E-02
Limestone [kg]	8,00E-06	4,76E-03	1,08E-03	5,39E-04	1,03E-03	2,42E-04	7,65E-03
Hard coal [kg]	8,14E-06	4,40E-03	6,15E-04	3,07E-04	5,85E-04	5,52E-04	6,47E-03
Soil [kg]	2,63E-06	3,98E-03	9,02E-04	4,51E-04	8,59E-04	3,20E-05	6,23E-03
Lignite [kg]	8,00E-06	7,54E-04	1,68E-04	8,39E-05	1,60E-04	5,43E-04	1,72E-03
Other (ore without minerals and elements) [kg]	1,13E-06	4,61E-04	1,04E-04	5,20E-05	9,91E-05	6,93E-05	7,87E-04
Heavy spar [kg]	3,29E-06	8,72E-06	4,86E-07	2,28E-07	4,35E-07	2,87E-04	3,01E-04
Clay [kg]	4,39E-07	1,66E-04	3,74E-05	1,87E-05	3,56E-05	3,18E-05	2,90E-04
Iron [kg]	8,16E-07	1,17E-04	2,16E-05	1,08E-05	2,06E-05	5,00E-05	2,21E-04
Gypsum [kg]	1,13E-07	1,10E-04	2,48E-05	1,24E-05	2,36E-05	4,42E-06	1,75E-04
Quartz sand [kg]	4,21E-07	1,66E-05	3,55E-06	1,78E-06	3,38E-06	3,86E-05	6,43E-05
Peat [kg]	1,92E-07	1,79E-05	7,14E-09	2,84E-09	5,40E-09	1,40E-05	3,21E-05
Sodium chloride (rock salt) [kg]	1,51E-08	1,08E-05	8,79E-07	4,40E-07	8,37E-07	1,18E-07	1,31E-05
Aluminum [kg]	2,60E-09	5,37E-06	1,20E-06	6,02E-07	1,15E-06	4,75E-08	8,38E-06
Zinc [kg]	6,58E-09	5,08E-06	5,73E-07	2,86E-07	5,45E-07	4,94E-07	6,98E-06
Copper [kg]	2,56E-09	2,86E-06	6,47E-07	3,23E-07	6,16E-07	1,36E-07	4,58E-06
Chromium [kg]	1,43E-09	2,88E-06	6,45E-07	3,23E-07	6,14E-07	9,83E-09	4,48E-06
Manganese [kg]	5,39E-09	2,01E-06	4,54E-07	2,27E-07	4,32E-07	4,07E-07	3,54E-06
Lead [kg]	1,29E-08	6,10E-07	1,28E-07	6,37E-08	1,21E-07	1,11E-06	2,05E-06
Unspecified [kg]	1,39E-09	4,01E-06	4,92E-07	2,46E-07	4,69E-07	5,65E-08	5,28E-06
Feedstock energy, renewable resources [MJ]							116,45
Feedstock energy, non-renewable resources [MJ]							0,62

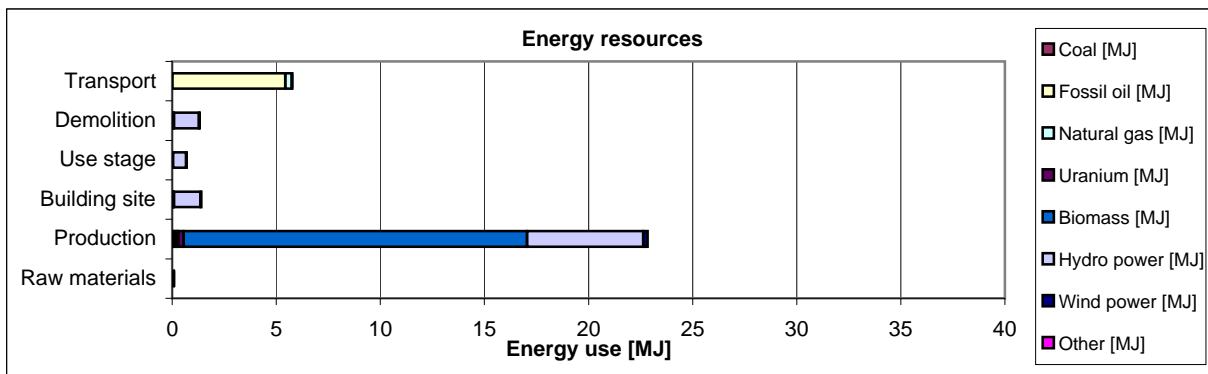
Land use and water resources

Land use has not been quantified. Water consumption is included in Table 2.

Energy resources

Energy carrier distribution for each life cycle fase

Figure 2



Energy consumption specified for the different energy carrier and life cycle stages

Table 3

	Raw materials	Production	Building site	Use stage	Demolition	Transport	Total
Fossil energy							
Coal [MJ]	3,0E-04	7,8E-02	1,8E-02	8,8E-03	1,7E-02	2,0E-02	0,14
Fossil oil [MJ]	9,7E-02	1,4E-01	3,8E-03	1,6E-03	3,1E-03	5,4E+00	5,66
Natural gas [MJ]	5,0E-03	8,5E-02	1,8E-02	8,8E-03	1,7E-02	3,1E-01	0,44
Uranium [MJ]	4,7E-04	2,5E-01	5,7E-02	2,9E-02	5,5E-02	2,9E-02	0,42
Renewable energy							
Biomass [MJ]	2,0E-03	1,6E+01	1,4E-05	7,0E-06	1,3E-05	1,4E-06	16,49
Hydro power [MJ]	2,2E-03	5,6E+00	1,3E+00	6,3E-01	1,2E+00	6,4E-03	8,70
Wind power [MJ]	8,0E-05	2,1E-01	4,8E-02	2,4E-02	4,6E-02	6,2E-04	0,33
Other [MJ]	8,8E-06	1,8E-04	3,4E-05	1,7E-05	3,2E-05	5,5E-04	8,3E-04
Total [MJ]							32,20

The calculation of electricity use is based on Nordel-mix consumed in Norway in 2007.

Emissions and environmental impacts

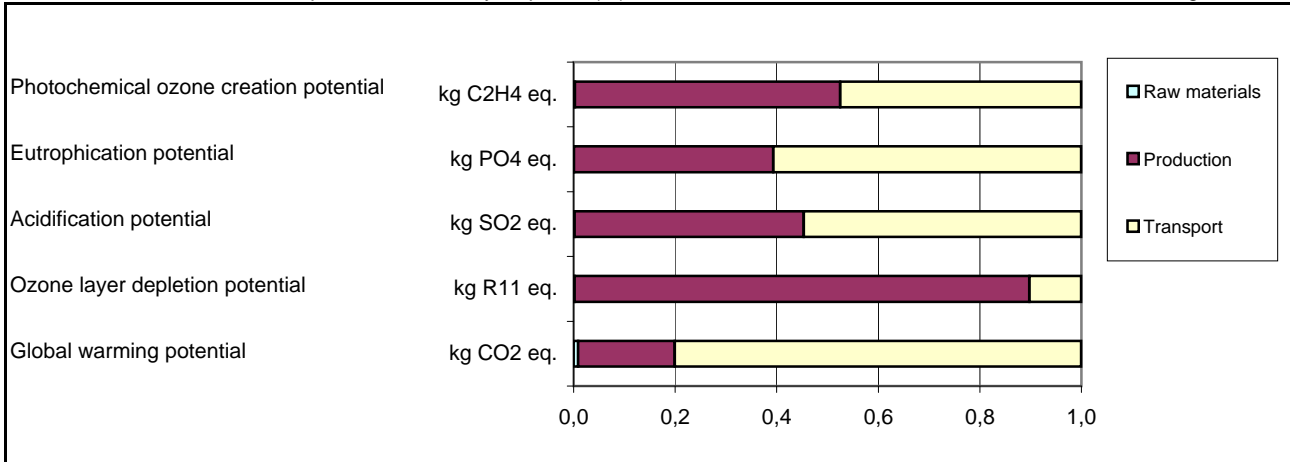
Environmental impacts

Table 4

Indicator	Unit	Raw materials	Production	Building site	Use stage	Demolition	Transport	Total
Global warming potential	kg CO ₂ eq.	3,6E-03	8,1E-02	7,8E-03	3,9E-03	7,4E-03	3,4E-01	0,44
Ozone layer depletion potential	kg R11 eq.	1,3E-11	6,8E-09	1,5E-09	7,7E-10	1,5E-09	7,8E-10	1,1E-08
Acidification potential	kg SO ₂ eq.	8,5E-06	2,3E-03	6,4E-06	3,2E-06	6,1E-06	2,8E-03	0,005
Eutrophication potential	kg PO ₄ eq.	6,6E-07	3,1E-04	9,1E-07	4,5E-07	8,7E-07	4,8E-04	0,001
Photochemical ozone creation potential	kg C ₂ H ₄ eq.	1,2E-06	2,3E-04	4,9E-07	2,4E-07	4,6E-07	2,1E-04	0,0004

Distribution of environmental impact for each life cycle phase (%)

Figure 3



Emissions and waste

Table 5

	Raw materials	Production	Building site	Use stage	Demolition	Transport	Total
Emissions to air							
NH ₃ [g]	7,7E-05	3,3E-01	1,3E-05	6,5E-06	1,2E-05	2,2E-03	0,332
CO ₂ [g]	3,5E+00	4,9E+01	7,6E+00	3,8E+00	7,3E+00	3,3E+02	398,56
CO [g]	1,6E-03	5,0E+00	2,3E-03	1,1E-03	2,2E-03	5,9E-01	5,579
HCl [g]	1,0E-05	9,8E-04	3,0E-05	1,5E-05	2,9E-05	5,1E-04	1,6E-03
Hg [g]	9,6E-09	2,6E-07	4,9E-08	2,5E-08	4,7E-08	3,8E-07	7,7E-07
CH ₄ [g]	4,7E-03	2,6E-01	5,4E-03	2,7E-03	5,1E-03	3,9E-01	0,669
N ₂ O [g]	6,7E-05	8,3E-02	7,1E-05	3,5E-05	6,7E-05	5,6E-03	0,089
NO _x [g]	4,1E-03	1,3E+00	5,8E-03	2,9E-03	5,5E-03	3,6E+00	4,959
NM VOC [g]	2,5E-03	4,1E-02	3,6E-04	1,8E-04	3,4E-04	2,4E-01	0,285
Particles [g]	1,7E-04	1,0E-02	5,9E-04	3,0E-04	5,7E-04	6,4E-02	0,076
Pb [g]	1,7E-07	8,1E-06	1,8E-06	8,9E-07	1,7E-06	6,1E-06	1,9E-05
SO ₂ [g]	5,4E-03	7,3E-01	2,3E-03	1,1E-03	2,1E-03	2,1E-01	0,956
Emissions to water							
BOD [g]	8,6E-06	5,0E-04	8,1E-06	4,0E-06	7,7E-06	5,1E-04	1,0E-03
COD [g]	3,0E-04	2,5E-02	4,6E-03	2,3E-03	4,4E-03	1,6E-02	0,052
N [g]	1,5E-05	5,6E-04	1,0E-04	5,1E-05	9,7E-05	4,6E-04	1,3E-03
P [g]	3,6E-06	1,6E-05	8,6E-07	4,2E-07	8,1E-07	1,5E-04	1,7E-04
Waste							
Waste to landfill [kg]	1,9E-04	2,5E-02	1,3E-02	2,7E-03	5,2E-03	1,5E-02	0,061
Hazardous waste [kg]	1,9E-04	5,0E-02	5,5E-03	2,7E-03	5,2E-03	1,5E-02	0,078

Waste treatment of final product

100% of norwegian interior wood panel (crude wood) will go to material recycling or energy recovery.

Use of chemicals

Chemicals

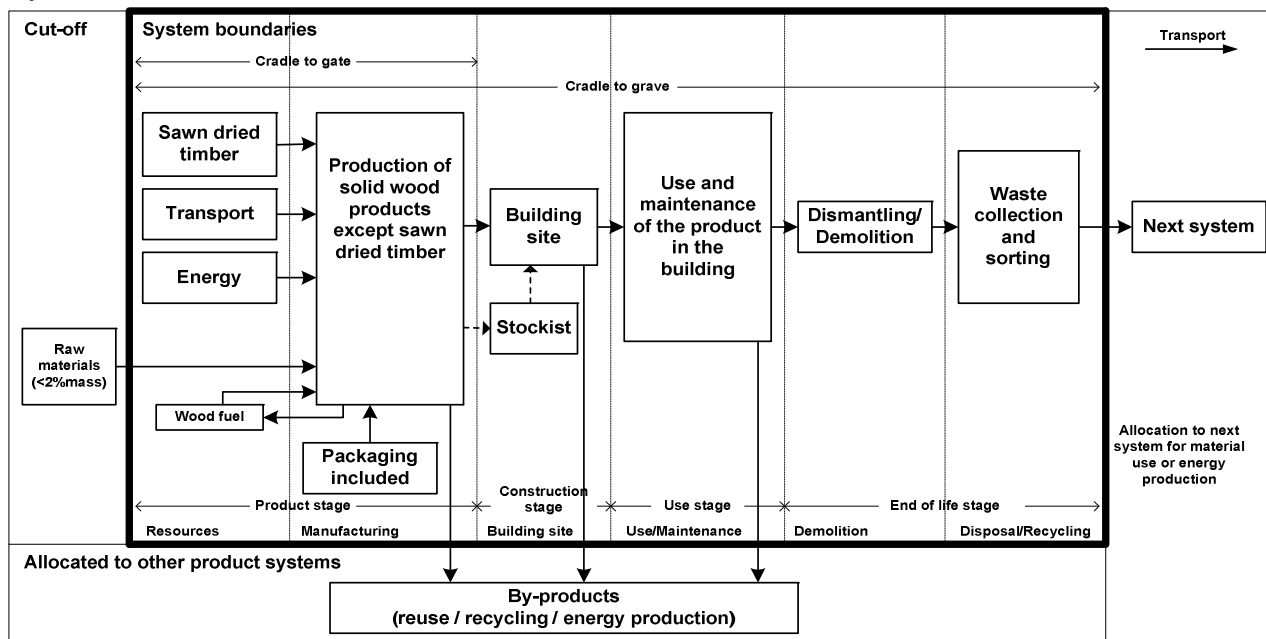
Table 6

Description	Quantity	CAS-nr.	R-phrases	Health ^[4]	Environment ^[4]
Lambda-cyhalotrin [kg]	8,88E-08	91465-08-6	R21, R25, R26, R50/53	class 2	class 2
Imidacloprid [kg]	6,63E-08	13826-41-3	R22	class 4	-
Glyphosate [kg]	1,32E-06	1071-83-6	R41, R51/53	class 4	class 3

Methodology

System boundaries

Figure 4



References

- [1] NS-ISO 14025:2006, Environmental labels and declarations - Type III environmental declarations - Principles and procedures
- [2] ISO 21930:2007, Sustainability in building construction - Environmental declaration of building products
- [3] PCR for preparing an environmental product declaration (EPD) for solid wood products, NPCR 015 2009
- [4] Abrahamsen et al. (2008): "EPDs as a tool for documentation/information on chemicals and toxicity in the value chains of products - a pre-study for EPD Norge".
- [5] Flæte, Per Otto (2009): "Energiforbruk og utslipp fra skogproduksjonskjeden med utgangspunkt i aktivitetsdata fra 2007 - fra frø til industritomt"
- [6] Sintef Byggforsk (2009): "Environmental Product Declaration (EPD) of 9 solid wood products", rapport MIKADO
- [7] EN 15251:2007, Indoor environmental input parameters for design and assessment of energy performance of buildings addressing indoor air quality, thermal environment, lighting and acoustics