

NORWEGIAN PLANED STRUCTURAL TIMBER (CRUDE WOOD)

Treindustrien 



Figure 1

NEPD nr: 084E

Approved according to ISO 14025, § 8.1.4

Approved 01-11-2009

Valid until 01-11-2012

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
Address 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 m³ of planed structural timber, installed and maintained with an expected average service life of 60 years. Conversion from 1m³ to 1 meter planed structural timber with standard dimensions has to be done in proportion to volume (e.g.: figures from the EPD are multiplied by 0,000081 for dimension 9mm x 9mm.)
Expected service life 60 years
Year of study 2009, with data collection representing 2007
Production area Norway
Expected market area Norway

Product description

Planed structural timber is a generic term for wooden building materials that has been machined for its full length and width. The EPD for Norwegian planed structural timber is based on timbers/sawn dried timbers used in Norway. Companies that procure data collection are producing planed structural timber of spruce and pine with moisture content of 10-14%, 14-18% and 18-20%. The main part of the production is composed of spruce with moisture content of 14-18%. It has been assumed 5% losses on the building site.

Origin of round timber 95% of round timbers used in the production of norwegian planed structural timber are certified in accordance with PEFC's standard.

Environmental indicators

Global warming	28,9 kg CO ₂ -eq.
Energy consumption	1 964 MJ
Amount of renewable materials	100 %
Indoor classification (according to EN 15251:2007)	not relevant

Product specification

Composition of final product

Table 1

Material	Unit	Quantity	Part [%]	Data quality
Wood	m ³	1,00	100 %	Specific data
SUM	m ³	1,00	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]	1,102	0	0	0	0	0	1,10
Bark [m ³]	0,122	0	0	0	0	0	0,12
Water (fresh) [kg]	497,35	25,60	0,02	0,01	0,02	2,50	525,49
Air [kg]	1,07	4,60	0,02	0,01	0,01	2,10	7,81
Other [kg]	6,3E-05	3,8E-02	5,6E-06	2,6E-06	5,2E-06	3,9E-03	0,04
New, non-renewable resources							
Crude oil [kg]	1,54E-01	6,84E-01	9,84E-04	3,80E-05	7,61E-05	8,71E+00	9,55E+00
Inert rock [kg]	1,36E-02	1,36E+00	4,55E-03	2,22E-03	4,45E-03	1,02E+00	2,41E+00
Natural gas [kg]	7,52E-03	4,93E-01	4,25E-04	1,88E-04	3,77E-04	4,65E-01	9,67E-01
Limestone [kg]	5,46E-04	3,25E-01	1,08E-03	5,39E-04	1,08E-03	1,66E-02	3,45E-01
Hard coal [kg]	5,55E-04	3,00E-01	6,19E-04	3,07E-04	6,15E-04	3,77E-02	3,40E-01
Soil [kg]	1,79E-04	2,71E-01	9,02E-04	4,51E-04	9,02E-04	2,19E-03	2,76E-01
Lignite [kg]	5,46E-04	5,14E-02	1,72E-04	8,39E-05	1,68E-04	3,71E-02	8,95E-02
Other (ore without minerals and elements) [kg]	7,68E-05	3,14E-02	1,05E-04	5,20E-05	1,04E-04	4,74E-03	3,65E-02
Heavy spar [kg]	2,24E-04	5,95E-04	2,51E-06	2,28E-07	4,56E-07	1,96E-02	2,05E-02
Clay [kg]	2,99E-05	1,13E-02	3,76E-05	1,87E-05	3,74E-05	2,17E-03	1,36E-02
Iron [kg]	5,56E-05	7,97E-03	2,20E-05	1,08E-05	2,16E-05	3,42E-03	1,15E-02
Gypsum [kg]	7,71E-06	7,47E-03	2,48E-05	1,24E-05	2,48E-05	3,02E-04	7,84E-03
Quartz sand [kg]	2,87E-05	1,13E-03	3,83E-06	1,78E-06	3,55E-06	2,64E-03	3,80E-03
Peat [kg]	1,31E-05	1,22E-03	1,05E-07	2,84E-09	5,67E-09	9,56E-04	2,19E-03
Sodium chloride (rock salt) [kg]	1,03E-06	7,36E-04	8,80E-07	4,40E-07	8,79E-07	8,09E-06	7,47E-04
Zinc [kg]	4,49E-07	3,46E-04	5,76E-07	2,86E-07	5,73E-07	3,38E-05	3,82E-04
Aluminum [kg]	1,77E-07	3,66E-04	1,20E-06	6,02E-07	1,20E-06	3,24E-06	3,73E-04
Copper [kg]	1,74E-07	1,95E-04	6,48E-07	3,23E-07	6,47E-07	9,27E-06	2,06E-04
Chromium [kg]	9,78E-08	1,97E-04	6,45E-07	3,23E-07	6,45E-07	6,72E-07	1,99E-04
Manganese [kg]	3,67E-07	1,37E-04	4,57E-07	2,27E-07	4,54E-07	2,78E-05	1,66E-04
Lead [kg]	8,79E-07	4,16E-05	1,35E-07	6,37E-08	1,27E-07	7,60E-05	1,19E-04
Unspecified [kg]	1,02E-03	1,49E+00	4,97E-03	2,48E-03	4,97E-03	1,47E-02	1,52E+00
Feedstock energy, renewable resources [MJ]							7 200,00
Feedstock energy, non-renewable resources [MJ]							42,10

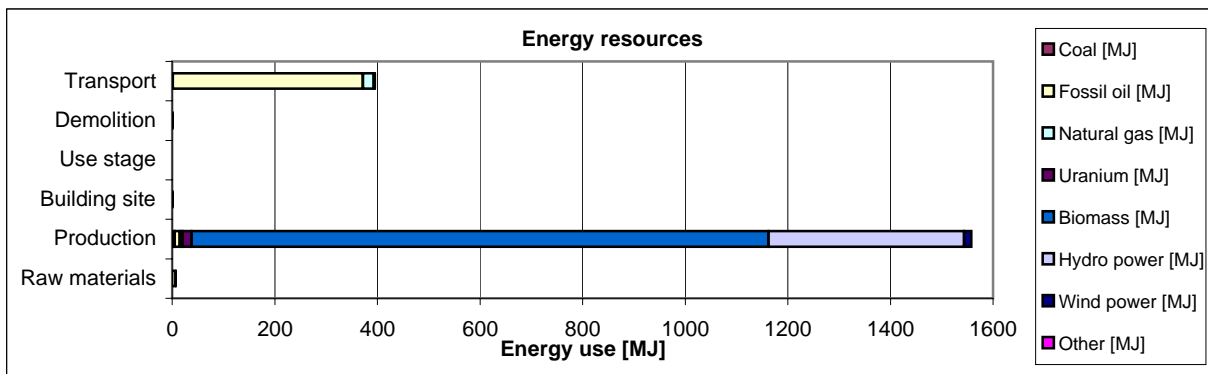
Land use and water resources

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]	0,02	5,30	0,02	0,01	0,02	1,38	6,74
Fossil oil [MJ]	6,58	9,59	0,04	0,002	0,003	370,31	386,53
Natural gas [MJ]	0,34	5,81	0,02	0,01	0,02	21,18	27,38
Uranium [MJ]	0,03	17,30	0,06	0,03	0,06	1,98	19,46
Renewable energy							
Biomass [MJ]	0,13	1124,51	1,4E-05	7,0E-06	1,4E-05	9,8E-05	1124,65
Hydro power [MJ]	0,15	381,21	1,27	0,63	1,27	0,44	384,96
Wind power [MJ]	0,01	14,56	0,05	0,02	0,05	0,04	14,73
Other [MJ]	6,0E-04	1,2E-02	3,8E-05	1,7E-05	3,4E-05	3,8E-02	0,05
Total [MJ]							1 964,49

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

Emissions and environmental impacts

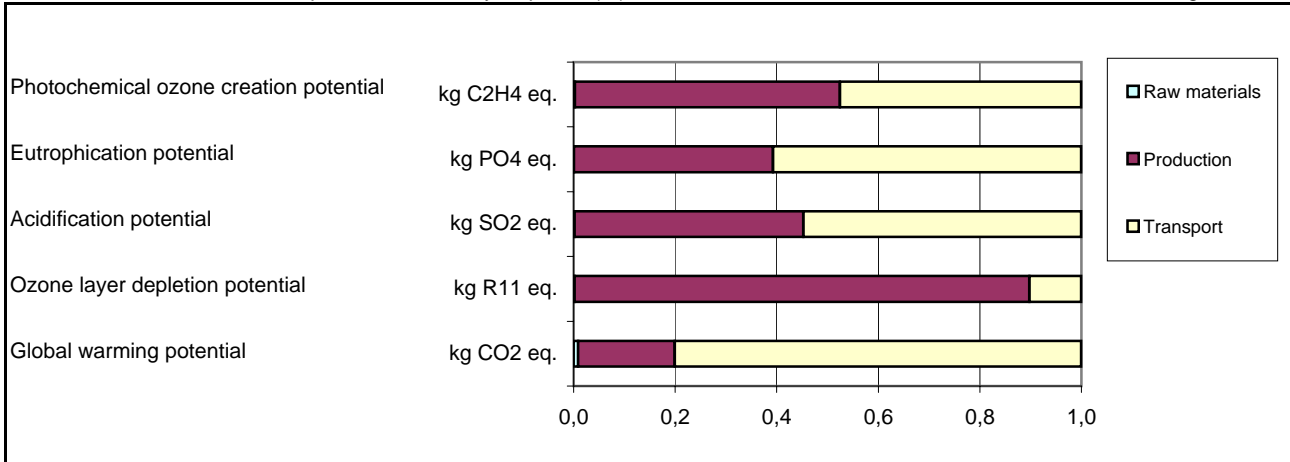
Environmental impacts

Table 4

Indicator	Unit	Raw materials	Production	Building site	Use stage	Demolition	Transport	Total
Global warming potential	kg CO ₂ eq.	0,25	5,51	0,01	0,004	0,01	23,16	28,94
Ozone layer depletion potential	kg R11 eq.	8,6E-10	4,7E-07	1,5E-09	7,7E-10	1,5E-09	5,3E-08	5,2E-07
Acidification potential	kg SO ₂ eq.	0,001	0,155	8,3E-06	3,2E-06	6,4E-06	0,188	0,344
Eutrophication potential	kg PO ₄ eq.	4,5E-05	0,021	1,0E-06	4,5E-07	9,1E-07	0,033	0,054
Photochemical ozone creation potential	kg C ₂ H ₄ eq.	8,3E-05	0,015	7,7E-07	2,4E-07	4,9E-07	0,014	0,030

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]	0,005	22,469	0,00002	0,00001	0,00001	0,150	22,62
CO ₂ [g]	237,76	3338,93	7,88	3,82	7,64	22388,10	25984,13
CO [g]	0,112	339,800	0,003	0,001	0,002	40,205	380,12
HCl [g]	0,001	0,067	0,00003	0,00002	0,00003	0,035	0,10
Hg [g]	6,5E-07	1,8E-05	5,2E-08	2,5E-08	4,9E-08	2,6E-05	4,4E-05
CH ₄ [g]	0,321	17,898	0,008	0,003	0,005	26,542	44,78
N ₂ O [g]	0,005	5,639	7,7E-05	3,5E-05	7,1E-05	0,385	6,03
NO _x [g]	0,280	89,858	0,006	0,003	0,006	247,725	337,88
NM VOC [g]	0,171	2,795	0,001	1,8E-04	3,5E-04	16,462	19,43
Particles [g]	0,011	0,705	0,001	3,0E-04	0,001	4,364	5,08
Pb [g]	1,2E-05	0,001	1,8E-06	8,9E-07	1,8E-06	4,2E-04	9,8E-04
SO ₂ [g]	0,371	49,949	0,004	0,001	0,002	14,541	64,87
Emissions to water							
BOD [g]	0,001	0,034	1,2E-05	4,0E-06	8,1E-06	0,035	0,07
COD [g]	0,020	1,690	0,005	0,002	0,005	1,070	2,79
N [g]	0,001	0,038	1,1E-04	5,1E-05	1,0E-04	0,031	0,07
P [g]	2,5E-04	0,001	1,9E-06	4,2E-07	8,5E-07	0,010	0,01
Waste							
Waste to landfill [kg]	0,013	1,736	0,527	0,003	0,005	0,994	3,28
Hazardous waste [kg]	0,013	3,424	0,006	0,003	0,005	0,994	4,45

Waste treatment of final product

100% of norwegian planed structural timber (crude wood) will go to material recycling or energy recovery.

Use of chemicals

Chemicals

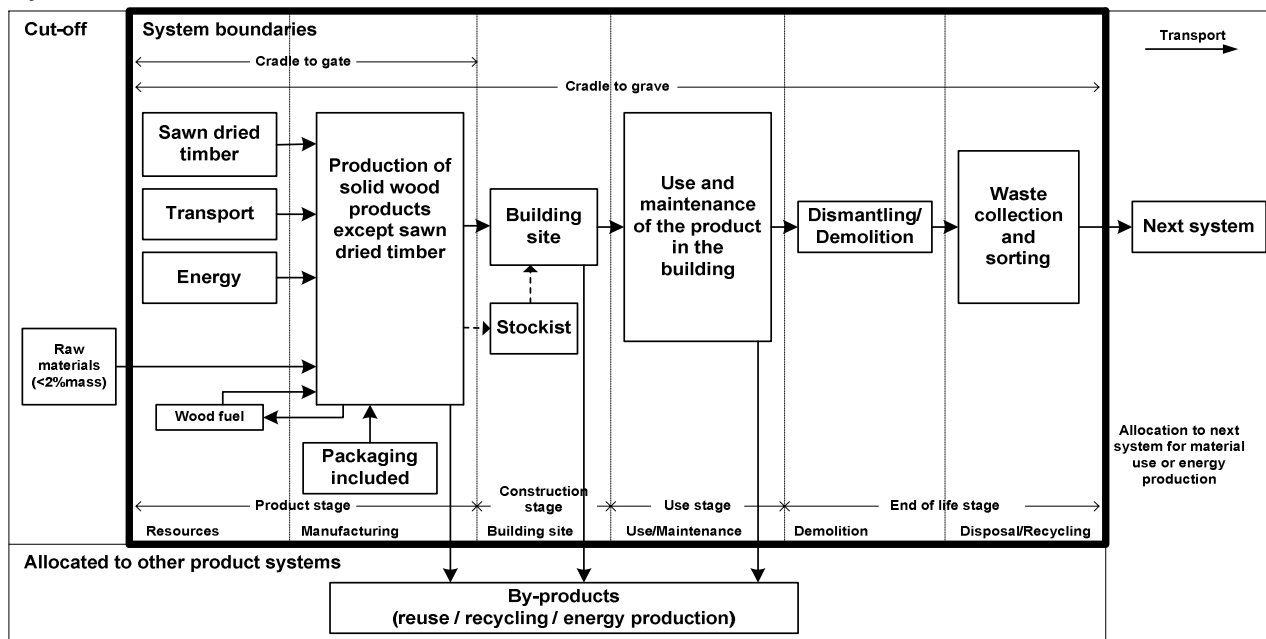
Table 6

Description	Quantity	CAS-nr.	R-phrases	Health ^[4]	Environment ^[4]
Lambda-cyhalotrin [kg]	6,05E-06	91465-08-6	R21, R25, R26, R50/53	class 2	class 2
Imidacloprid [kg]	4,52E-06	13826-41-3	R22	class 4	-
Glyphosate [kg]	9,00E-05	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