

Guide to Stora Enso Environmental Product Declarations (EPDs)



Wondering where to find the carbon footprint of Stora Enso's wood products? Or how much carbon they store? EPDs are the answer, and this is your guide to interpreting them!

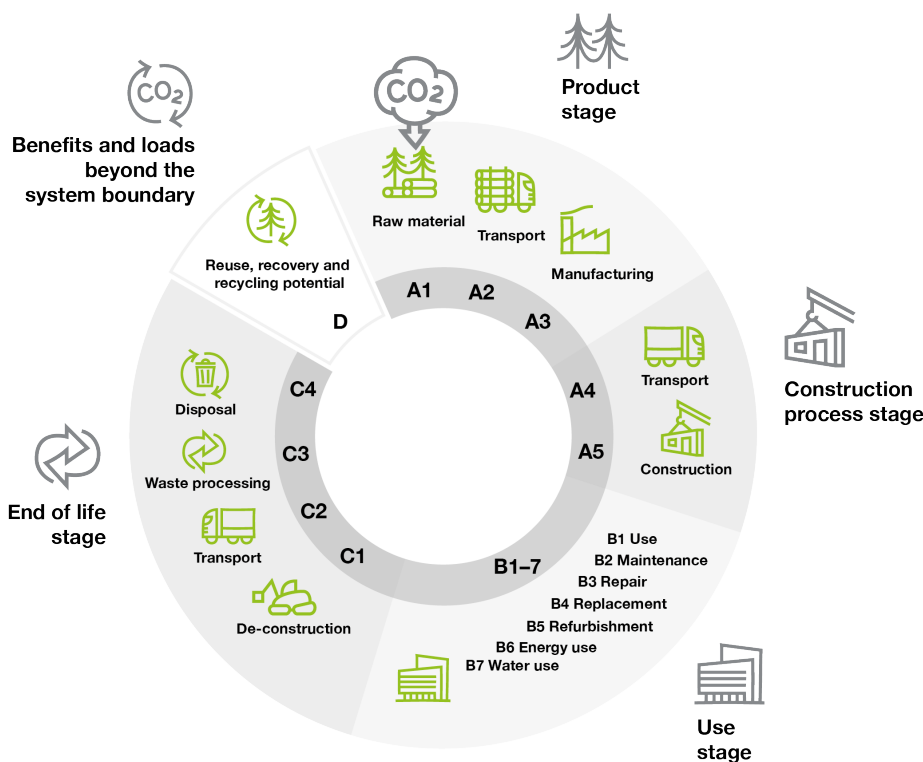
EPDs, what exactly are they?

In addition to carbon footprint information, EPDs include details on products' environmental impacts, use of resources and waste production during their life cycle. When using an EPD as your source you can be sure the information is transparent and valid as EPDs are made based on a standardised methodology and verified by an independent third party.

EPDs are based on life cycle assessments (LCAs) and the information is presented by the product's life cycle stages, as demonstrated in the illustration below. The stages (e.g. Product stage) and modules (e.g. A1 Raw material, A2 Transport and A3 Manufacturing) follow the European standard EN 15804 for construction products.

Life Cycle Assessment (LCA)

Life cycle assessment is a systematic process of evaluating the effects that a product has on the environment over the entire period of its life. LCAs can also be done for a service, or for other measurable activity.



More than 30 indicators are presented in EPDs. Below you can see how the indicators are reported:

Mandatory impact category indicators according to EN 15804+A2

Results per declared unit – 1 m ³ CLT by Stora Enso													
Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq.	3,26E+1	8,71E+0	1,12E+1	5,26E+1	2,59E+1	5,38E+0	0,00E+0	4,01E+0	2,04E+0	2,02E+1	0,00E+0	-2,67E+2
GWP-biogenic	kg CO ₂ eq.	-7,62E+2	6,28E-3	3,40E-1	-7,62E+2	1,03E-2	1,00E-3	0,00E+0	6,98E-4	8,12E-4	7,62E+2	0,00E+0	-7,51E-1
GWP-luluc	kg CO ₂ eq.	8,26E-1	4,73E-3	4,76E-2	8,78E-1	9,72E-3	4,06E-4	0,00E+0	3,97E-4	7,67E-4	2,27E-3	0,00E+0	-2,77E-1
GWP total	kg CO ₂ eq.	-7,29E+2	8,72E+0	1,16E+1	-7,08E+2	2,59E+1	5,38E+0	0,00E+0	4,01E+0	2,05E+0	7,82E+2	0,00E+0	-2,68E+2
ODP	kg CFC 11 eq.	2,36E-6	4,47E-6	2,32E-6	9,15E-6	6,46E-6	8,53E-7	0,00E+0	8,49E-7	5,10E-7	1,75E-6	0,00E+0	-2,86E-5
AP	mol H ⁺ eq.	1,09E-1	4,92E-2	1,53E-1	3,11E-1	8,26E-2	2,02E-2	0,00E+0	2,00E-2	6,51E-3	2,04E-1	0,00E+0	-7,43E-1
EP-freshwater	kg P eq.	5,66E-3	1,09E-4	5,79E-4	6,35E-3	1,85E-4	1,34E-5	0,00E+0	1,32E-5	1,46E-5	1,01E-4	0,00E+0	-1,25E-2
EP-marine	kg N eq.	3,60E-2	1,02E-2	4,58E-2	9,19E-2	1,82E-2	7,87E-3	0,00E+0	7,75E-3	1,43E-3	9,41E-2	0,00E+0	-1,17E-1
EP-terrestrial	mol N eq.	3,44E-1	1,12E-1	6,01E-1	1,06E+0	2,02E-1	8,65E-2	0,00E+0	8,52E-2	1,59E-2	1,07E+0	0,00E+0	-1,32E+0
POCP	kg NMVOC eq.	3,04E-1	3,98E-2	1,21E-1	4,65E-1	7,95E-2	2,44E-2	0,00E+0	2,41E-2	6,27E-3	2,82E-1	0,00E+0	-3,90E-1
ADP minerals&metals ³	kg Sb eq.	8,10E-5	2,31E-5	1,17E-4	2,21E-4	6,20E-5	2,11E-6	0,00E+0	2,04E-6	4,89E-6	2,00E-5	0,00E+0	-1,40E-4
ADP-fossil ³	MJ	2,20E+2	2,86E+2	3,10E+2	8,16E+2	4,22E+2	5,48E+1	0,00E+0	5,45E+1	3,33E+1	1,21E+2	0,00E+0	-5,07E+3
WDP ³	m ³	1,52E+1	5,03E-1	5,16E+0	2,09E+1	1,41E+0	8,26E-2	0,00E+0	7,77E-2	1,11E-1	1,21E+0	0,00E+0	-2,79E+1
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												

How are product’s CO₂ footprint and carbon storage measured?

A product’s carbon footprint is indicated in the ‘GWP-fossil (Global warming potential, fossil)’ indicator which essentially measures the amount of greenhouse gases (GHG) emitted during a certain life cycle stage.

Carbon dioxide (CO₂) is the most common greenhouse gas emitted from human activities but there are others as well, like methane (CH₄) or nitrous oxide (N₂O), which are all included under the indicator of Global warming potential.

Because other gases in addition to CO₂ are included, the unit used you will see the expression CO₂ equivalent used or CO₂ eq. for short. This unit can be used to quantify all greenhouse gases in one metric by standardising the gases’ climate impact of heating the atmosphere using CO₂ as the benchmark.

How to read the numbers?

In our EPDs a scientific display of numbers is used. Here is how to read them:

1.23E+2 = 123
 1.23E-6=0.00000123

Carbon footprint and CO₂ footprint

are typically used as synonyms to refer to the total amount of greenhouse gases except biogenic CO₂ released as a result of certain set of actions.

Let's use cross-laminated timber (CLT) as an example and zoom in to the EPD to find out the carbon footprint and the biogenic carbon content:

1. The fossil carbon footprint (amount of fossil greenhouse gases emitted) for CLT per m³ is 52.6 kg CO₂ eq. (or 5,26E+1 spelt scientifically). It is shown in the GWP-fossil indicator row in a column where modules A1, A2 and A3 are combined (total A1-A3).

2. Biogenic carbon content for CLT per m³ is 762 kg CO₂ eq. It is shown in the EPD in its own table titled "biogenic carbon content at the factory gate" as you can see below:

1. Mandatory impact category indicators according to EN 15804+A2

Indicator	Unit	Results per declared unit			
		A1	A2	A3	A1-A3
GWP-fossil	kg CO ₂ eq.	3,26E+1	8,71E+0	1,12E+1	5,26E+1
GWP-biogenic	kg CO ₂ eq.	-7,62E+2	6,28E-3	3,40E-1	-7,62E+2
GWP luluc	kg CO ₂ eq.	8,26E-1	4,73E-3	4,76E-2	8,78E-1
GWP total	kg CO ₂ eq.	-7,29E+2	8,72E+0	1,16E+1	-7,08E+2

2. Biogenic carbon content at the factory gate

Biogenic carbon content	Unit (expressed per declared unit)
Biogenic carbon content in product	762 kg CO ₂ eq. / m ³ = 207,8 kg C / m ³
Biogenic carbon content in accompanying packaging	0 kg CO ₂ eq. / m ³ = < 0,1 kg C / m ³
<i>Please note: 1 kg biogenic carbon is equivalent to 44/12 kg of CO₂</i>	



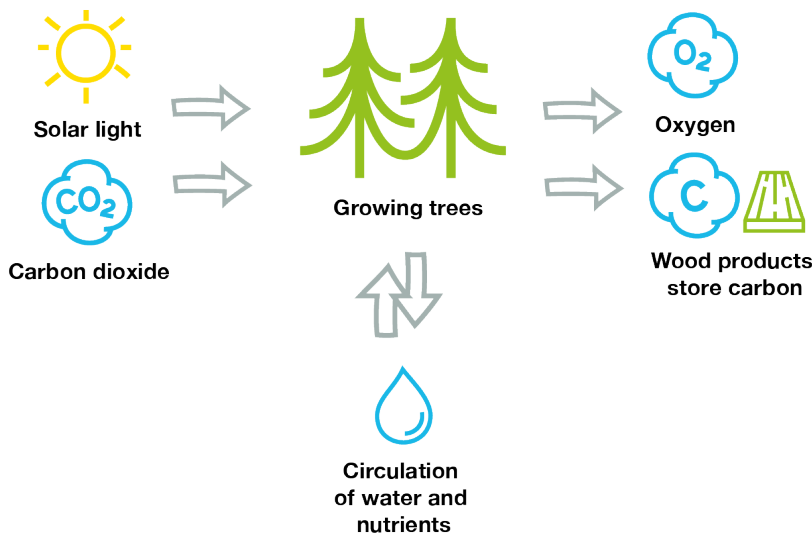
What is biogenic carbon storage?

Growing trees absorb carbon dioxide (CO₂) and in doing so remove carbon (the C in CO₂) from the atmosphere. Wood products store the captured carbon and make a long-term carbon storage. Wood is the only major construction material that can do that!

Approximately half of the dry mass of wood is carbon. However, the biogenic carbon content on end products are impacted by factors like tree species and dry density.

Biogenic carbon content is typically declared in C in the EPDs but may also be stated in CO₂. As 1 kg of biogenic carbon is equivalent to 44/12 kg of CO₂, the amount of biogenic carbon in one m³ of CLT by Stora Enso is 207.8 kg C equivalent to 762.0 kg CO₂ removed for the atmosphere.

Reusing and recycling wood products after their original use further increases the carbon storage duration. Keeping wood in circulation as long as possible and utilizing it in the most valuable and effective way is known as the cascading use of wood where recovering energy (burning) or disposing of wood are the very last options.



What does CO₂ equivalent measure?

CO₂ equivalents (CO₂ eq.) is a metric for describing different greenhouse gases in a common unit. Various greenhouse gases (GHG) are translated in CO₂ equivalents based on their global warming potential representing the gases' total warming impact relative to CO₂ over a set period – usually a hundred years (GWP100). For example, methane's effect on the climate is 25 times worse than CO₂, and nitrous oxides are 298 times worse than CO₂.

GHG	Chemical formula	GWP 100*kg CO ₂ eq. / kg GHG
Carbon dioxide	CO ₂	1
Methane	CH ₄	25
Nitrous oxide	N ₂ O	298

*2007 estimates

Other indicators and parameters

As mentioned, there are more than 30 indicators in the EPD of which the Global warming potential is the most used one. Please refer to one of our EPDs for viewing the rest of the indicators.

In addition to comprehensive environmental information, EPDs include also other useful facts on the products such as product composition and technical information and some background on the LCA process.

Why are EPDs needed?

With the building sector being responsible for nearly 40% of global energy-related CO₂ emissions, 10% coming from construction materials alone, there is increasing demand for product manufacturers to make information on the environmental impacts of their products available. EPDs are a standardised way of doing this.

While the existence of EPDs does not mean a product is sustainable, EPDs are a valuable tool to communicate verified and relevant information on the product's environmental performance. The role and availability of EPDs have grown significantly in the last ten years.

The growing number of available EPDs makes it easier to make sustainable choices. EPDs are likely to become increasingly important regardless of whether voluntary certification is being sought or if EPDs are being requested to support other environmental targets.

EPDs and life cycle assessments (LCAs) also serve an important purpose internally at Stora Enso as they make visible relevant information along a product's supply chain on the parts of the manufacturing processes that burden the environment the most and enable improvement over time.



Comparing the carbon footprint of different construction materials

The growing availability of EPDs provides a basis for a fair comparison of construction products on their environmental performance. It is, however, important to make informed comparisons to get meaningful results.

When comparing *same material* with each other, like a CLT cube to another CLT cube from a different provider for instance, it makes sense to assess pieces of material that are the same size, cubic metres or kilograms for example. This is because no matter who manufactures, the

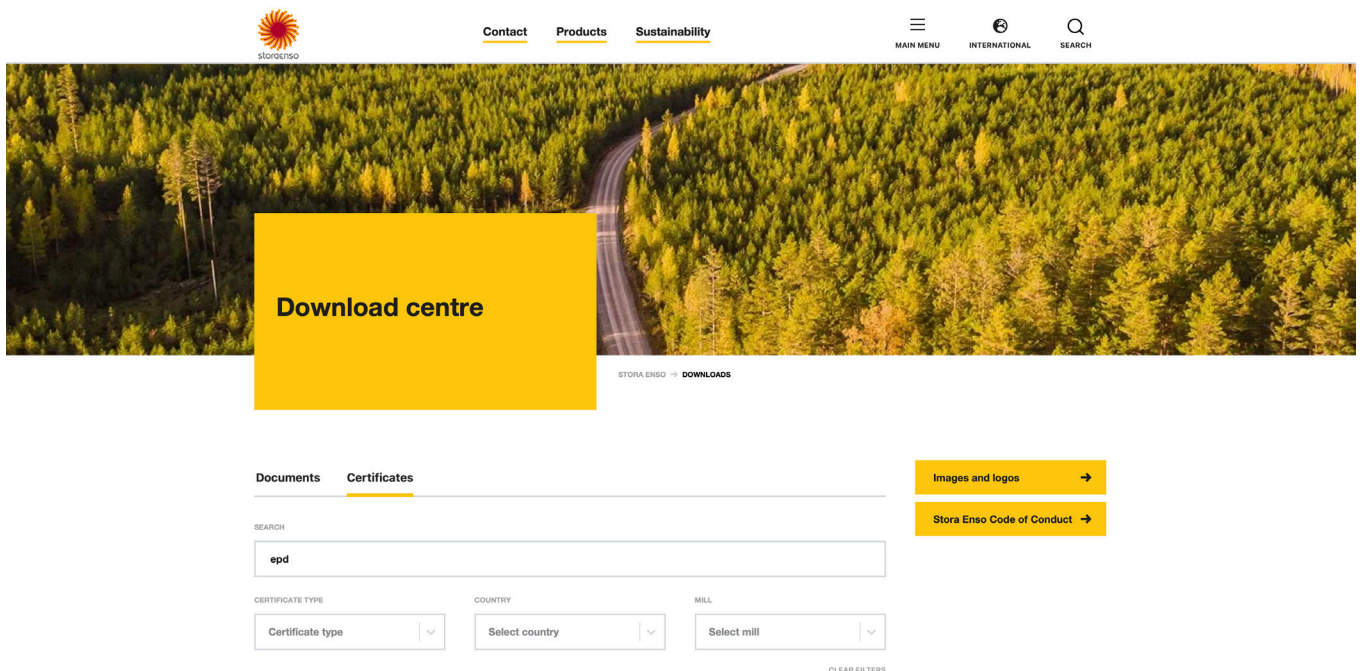
CLT would be used in the same way (as a wall for instance). The carbon footprint found on the EPD is well-suited for this type of comparison.

When comparing *different materials* with each other, such as wood and concrete, it is best to assess the final end use (e.g. CLT wall v. concrete wall) or a building (wooden building vs. concrete building) instead of comparing kilograms or cubic metres. This way you would be comparing materials serving the same function.

Where to find Stora Enso EPDs?

At Stora Enso, we have EPDs available for all our main wood products. All EPDs are publicly available to everyone. Just go to [Storaenso.com](https://storaenso.com) > Download centre and type in “EPD” and you will be able to find a list of

all EPDs we have available. In the download centre, just make sure you’re searching under the “certificates” tab to get results. Here is a direct link: [Download centre | Stora Enso](#)



The screenshot shows the Stora Enso website's 'Download centre' search interface. At the top, there is a navigation bar with the Stora Enso logo, links for 'Contact', 'Products', and 'Sustainability', and icons for 'MAIN MENU', 'INTERNATIONAL', and 'SEARCH'. Below the navigation bar is a large banner image of a forest with a road, overlaid with a yellow box containing the text 'Download centre'. Below the banner, there is a breadcrumb trail: 'STORA ENSO → DOWNLOADS'. The search interface includes a 'Documents' tab and a 'Certificates' tab. A search bar contains the text 'epd'. Below the search bar are three dropdown menus: 'Certificate type', 'Select country', and 'Select mill'. To the right of the search bar are two yellow buttons: 'Images and logos →' and 'Stora Enso Code of Conduct →'. At the bottom right of the search interface is a 'CLEAR FILTERS' link.

We have collected the carbon footprint and carbon storage information of all our products in the below chart for easy access.

Stora Enso wood products' carbon footprints and biogenic carbon contents

Product (EPDs publishing year)	Carbon footprint (Global warming potential, fossil kg CO ₂ eq/m ³ A1-A3)	Biogenic carbon content kg CO ₂ eq/m ³
CLT (2023)	52.6	762.0
Cladding and decking (2020)	71.1	728.0
Classic Planed (2020)	38.8	753.0
Classic Sawn (2021)	33.9	733.0
CLT Rib (2023)	21.8 kg CO ₂ eq./m ²	124.0 kg CO ₂ eq./m ²
Industrial components (2020) (Window and door components)	64.3	833.0
KVH® (Structural timber) (2020)	30.6	717.0
LVL (2023)	121.0	766.0
LVL Rib (2023)	22.0 kg CO ₂ eq./m ²	95.7 kg CO ₂ eq./m ²
Pellets	Multiple declared and functional units, please refer to the EPD	Multiple declared and functional units, please refer to the EPD
Thermowood® (2020)	56.7	744.0

i United Nations Environment Programme (2022). 2022 Global Status Report for Buildings and Construction: Towards a Zero emission, Efficient and Resilient Buildings and Construction Sector. Nairobi.

ii EPD Facts & Figures
<https://www.eco-platform.org/epd-facts-figures.html>