



# Wood Products 2023



Cover image:  
Wood Hotel,  
Vienna, Austria

Developer:  
Katharo Lodges  
GmbH

Architecture &  
structural design:  
Zieritz + partner  
ZT GmbH

Main Contractor:  
DPM Holzdesign  
GmbH

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Visit our wood  
products website



More about  
Mass Timber Construction







# We're branching out

Everyone has a story. Stora Enso's story begins in the 13th century, and with mass timber construction, we are experiencing the resurgence of one of the oldest and most trusted building materials known to humankind.

World-renowned architects and visionary developers use Stora Enso for their wood products and building solutions. From state-of-the-art building concepts to classic sawn wood and precision-cut prefabricated mass timber, we continue to be the trusted global leader and one of the largest sustainable forest owners in the world

This year, we are branching out and moving up the value chain as we proudly introduce Sylva by Stora Enso – our new product brand delivered in a kit! Sylva kits include custom-made building components with everything needed to create a sustainable wood structure. Designing with wood has never been this clean, safe for the planet's health, and hassle-free.

Get inspired with us on the following pages and imagine building a brighter future together!

CLT house in Vålberg,  
Värmland, Sweden



# Why build in wood?

Building with wood has many advantages. First and foremost, wood is renewable. Wood does what competing materials can't: wood grows back. Steel and concrete don't. Carbon absorbed in trees stays in the timber for decades, making it the most environmentally kind building material of all time.

But there are many other compelling benefits of building with wood and why leading market players are turning to this natural material as their preferred construction material.

In the developed world, we spend about 90% of our time indoors. It's important then to get the indoor climate right. This means looking at everything from air quality, hygiene, humidity, temperatures and even the touch and feel of the materials that surround us. All of these aspects affect us in our day to day indoor lives.

## Innovation

Some architects are calling it a revolution. Across the construction landscape, the use of innovative, greener building materials is taking root. New innovations in wood mean that we can now build higher than ever with a raw material that is lighter than concrete and stronger than steel.

### Life cycle design

It's not just new massive engineered wood elements that are making this change possible. A series of new digital tools are making it easier to be creative and cost and material efficient. Read more in this brochure about our life cycle design with our Digital Tools and Building Concepts and how they are being applied in a variety of award-winning designs.

### Customisable design

Building with high-performance, precision-engineered prefabricated elements and sustainable massive wood materials allow you to create strong, stable yet lightweight structures to achieve longer spans and new building heights without complicated fixings or specialised labour or equipment. It's simply genius!

## Efficiencies

### Noise

Five times less traffic arrives at the site of a wooden building compared to a concrete building. This results in less noise pollution for those living or working in the area of the site. Buildings like this also require less people on site which also reduces noise pollution.

### Cost efficiencies

Compared to conventional construction, building in timber reduces construction schedules, site overheads and financial holding costs.

The reduced construction time is one of the greatest incentives of timber in construction. Much faster construction times can be achieved compared to more site-intensive alternatives.

## Health & well-being

An increasing amount of evidence shows that wood has beneficial effects in almost all parts of the indoor climate. It helps reduce stress, blood pressure and heart-rate as well as allowing for more creativity and productivity in the workplace. Wood is also an important part of what's called biophilic design; our desire to be connected with the natural environment.

People increasingly live indoor lives and have limited opportunities to connect with nature. Exposing the natural wood within a building environment stimulates the vital connection with nature, increasing positivity and productivity.

### Thermal comfort

There is considerable evidence of improved thermal insulation in wooden buildings. Thermal 'sensation' is a parameter that reflects thermal comfort. For example, cold surfaces can cause the feeling of a draught even when the building envelope is airtight as the human body radiates heat towards colder surfaces of a room. Optimised thermal insulation guarantees suitable surface temperatures of walls and the roof of a building to mitigate uncomfortable indoor conditions.

Several studies indicate that the presence of wood in office buildings can positively impact our physiology, with rates of well-being increasing by 13% and productivity increasing by 8%.

### Air quality

Moisture damage in building structures is one of the critical causes of poor indoor air quality and is associated with health problems such as asthma and respiratory disorders. Highly insulated CLT-based structures contribute to a positive indoor climate in various ways, for example:

- Good thermal insulation enables even room temperatures
- Natural wooden materials have low emissions during the use of a building
- Use of wood as an interior design element contributes to a pleasant living and working environment

Comfort and indoor air quality are becoming increasingly essential criteria. Stora Enso Building Solutions promote an overall safe and healthy indoor climate.





CLT house in Vålberg,  
Värmland, Sweden







# Sustainability

Sustainability is at the heart of all we do. Stora Enso is one of the world's largest private forest owners. Sustainably managed, our growing forests have a positive climate impact, both as a carbon sink and through our wood products. Global megatrends, call for fossil-free materials and new applications for renewable and innovative materials.

We raised our ambition to safeguard and enhance biodiversity. By adopting a regenerative stance, we are shifting our goals from minimising negative environmental impacts to becoming a net positive contributor. We welcome you to join us on this journey and let us help you reach your climate goals with our sustainable wood products.

It is the busiest time of the year, when our Nordic forests are being regenerated by planting or seeding. This year, Stora Enso will plant more than 48 million tree seedlings. In northern forests, the planting season is typically 150 days long, which means that, during this year's planting season, about 320 000 seedlings are planted every day.





Sustainability initiatives are increasingly subject to tightening legislative requirements and voluntary third-party verification. Stora Enso helps developers and investors, designers, contractors, owners and occupiers to achieve compliance and address their sustainability ambitions.

### **Renewable wood and low carbon building solutions**

Wood construction helps to reduce fossil carbon emissions. Sustainable, growing forests store carbon dioxide from the atmosphere. Wood construction materials store an amount of carbon equal to approximately half of their dry weight. One cubic metre of wood product captures approximately 750 kilograms of carbon dioxide from the atmosphere. At the end of their life cycle, wood products can be reused, recycled or used for energy production. Additionally, sustainably managed, growing forests capture carbon dioxide from the atmosphere.

Wood for Stora Enso's wood products originates from semi-natural, sustainably managed European forests, which grow by area and by volume. The European forests contribute to the social welfare and livelihood of local communities and regions with 16 million forest owners. Parallel multiple uses of these forests for recreation and nature conservation are integral parts of sustainable forestry practices.

We know the origin of all the wood we use: 100% comes from sustainable sources. We use various tools to ensure this, including forest certification and third-party traceability systems such as the Forest Stewardship Council's (FSC® trademark nrC125195) Chain of Custody/Controlled Wood scheme, the Chain of Custody/Due Diligence System of the Programme for the Endorsement of Forest Certification (PEFC), and the ISO 14001 environmental management standard. We always ensure that the forests we harvest wood from are duly regenerated.

In 2021, 77% of our total wood supply originated from third party certified forests, while 100% of the wood origin was covered by third party certified traceability.

Stora Enso's mills also apply ISO based management systems to ensure responsible, efficient, clean, and safe working environments (ISO 9001 quality, ISO 45001 safety and ISO 50001 energy efficiency).

Heat energy is mostly produced using biomass generated from sawmill residues, avoiding fossil carbon emissions. High yields and efficiencies in the use of wood ensure that no wood goes to waste. All of our raw materials are carefully selected and scanned using x-rays, and visual grading to guarantee the best possible material quality for each end use.

### **Sustainability benefits in transport**

Stora Enso's prefabricated wood products are transported to site in optimised loads. As wood is five times lighter than concrete, the total number of truckloads are lower, meaning transportation costs and emissions are also reduced.

### **Reduced building mass**

Compared to concrete construction, the use of wood significantly reduces the building's weight resulting in reduced substructure and foundation requirements. Lighter wood products can be installed with mobile cranes, instead of heavier and more expensive tower cranes.

### **Life cycle design in mass timber buildings**

Life cycle design aims to achieve building solutions that consider life cycle costs and contribute to higher construction quality, longer service times, good indoor environment, low energy demand, and carbon emissions, and other environmental impacts.

New buildings are typically designed for 50–100 years of service life. Longer service life using wood construction has been proven throughout history. However, components such as fans, pumps, piping, surface coatings, waterproofing, facades, and window frames have a typical service life of 25–50 years. Therefore, a long service life requires a life cycle approach that addresses:

- Shorter lifetime components that are designed for replacement
- Long-term maintenance
- Periodic condition surveys, and timely repairs
- High-quality construction of the building, building elements, and components.


Stora Enso's wood products are pre-fabricated in tightly controlled factory conditions that improve the quality and ease of construction. High quality construction and the long service life of a building results in a reduced demand for renovation and refurbishment and reduces material use, waste generation, and energy use in the production of materials, transport and construction, further enhancing a building's sustainability performance.

### **Certification**

The use of certification systems can provide a tool to help establish and verify sustainable products and operations for customers, authorities and/or developers and investors.

Environmental Product Declarations (EPD), offered for all our building products, provide transparent, third-party verified information about the environmental performance of a product throughout its life cycle and are in line with relevant ISO and EN standards. EPDs provide important information to our customers when assessing the life cycle impacts of their construction projects. They are also an important resource for customers who wish to apply for building certification schemes or ecolabels for their products.





Magdalene  
College Library,  
Cambridge, UK

Architect:  
Níall McLaughlin  
Architect

Developer:  
Magdalene  
College

Stora Enso  
Partner: Eurban







The below illustration represents the circular and renewable life of wood.



### 1 **Sourcing renewable, sustainable and circular resources**

Stora Enso's main raw material is renewable wood from sustainably managed forests. Wood and biomass play an important role in combating global warming, and the transition towards a circular economy.

### 2 **Safe and efficient operations**

Safe and efficient Stora Enso operations help combat global warming and resource scarcity, while promoting the welfare of our employees and wider workforce.

### 3 **We make sustainable products that add value**

Our products add societal value by addressing critically important global mega-trends, such as growing population, global warming, and resource scarcity.

### 4 **Our wood products and building solutions enable safe and low embodied carbon construction**

Stora Enso's renewable and light-weight building solutions reduce embodied greenhouse gas emissions and promote safe, circular and low-carbon construction. Wood products also have significantly lower embodied greenhouse gas emissions associated with them

compared with conventional construction materials.

### 5 **Sustainable wooden buildings store carbon and help reduce operational carbon emissions**

Stora Enso's wood products and building solutions promote more sustainable green buildings. They help to improve energy efficiency and reduce greenhouse gas emissions. In addition, wood stores carbon during

the building's life time, while sustainable forest management guarantee the growth of new trees. Trees grow by absorbing carbon dioxide from the atmosphere and store it as biogenic carbon in the wood products. The longer the biogenic carbon is stored, the greater the environmental benefit as longer storage increases the sink for CO<sub>2</sub> emissions.

### 6 **Comfortable and healthy spaces with wood**

Biophilic building designs using wood enhance health and well-being in indoor environments and help avoid the chemicalisation of our environment.

### 7 **Our designs and services give materials and buildings a longer life**

Stora Enso's product designs and services can extend the lifespan of existing buildings and materials. Light-weight wood enables renovations or adding floors and ultimately helps avoid demolition and waste, while also promoting building energy efficiency.

### 8 **Wood allows circularity even at end-of-life**

When a wood product reaches its end-of-life and can no longer be re-used or recycled, it can be used for bioenergy generation – to ultimately avoid becoming waste and to substitute fossil fuels.



# Building concepts

**We have developed Building Concepts for residential, industrial, office and school buildings. We have optimised them to create the best performing, low-carbon and cost-effective building solutions based on our products from Stora Enso's Sylva kit. As a result, you can design and build low-carbon and cost-effective buildings of all typologies and scales for your specific project's needs.**

Our Concepts apply the Design for Manufacturing and Assembly method (DfMA) to align the design and delivery process for a more predictable and optimal outcome.

## **Why design with our Building Concepts?**

- Assist architects, designers, developers, contractors, etc. in the early stages of choosing the best design strategy and products for a successful wooden building.
- Obtain the highest value from a DfMA by using pre-optimised concepts in the early phase of a project, thus streamlining production, installation and construction from the start.

- Find the right products for the right applications for your specific project needs.
- Envision the outcome of various early design choices and maximise customer value.
- Understand and quantify the benefits of using the Sylva kit for your project in a way that clearly explains the design choices to other stakeholders.
- Find the application technology (product performance information, certification, build-ups, etc.) that best suits your chosen concept.

Now available to  
use with



More inspiration for  
building concepts



Find your concept





## Basic concept of a school entirely made of wood

The school concept is based on a 600 m<sup>2</sup> school module with a capacity for 100 to 150 students or five to eight classes. The generous size of the school module allows for simultaneous use by various age groups and classes with different learning needs. The open-plan layout facilitates open activities, communication and group teaching.

The module presented can be used on multiple scales, ranging from schools of 100 students to approximately 1 000.

The school concept is designed based on combinations of our Sylva kit. Sylva CLT Walls for a mass timber envelope, Sylva Beams and Columns to maximize flexibility, and Sylva LVL Rib Floors and Roofs for long spans.

Roof form, central halls and individual room layouts are left open in the design and can be easily customised.

The following guidelines aim to illustrate the applications of the Stora Enso concept for school buildings as well as help architects apply our concept to the particular needs of each school typology.

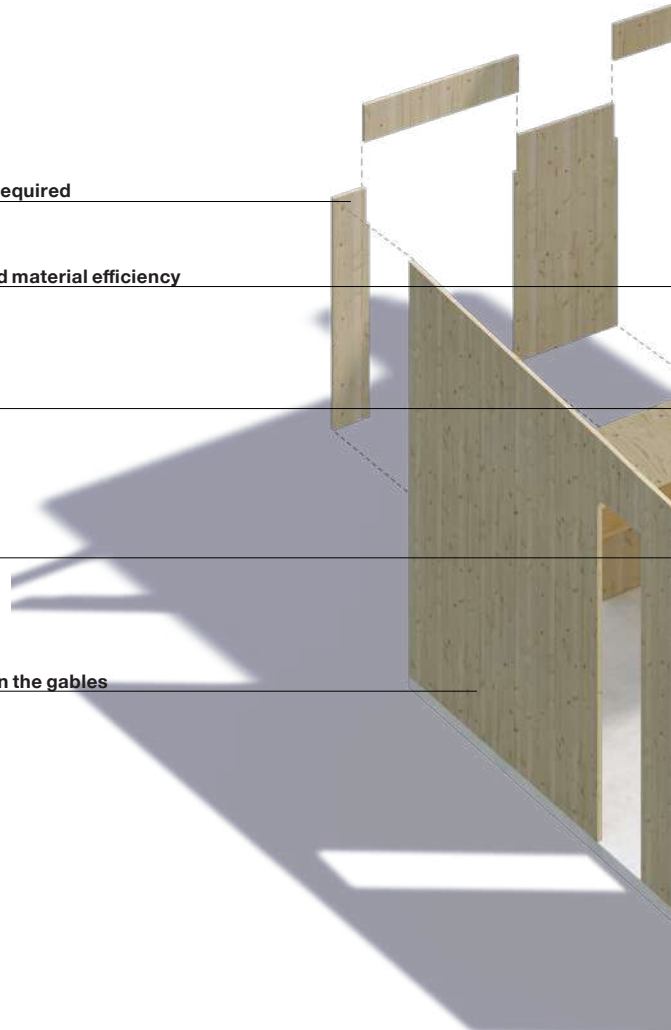
Sylva CLT Walls with visual quality if required

Sylva LVL Rib Floor for long spans and material efficiency

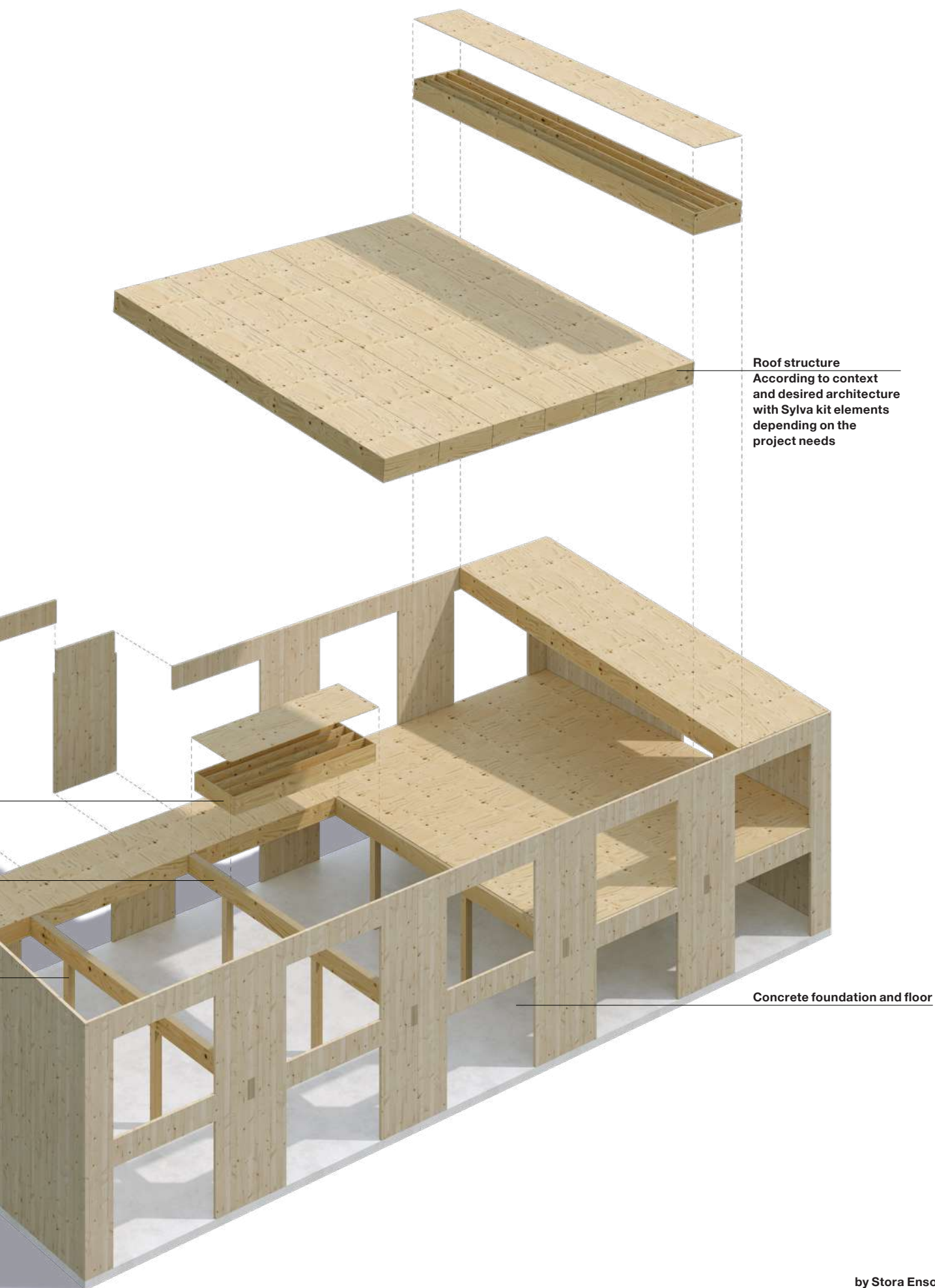
Sylva GLT or LVL Beams

Sylva GLT or LVL Columns

Sylva CLT Walls for lateral stiffening in the gables







Waingels College,  
Reading, UK

Architect:  
Sheppard Robson

Partner: Eurban











Current spread  
Waingels College  
(see previous spread  
for details)





## Basic components of the industrial concept

Get inspired. This is just one of our building concepts that cover the needs of just about any industrial operation from a modest warehouse to a two-storey showroom and factory floor. Wooden industrial buildings offer you the most sustainable alternative on the market, with carbon emissions that are 30% lower than the EU benchmark.

Our concept shows you a range of solutions that are cost-efficient to construct using a combination of massive-engineered wood products. The designs are flexible and modular and designed for manufacturing and assembly. They can even be made for disassembly and reassembly.

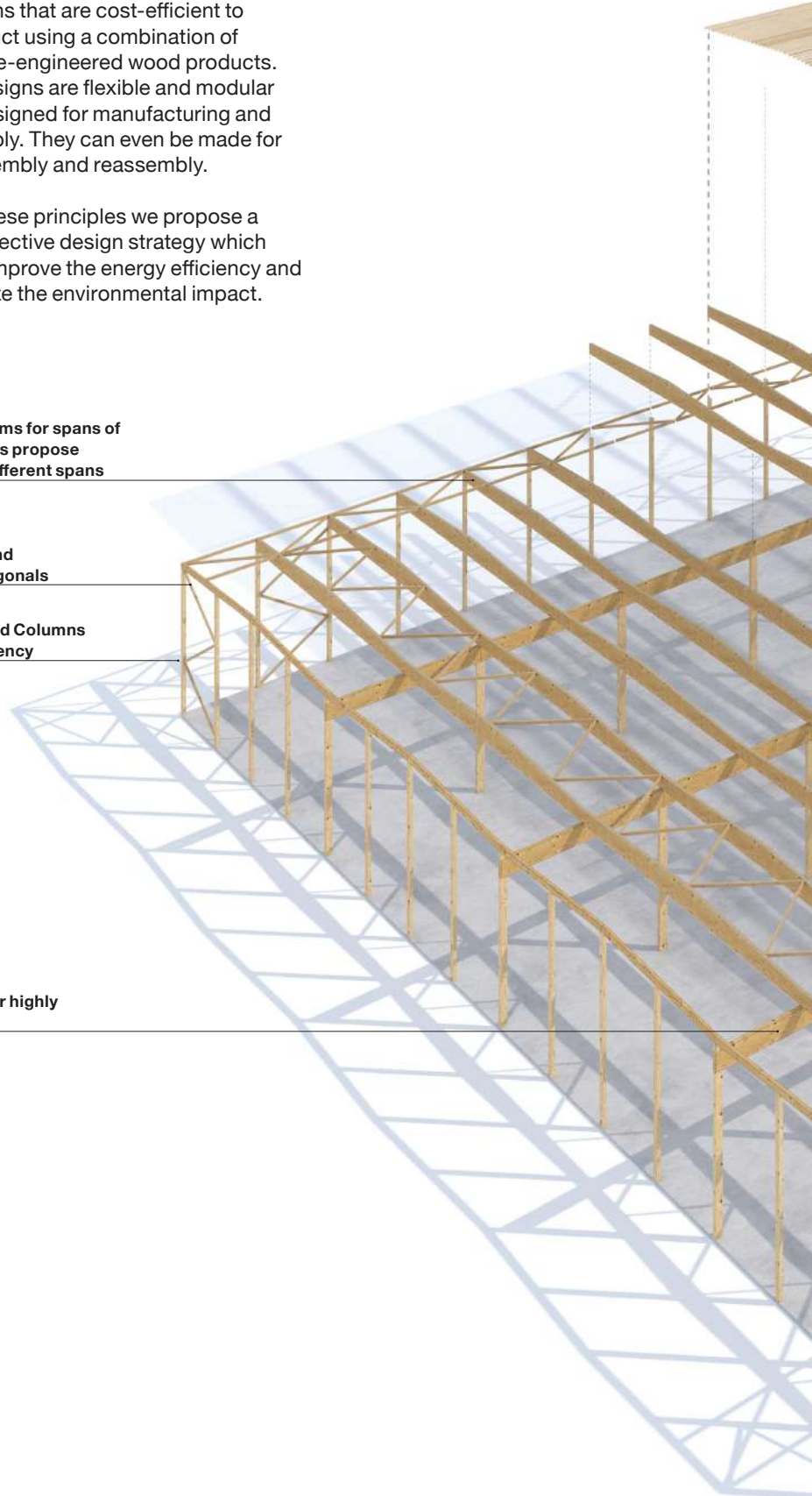
With these principles we propose a cost effective design strategy which helps improve the energy efficiency and minimize the environmental impact.

**Sylva GLT or LVL Main Beams for spans of approx. 24 m. The concepts propose different beam types for different spans**

**Sylva GLT or LVL Beams and Columns for stiffening diagonals**

**Sylva GLT or LVL Beams and Columns to maximize material efficiency**

**Sylva LVL or GLT Beams for highly loaded transfer structures**





**LVL 75 mm rafters to  
maximize cost efficiency**









**Industrial concept  
external renderings:  
Distribution Centre**

**Architects:  
Waugh Thistleton, UK**





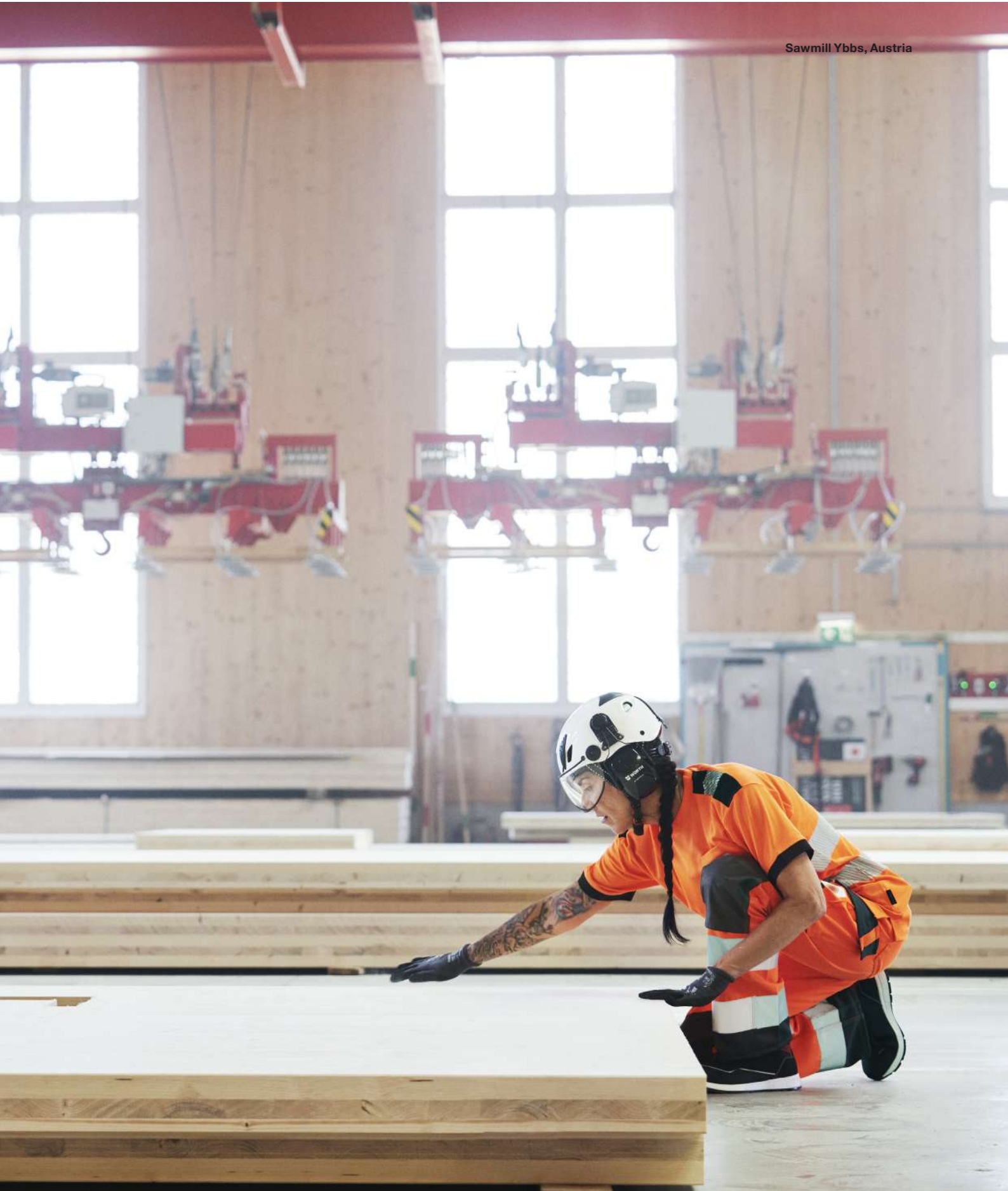
Storage Hall,  
Parthenay, France

Developer: ACEM

Architect: Triade







## Basic components of the residential multi-storey concept

To help anyone interested in understanding more about how to build homes in wood we have developed a series of concepts for residential multi-storey buildings.

The core of the concept is Stora Enso's Sylva Walls and Floors, which provide both technical performance and industrial quality. These engineered wood components from our Sylva kit enable an industrial method of construction that reduces assembly time on site.

### **Sylva CLT Walls for stiffening cores**

### **Sylva CLT Walls for vertical load bearing structures**

- High rigidity provides large flexibility for openings in shear walls
- Big elements are reducing the grooves / joints
- Great fire resistance

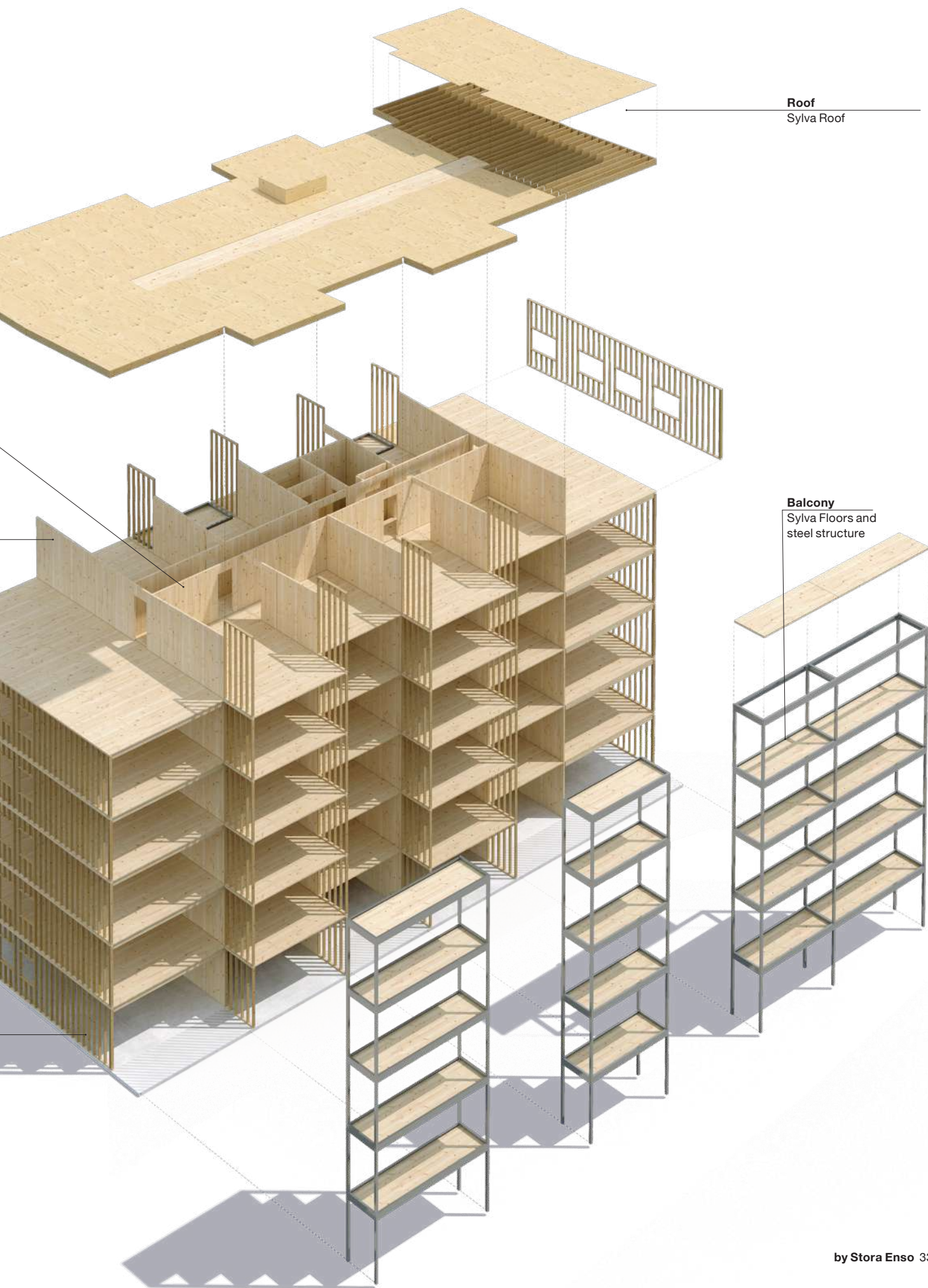
### **Sylva CLT, CLT Rib or LVL Rib Floors**

- Large spans possible
- Optimized use of material
- Gap between the ribs can be used for installations (water, heating, electricity)
- CLT rib panels for long spans between 6-7.5m

### **External walls**

- (timber frame + timber panel)
- Optimized use of material
  - Timber panels act as building phase protection











Renderings prepared  
by Pablo Katz  
Architecture, and  
L.BV Architecture





**Current spread:**  
Abélia, Bry sur  
Marne, France

**Architect:**  
**VIGUIER**  
architecture  
urbanisme  
paysage

**Developer:**  
Woodeum

**Partner of**  
**Stora Enso:**  
Woodeum







## Basic components of the office concept

Stora Enso has developed flexible, modular wooden office concepts which meet all requirements for open space, grid space and clear ceilings. Our concepts enable office adaptation and demonstrates how the building products and applications can be used in a way that meets local fire safety and acoustic regulations. The concept

can be adjusted to meet specific project or market needs.

The concept proposes a post and beam frame structure, with a design strategy to solve an optimal Mechanical, Electrical and Plumbing (MEP) service distribution, in a cost effective way.

### **Sylva GLT or LVL Columns**

High strength and fire resistance

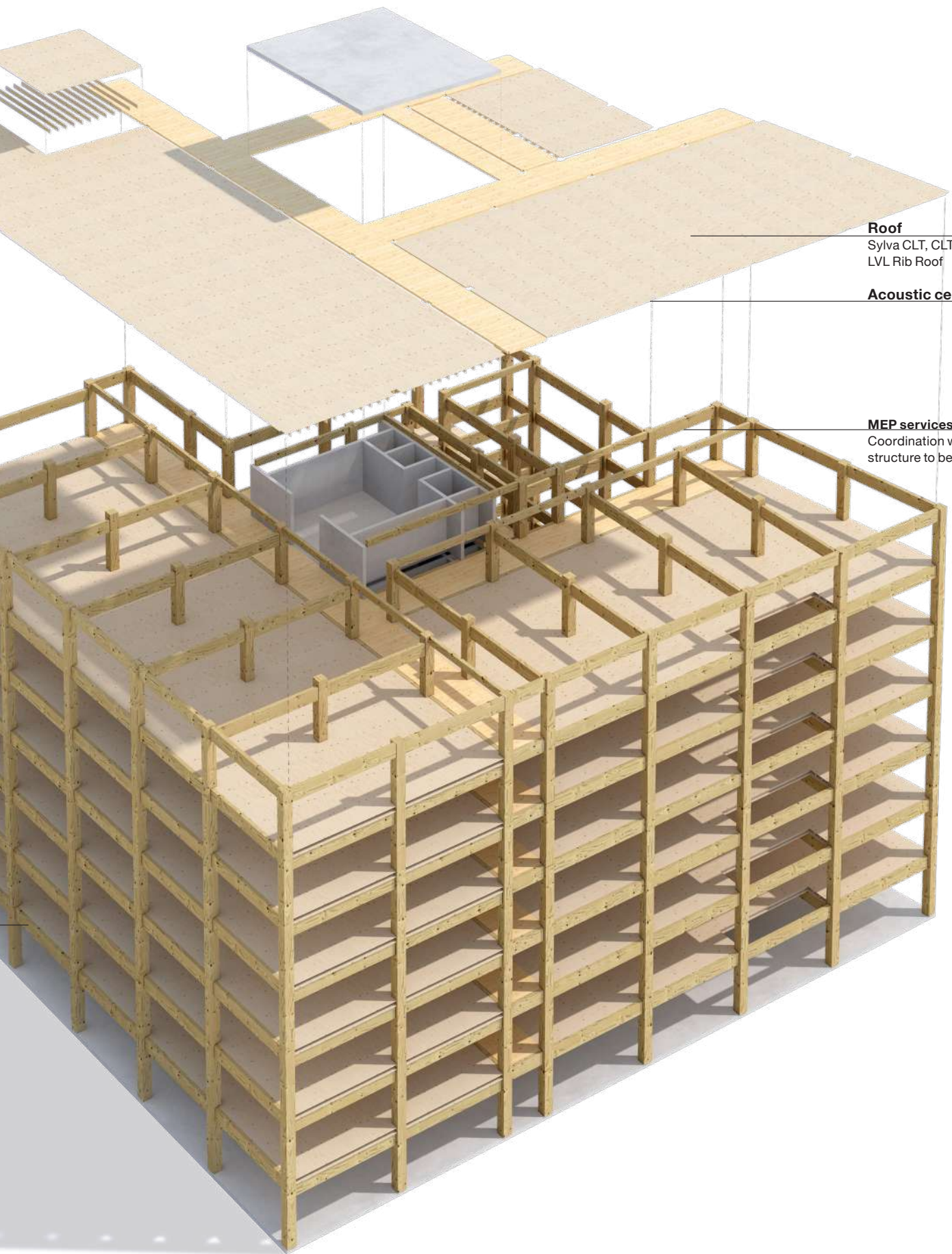
### **Sylva CLT, CLT Rib or LVL Rib Floors**

Different products for different spans and requirements

### **Sylva GLT or LVL Beams**







**Roof**

Sylva CLT, CLT Rib or  
LVL Rib Roof

**Acoustic ceilings**

**MEP services**

Coordination with  
structure to be considered



The Green House,  
London, UK

Architect Waugh  
Thistleton Architects

Developer Ethical  
Property Company

Partner of Stora  
Enso BK Structures

Main contractor ARJ  
Construction







**WoodCity Office,  
Helsinki, Finland**

**Architect:  
Anttinen Oiva  
Arkkitehdit Oy**

**Developer:  
Supercell**

**Partner of  
Stora Enso:  
SRV Rakennus Oy**





Introducing



## **Find the right solution for every application**

Sylva is Stora Enso's range of prefabricated wood-based products for low-carbon buildings. The Sylva kit includes everything needed to create a modern, sustainable wood structure. Our custom-made elements, (Sylva Walls, Sylva Floors and Roofs, Sylva Stairs and Sylva Beams and Columns) optimise the use of sustainable wood to suit any application and requirement. And of course, we ensure your delivery arrives on-site ready to install, just-in-time (JIT).

Experience how easy it can be to construct with wood and choose Sylva for your next building project!

Read more  
on our website





### **Sylva Beams and Columns**

An advanced wood product developed for the demands of today's construction industry

Stronger than conventional timber with a higher strength-to-weight ratio than steel, Sylva Beams and Columns offer unlimited flexibility in design opportunities while reducing your project's overall carbon footprint.

### **Sylva Stairs**

Cut to your design with precision

Are you in search of high-quality, easy-to-install stairs for your next building project? Sylva Stairs are custom designed and come ready to install on-site with no need for specialised tradespeople. Better yet, you can use Sylva Stairs during the construction phase eliminating the need for temporary stairs.





### **Sylva Floors and Roofs**

Experience how easy it can be to build with wood

Sylva Floors and Roofs are custom-made, and prefabricated structural elements that can span short or long distances. View our wide range of floor and roof solutions and see how easy it is to design efficiently for all circumstances without any requirement for additional beams or support.



### **Sylva Walls**

Ready-to-fit wall panels

Sylva wall panels can be delivered with openings for windows, and doors pre-cut and ready for installation. Shorter set-up times and lower construction costs will make your next project a breeze with Sylva Walls.

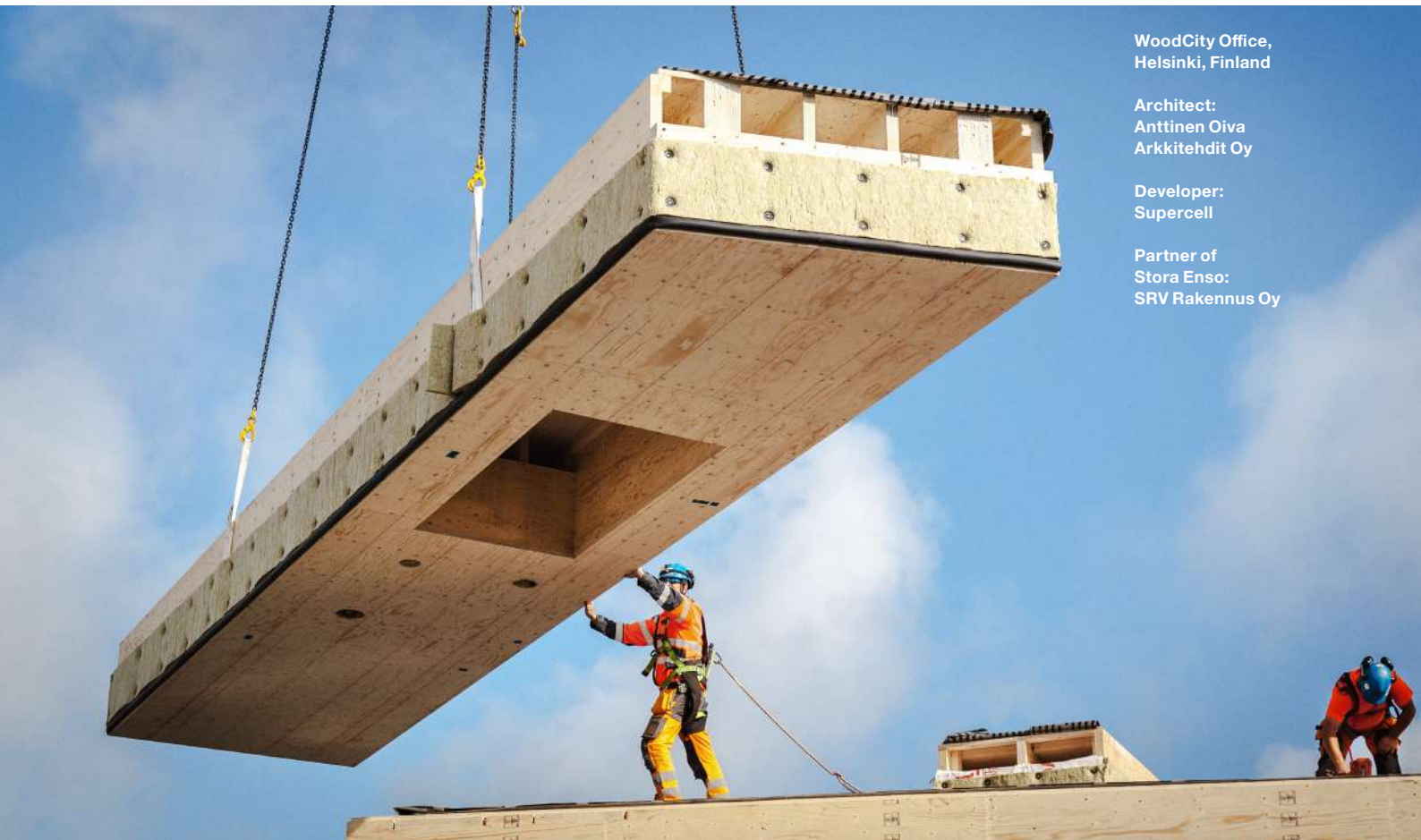


Lapinmäki,  
Helsinki, Finland

Developer:  
City of Helsinki

Architect: AFKS Oy





WoodCity Office,  
Helsinki, Finland

Architect:  
Anttinen Oiva  
Arkkitehdit Oy

Developer:  
Supercell

Partner of  
Stora Enso:  
SRV Rakennus Oy



Slottet, Falun,  
Sweden

Developer:  
Falun Municipality

Architect: Sweco  
Arkitekter





# Our wood products

We sell a wide variety of products including:

- Cross Laminated Timber (CLT)
- Laminated Veneer Lumber (LVL)
- Rib panels
- Glued Laminated Timber (GLT/Glulam)
- Sawn and planed wood
- Cladding and decking
- KVH structural timber (Konstruktionsvollholz)
- Window and door components
- Thermowood
- Pellets





Current spread

Eilean Donan Castle  
Visitors Centre,  
Kyle of Lochalsh, UK

Architect:  
ANTA Architecture

Developer:  
Eilean Donan Castle

Partner of  
Stora Enso:  
Eurban



# CLT

Cross laminated timber (CLT) is a solid wood construction product consisting of at least three bonded single-layer panels arranged at right angles to each other. Sizes of up to 3.45 x 16 metres can be produced. CLT solid wood panels are made up of several layers and are available in different panel thicknesses. The layers are bonded with carefully selected adhesives that are suitable for their respective purpose. CLT products are long-lasting and safe to use and recycle. They are continuously tested to ensure that they meet the strictest requirements in terms of ambient air emissions. CLT also offers virtually boundless possibilities in terms of construction concept, style and architecture. It is suitable for internal and external walls and for floors and roofs.

Building images  
current spread

Eilean Donan Castle  
Visitors Centre,  
Kyle of Lochalsh, UK

(Details on previous  
spread)







As buildings become more sustainable and timber structures grow larger, CLT has become a popular solution for floors, roofs, walls, and stairs due to its strength, appearance, and versatility.

CLT

LVL

Rib Panels

GLT

Sawn and  
planed wood

Cladding and  
decking

KVH

Window & door  
components

Thermowood

Wood pellets



## Applications

CLT is extremely versatile and can be fully combined with other building materials. Thanks to its load distribution properties in two directions, CLT sets no limits to architectural building projects. For this reason, it is becoming increasingly used for the construction of houses and apartment buildings, as well as for industrial and commercial buildings. As a high-quality structural building material with an excellent strength to weight-ratio.

## Benefits

CLT offers many advantages over conventional construction materials:

- Short construction time, easy to assemble and high level of prefabrication
- Up to 10% more living space gained by using CLT
- CLT is lighter than concrete or brick which can help unlock more potential building sites
- Environmentally-friendly and sustainable construction method
- Helps to reduce global warming
- Comfortable and healthy indoor climate
- Thermal insulation properties
- Earthquake-resistant construction method
- Sustainable, certified building material





Current spread

John Morden Centre,  
London, UK

Architect:  
Mae Architects

Developer:  
Morden College

Structural Engineer:  
Michael Hadi

Contractor:  
Clive Graham  
Associates



CLT

LVL

Rib Panels

GLT

Sawn and  
planed wood

Cladding and  
decking

KVH

Window & door  
components

Thermowood

Wood pellets



John Morden Centre  
(details on  
previous spread)





## CLT tech specs at a glance

<b>Application</b>	Structural elements for walls, floors & roofs
<b>ETA number</b>	14/0349
<b>Maximum element dimensions</b>	Length: 16m / Width: 2.95m / Thickness: 0.32 m
<b>Invoiced widths</b>	2.25 m / 2.45 m / 2.75 m / 2.95 m (on request up to 3.45 m)
<b>Panel lay-up</b>	3, 5, 7 or more layers depending on structural design requirements
<b>Wood species</b>	Spruce (pine, fir, stone pine/larch and other wood types on request)
<b>Strength class</b>	C24 according to EN 338, maximum 10% C16 permitted (other strength class compare with ETA 14/0349)
<b>Moisture content</b>	12% +/-2% on delivery
<b>Adhesive</b>	Formaldehyde-free PUR adhesive for finger jointing and surface bonding, approved for load-bearing and non-load-bearing components indoors and outdoors according to EN 15425; Formaldehyde-free EPI adhesive for edge bonding
<b>Surface quality</b>	Non-visual quality (NVI), Industrial visual quality (IVI) and Visual quality (VI); the surfaces are always sanded on both faces
<b>Weight</b>	For determining transport weight: approx. 470 kg/m <sup>3</sup>
<b>Fire rating</b>	<ul style="list-style-type: none"> <li>• Timber components (apart from floors) Euroclass D-s2, d0</li> <li>• Floors Euroclass Dfl-s1</li> </ul>
<b>Thermal conductivity</b>	0.12 W/(mK)
<b>Air tightness</b>	CLT panels are made up of at least three layers of single-layer panels and are therefore extremely air-tight. The air-tightness of a 3-layer CLT panel was tested according to EN 12114
<b>Service class</b>	Service class 1 and 2 according to EN 1995-1-1

See our CLT technical brochure



More CLT inspiration



LVL

Rib Panels

GLT

Sawn and planed wood

Cladding and decking

KVL

Window &amp; door components

Thermowood

Wood pellets



Wisdom Stockholm

Developer:  
Sweden's National  
Museum of Science  
and Technology

Architect:  
Elding Oscarson

Main contractor:  
Oljibe  
Specialist Timber

Contractor:  
Blumer Lehmann



# LVL

Laminated Veneer Lumber (LVL) is an advanced wood product developed for the demands of today's building and construction industry. It consists of 3 mm spruce veneers glued together and is engineered to be relatively stronger than steel, yet lighter than concrete, while being highly workable and durable.

This massive wood product harnesses the power of Nordic Spruce. LVL has proven its value as the preferred choice for a wide range of structural applications. LVL is also one of the strongest wood-based construction materials relative to its weight, providing an ideal solution when strength, dimensional stability and high load-bearing capacity are essential. With its consistent quality and excellent workability, LVL is powering a new wave of agile, renewable construction.

## Applications

LVL is the preferred choice for structural applications such as beams and columns when the ideal solution you're looking for is strength, dimensional stability, and high load-bearing capacity.

LVL delivers high technical performance and predictable results with standard woodworking tools thanks to its homogeneous and consistent quality.

All in all, with LVL, you can expect greater consistency, load-carrying capacity, and design flexibility to achieve maximum efficiency.

## Benefits

- Twice as strong as steel proportionate to weight
- Dimensionally stable, no warps, splinters or splits
- Homogeneous
- Easy to drill, cut, fasten and fit
- Requires only standard wood working tools
- Precision-engineered and easily tailored
- Low waste of material
- Light and highly portable
- Easily blended and bundled with other wood products
- Pre-fabrication cuts construction time
- Entirely sourced from renewable, recyclable wood and environmentally friendly





Wisdom Stockholm  
(see previous spread  
for details)



# Types of LVL

## S grade – precision beams

---

With S grade all the veneers run in the same direction enhancing the strength properties of the material. This feature, along with its light weight and ease of reworking, makes it the ideal choice for the construction industry in a wide range of applications – from framing to beams and roof components to form-work.

### Available dimensions\*

- Thicknesses (mm): 27 / 30 / 33 / 39 / 45 / 51 / 57 / 63 / 69 / 75
- Widths (mm): 200 / 220 / 240 / 250 / 260 / 300 / 350 / 360 / 400 / 450 / 500 / 600, up to 2,400 available on request
- Max length (m): 24

## X grade – precision panels

---

Veneers regularly spaced crosswise through the element makes this ideal for construction panels and boards. The X grade has superior inherent dimensional stability which opens up a host of possibilities for how it can be used – especially where shear strength is a design driver.

### Available dimensions\*

- Thicknesses (mm): 27 / 30 / 33 / 39 / 45 / 51 / 57 / 63 / 69 / 75
- Widths (mm): 200 / 220 / 240 / 250 / 260 / 300 / 350 / 360 / 400 / 450 / 500 / 600
- Panels (mm): 1 200–2 400
- Max length (m): 24

## T grade – precision studs

---

All the veneers in T grade run in the same direction, however these are lighter veneers. As such it has all the qualities exhibited by LVL in terms of dimensional accuracy, structural rigidity and lack of twisting. Therefore, the T grade is suitable for structures requiring dimensional stability and straightness as well as light weight. A typical application is wall studs for internal walls.

### Available dimensions (mm)\*

- 39x66, lengths 2 550–6 000
- 39x92, length 6 000
- 45x45, lengths 2 550–6 000

\* Other dimensions upon request

## Multiple glued LVL G

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Stora Enso LVL G is produced by multiple gluing LVL S or LVL X panels and together creating big dimension panels.

### LVL G L-type

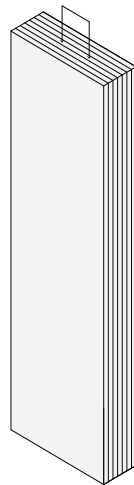
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- LVL G LS and LVL G LX for post & beams structures
- LVL G LX massive panels for horizontal use in flooring or roofing applications

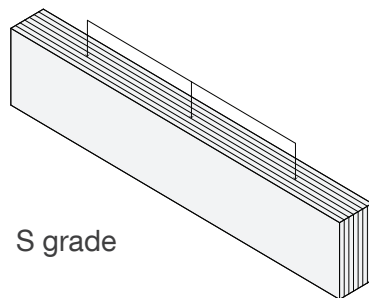
### Available size (master panel)

- Thickness: 84–600 mm
- Width: 100–2 400 mm
- Length: 6.0–19.9 m (with 100 mm increments)

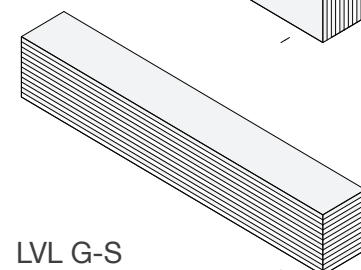
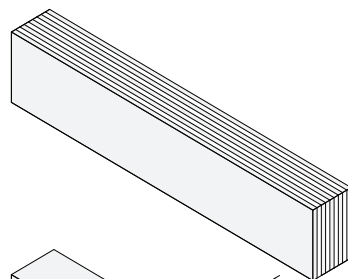
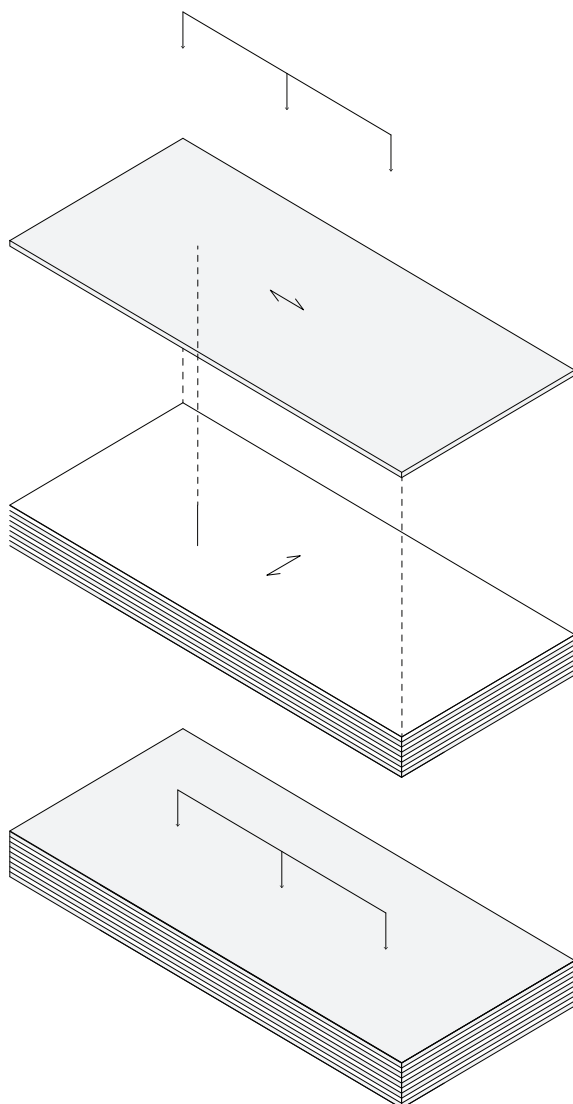




T grade



S grade

LVL G-S  
types for  
post and  
beam

X grade

Wisdom Stockholm  
(see pg 58 for details)





## LVL tech specs at a glance


<b>Application</b>	Structural applications; studs, post and beam frames, wall, floor and roof panels
<b>Maximum width</b>	2 400 mm
<b>Maximum thickness</b>	75 mm
<b>Maximum length</b>	24 m
<b>Wood species</b>	Spruce (Picea abies)
<b>Adhesives</b>	LVL is consisting of multiple layers of veneers that are bonded together with brown phenolic resin. Top face veneer scarf joints are bonded with clear melamine-formaldehyde resin. LVL meets the formaldehyde emission class E1 according to standard EN 717-1.
<b>Moisture content</b>	8–10% upon leaving the mill
<b>Surface quality</b>	Intended for non-visual applications. Standard LVL is delivered unsanded with a clear glue line on the top face. Calibration and optical sanding available on request.
<b>Density</b>	Mean density 510 kg/m <sup>3</sup> (LVL S & X)
<b>Thermal conductivity</b>	$\lambda = 0.13 \text{ W/(mK)}$
<b>Specific heat capacity</b>	$c = 1\,800 \text{ J/(kg-K)}$
<b>Service class</b>	Service classes 1 and 2
<b>Reaction to fire</b>	D-s1, d0 (EN 13501-1)
<b>CE marking</b>	According to European Standard EN14-374

LVL technical  
brochure



Read more about LVL  
on our website





The French Agency for  
Veterinary Medicinal  
Products

Architect:  
DLW Architectes

Developer:  
ANSES ANMV



# Rib panels

Prefabricated Rib panels by Stora Enso make the perfect choice for long-span structures and large open areas featuring unobstructed, column-free spaces. Made of massive wood, they are lightweight, cost competitive and environmentally sound.

We offer ready-to-install rib panels from CLT and GLT or LVL. Our rib panels can be installed quickly and easily on site. All our rib panels are CE marked. Our rib panels are powering a new wave of visionary design.

## Applications

For spans longer than 6 metres, rib panels provide an effective, economical solution. They have superior strength, stability and high load-bearing capacity, at a low weight. This provides you new possibilities in design, as well as maximum structural performance using less material.

The space between ribs can be used to route service lines or other installations. This can be ideal for public buildings that require good acoustic characteristics.

Because the rib panels are prefabricated and lightweight, you get a faster work-flow from delivery to assembly compared with other construction methods. There is no forming or curing time and no special equipment needed. Prefabrication also helps reduce construction costs.

## Benefits

Rib panels create flexible, long span layouts for especially suited for commercial office buildings, residential buildings, schools, industrial buildings and structures with long span roofs.

- Prefabrication allows faster construction and lower cost
- Fast installation, no need for special equipment
- Stronger structures with less material savings in foundation costs due to reduced self-weight
- Allow for long, open spans with less beams and columns for a flexible layout that can adapt over time as needs change
- Entirely sourced from renewable wood

Les Jumeaux -  
Parc Racine<sup>2</sup>,  
Villeneuve d'Ascq,  
France

Architect:  
GBL architectes

Partner of Stora  
Enso: Creation Bois

Developer:  
Aventim Immobilier



## LVL Rib panels tech specs at a glance

<b>Application</b>	Floor and roof elements
<b>Maximum dimensions*</b>	Width: 1.0–2.4 m Length: 5–20 m Ideal for spans from 6m onwards
<b>Height*</b>	225 mm to 1 200 mm
<b>Certification</b>	ETA 18/1132 and CE marked, PEFC™ certified, and FSC available on request
<b>Adhesives</b>	Phenolic resin. Top face veneer scarf joints are bonded with clear melamine-formaldehyde resin. LVL meets the formaldehyde emission class E1 according to standard EN 717-1. Rib Panel assembly adhesive PUR.
<b>Surface quality</b>	Non-visual / Industrial visual
<b>Service class</b>	1 and 2 according to EN 1995-1-1
<b>Reaction to fire</b>	LVL rib panels certified up to R120 fire resistance
<b>Water vapour resistance factor</b>	Wet cup $\mu=70$ Dry cup $\mu=200$

\*Non-standard dimensions possible, subject to enquiry

Read more  
about rib panels  
on our website



## CLT Rib panels tech specs at a glance

<b>Application</b>	Floor and roof elements
<b>Maximum dimensions*</b>	0.8–2.45 m, 6–12.0 m Ideal for spans from 6 m onwards.
<b>Height*</b>	220 mm to 580 mm
<b>Certification</b>	ETA-17/0911 and CE marked. Available as PEFC-certified upon request.
<b>Adhesive</b>	PUR
<b>Surface quality</b>	Visual / Non-visual
<b>Service class</b>	1 and 2 according to EN 1995-1-1
<b>Resistance to fire</b>	CLT rib panels can be manufactured and certified to meet fire resistance requirements from REI 30 to REI 90.

\*Non-standard dimensions possible, subject to enquiry

Marmalade Lane,  
Cambridge, UK

Developer:  
K1 Cohousing

Architect:  
Mole Architects

Partner of Stora  
Enso: Eurban







Stora Enso Hylte  
Mill, Sweden

Architect:  
Sweco Architects AB

CLT

LVL

Rib Panels

GLT

Sawn and  
planed wood

Cladding and  
decking

KVH

Window & door  
components

Thermowood

Wood pellets





Magdalene College  
Library, Cambridge, UK

Architect:  
Níall McLaughlin  
Architect

Partner of Stora Enso  
Eurban

CLT by Stora Enso  
GLT by Neue Holzbau AG



# GLT/Glulam

Glued laminated timber (GLT/Glulam) is an engineered wood product for load-bearing structures. GLT products are stronger and stiffer than conventional timber. With a higher strength to weight ratio than steel, it can offer unlimited flexibility in design and construction opportunities.

GLT is particularly suitable for where there is a requirement for a natural solid wood appearance without visible joints of individual lamellas.

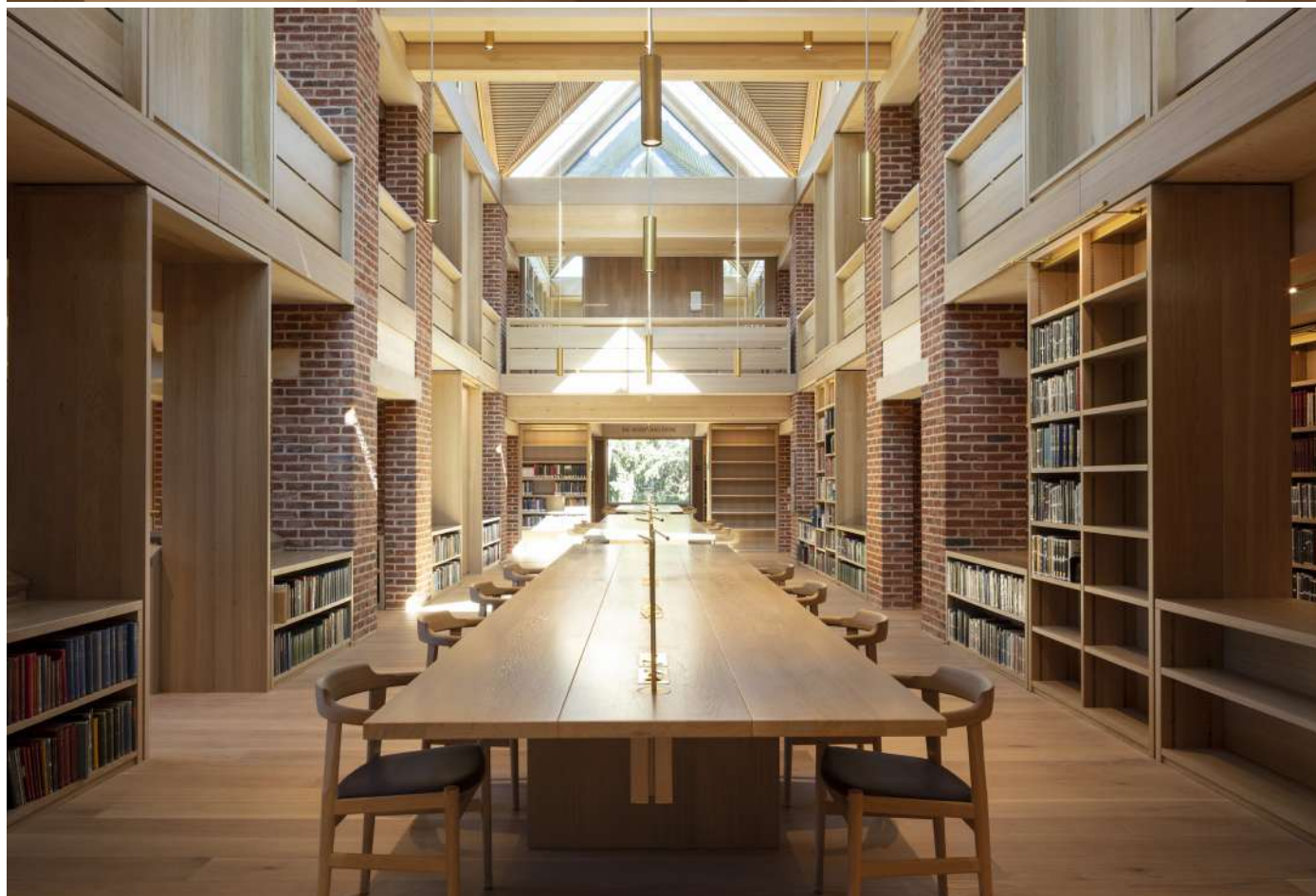
GLT consists of at least two dried boards or lamellas made of coniferous wood that are glued together in parallel with the fibers. Due to the strength grading of the raw material and the optimized positioning of layered structures, the product ensures a stable quality and has higher load capacities than conventional timber. The manufacturing process makes GLT a very dimensionally stable building material. GLT is available in visual or non-visual quality. By finger-jointing the glued laminated timber, lengths of up to 16 metres can be produced.

Current spread

Magdalene College  
Library, Cambridge, UK  
(details on previous  
spread)













## Applications

GLT is typically used for beams in floors, roofs and columns. GLT beams can span more than 30 metres and can be found in every kind of building from churches to schools to commercial office buildings or even giant warehouses and distribution centres.

GLT is typically used where industrial strength is required. They can be used indoor and outdoor in both very dry and wet climates. Because of GLT's strength and excellent seismic resistance they are a suitable choice for construction that needs to span large distances or withstand the more dangerous forces of nature such as earthquakes and typhoons. Common applications include:

- Structural parts of a building or bridge
- Posts, beams, studs, floor joists and roof rafters, lintels, floor beams
- Columns, including round, square, and complex sections
- Posts
- Curved beams and arches

## Benefits

GLTs are highly resource-efficient because they consist of relatively thin pieces of timber bonded together to create a material similar in size and strength of old-growth timber. GLTs therefore offer many benefits:

- Beams can freely span large distances – the sky is quite literally the limit when building with GLTs
- Versatile and easy to make to size
- Manufactured to precise dimensions
- Available in both non visible and beautiful finishes
- Easy to install and repair – no need for special equipment
- Predictable fire resistance; can outlast steel beams under the same fire conditions

## GLT tech specs at a glance

<b>Application</b>	Structural timber
<b>Maximum width</b>	standard up to 240 mm (block glued up to 600 mm)
<b>Maximum length</b>	16 m
<b>Maximum height</b>	Up to 1200 mm
<b>Strength classes</b>	GL24h, GL28c
<b>Wood species</b>	Spruce
<b>Moisture content</b>	12% ± 2% (max 15%)
<b>Surface quality</b>	NVI (non-visual), VI (visual), planed and chamfered
<b>Weight</b>	Approx. 470 kg/m <sup>3</sup>
<b>Water vapour transmission resistance</b>	40 μ
<b>Thermal conductivity</b>	0.13 W/(mK)
<b>Class according EN 13501-1</b>	D-s2, d0
<b>Service class</b>	1 and 2

Read more  
about GLT  
on our website







# Sawn and planed

Stora Enso offers an extensive range of high-quality rough sawn, structural or planed timber. Our portfolio includes a huge variety of dimensions and lengths, and can cut and plane to exact requirements.

We supply strong, workable and beautiful whitewood and redwood products in various qualities cut to specific lengths according to customer needs. Like all our wood products, our classic sawn products come with the highest environmental credentials.

Our sawmills utilise the most modern technology and select the best raw material for each end use – reducing handling costs and raw material waste. Processes are designed for different customer needs and they are continuously improved. This way, you are sure to get a reliable delivery and all-round high quality.

## Applications

Our classic sawn wood segment focuses to serve industrial integrators, merchants and DIY retailers, as well as wholesalers and trading houses. We supply a wide range of sawn and planed wood to choose from: rough, strength graded or planed sawn goods. Uses include:

- General construction (both new build and renovation)
- Joinery
- Frame and truss
- Floorings
- Garden products
- Cladding and decking
- Furniture
- Packaging

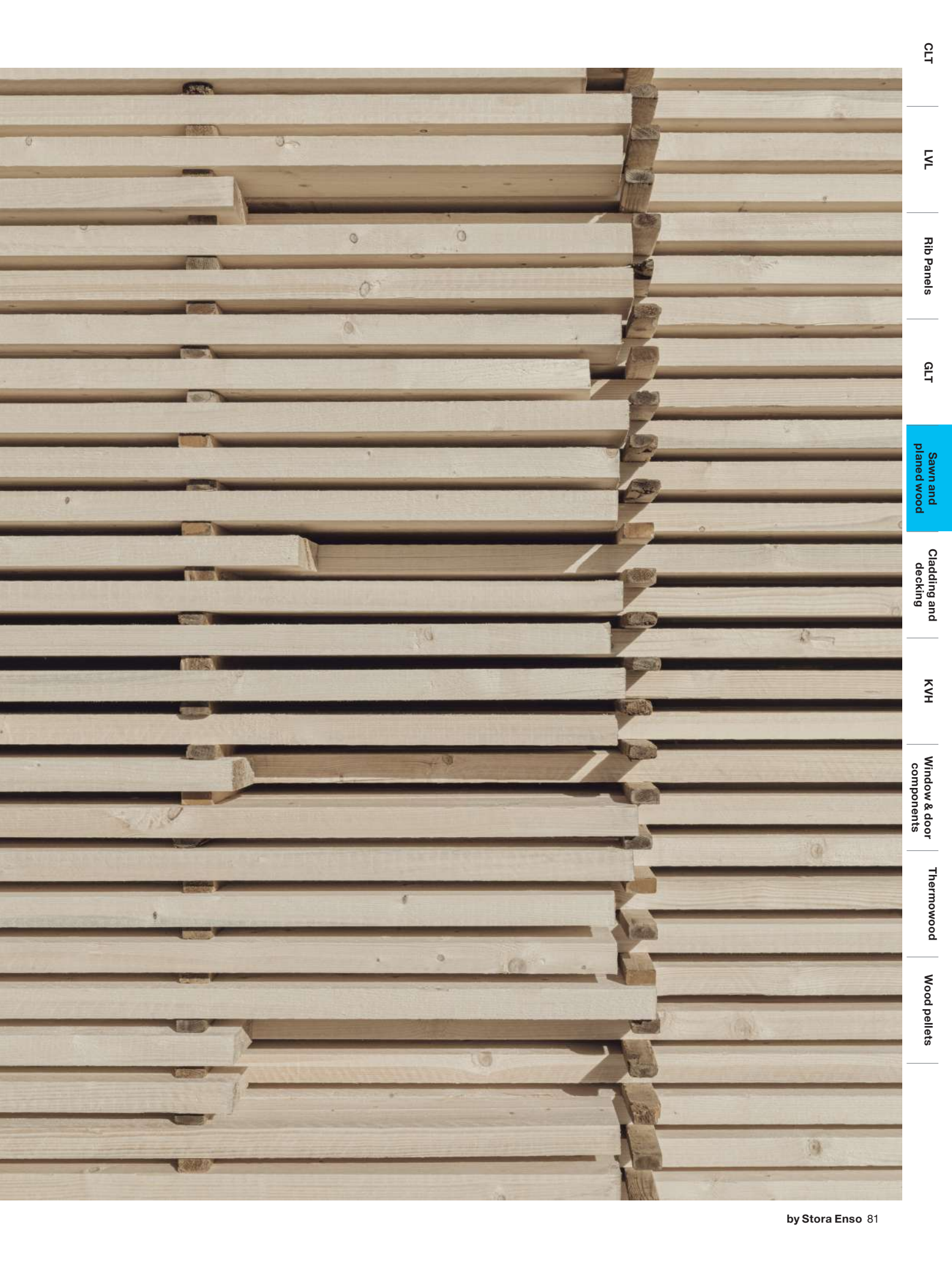
## Benefits

- Highly accurate size tolerances, flexible sizes and lengths
- Superior form stability and surfacing
- Consistent and uniform quality
- High environmental standards
- Utilisation of the latest technology and high-quality raw material

Read more on our website







CLT

LVL

Rib Panels

GLT

Sawn and  
planed wood

Cladding and  
decking

KVH

Window & door  
components

Thermowood

Wood pellets



Moholt kindergarten,  
Trondheim, Norway

Developer:  
Student Welfare  
Organisation in  
Trondheim

Architekt:  
MDH Architects

Partner of Stora Enso:  
Woodcon





## Sawn and planed wood tech specs at a glance

### CLS items used in USA

<b>Thickness</b>	2" (38 mm)
<b>Widths</b>	3"–12" (solid), 6" and 8" (FJ)
<b>Lengths</b>	6'–16' (solid), 26'–36' (FJ)
<b>Wood species</b>	Spruce and pine
<b>Moisture content</b>	12% ± 2%
<b>Grades</b>	No2 and MSR grades
<b>Produced in</b>	Austria, Czech Republic, Estonia, Lithuania, Latvia, Poland

### Hagarazai Japan by Stora Enso

<b>Thickness</b>	15–45 mm
<b>Widths</b>	40–120 mm
<b>Lengths</b>	2.7–3.985 m
<b>Wood species</b>	Spruce
<b>Surface</b>	Planed
<b>Moisture content</b>	18% ± 2%
<b>Grades</b>	A, B
<b>Produced in</b>	Austria, Czech Republic, Finland, Netherlands

### CLS/SCANTS UK by Stora Enso

<b>Thickness</b>	38/42/45 mm
<b>Widths</b>	69/89/94/140 mm
<b>Lengths</b>	2.4–4.8 m
<b>Wood species</b>	Spruce
<b>Surface</b>	Planed
<b>Moisture content</b>	18% ± 2%
<b>Grades</b>	C16 and B
<b>Produced in</b>	Czech Republic, Estonia, Finland, Lithuania, Sweden

### Framings for Australia

<b>Thickness</b>	35, 45 mm
<b>Widths</b>	70, 90, up to 190 mm
<b>Lengths</b>	2.4–6.0 m
<b>Wood species</b>	Spruce and pine
<b>Moisture content</b>	12% ± 2%
<b>Grades</b>	F5, F8, MGP10, MGP12
<b>Produced in</b>	Austria, Czech Republic, Estonia, Finland, Lithuania, Poland, Sweden

### CLS Japan by Stora Enso

<b>Thickness</b>	38 mm
<b>Widths</b>	89, 140, 184, 235 mm
<b>Lengths</b>	1.830–3.985 m
<b>Wood species</b>	Spruce
<b>Surface</b>	Planed
<b>Moisture content</b>	18% ± 2%
<b>Grades</b>	A, B, JAS 2
<b>Produced in</b>	Czech Republic

### C24/C18 for European market

<b>Thickness</b>	45 or 70 mm
<b>Widths</b>	70/95/120/145/170/195/ 220/245 mm
<b>Lengths</b>	Falling length 3.0–6.0 m
<b>Wood species</b>	Spruce or pine
<b>Surface</b>	Planed and rough sawn (C-class)
<b>Moisture content</b>	18% ± 2%
<b>Grades</b>	Mainly C24, C18, but even C30, C35 and C40
<b>Produced in</b>	Estonia, Sweden, Finland, Netherlands



**Donau Lodge,  
Ybbs an der Donau,  
Austria**

**Architect: Planorama**



# Cladding & decking

Stora Enso provides ready to install products for exterior claddings, interior walls, ceiling panels and floor boards. The products are suitable for both new constructions and renovations and ideal for construction companies, industry retailers and DIY builders.

Consistent quality and availability of goods are provided due to many years of production experience, the careful selection of raw materials and modern technologies. The products are available uncoated or surface treated. There are several types of coatings available: primer, paint, wax or lacquer. All of the products are mini-bundled or neatly shrink-wrapped in order to achieve clean, long-lasting and user friendly packaging.

## Applications

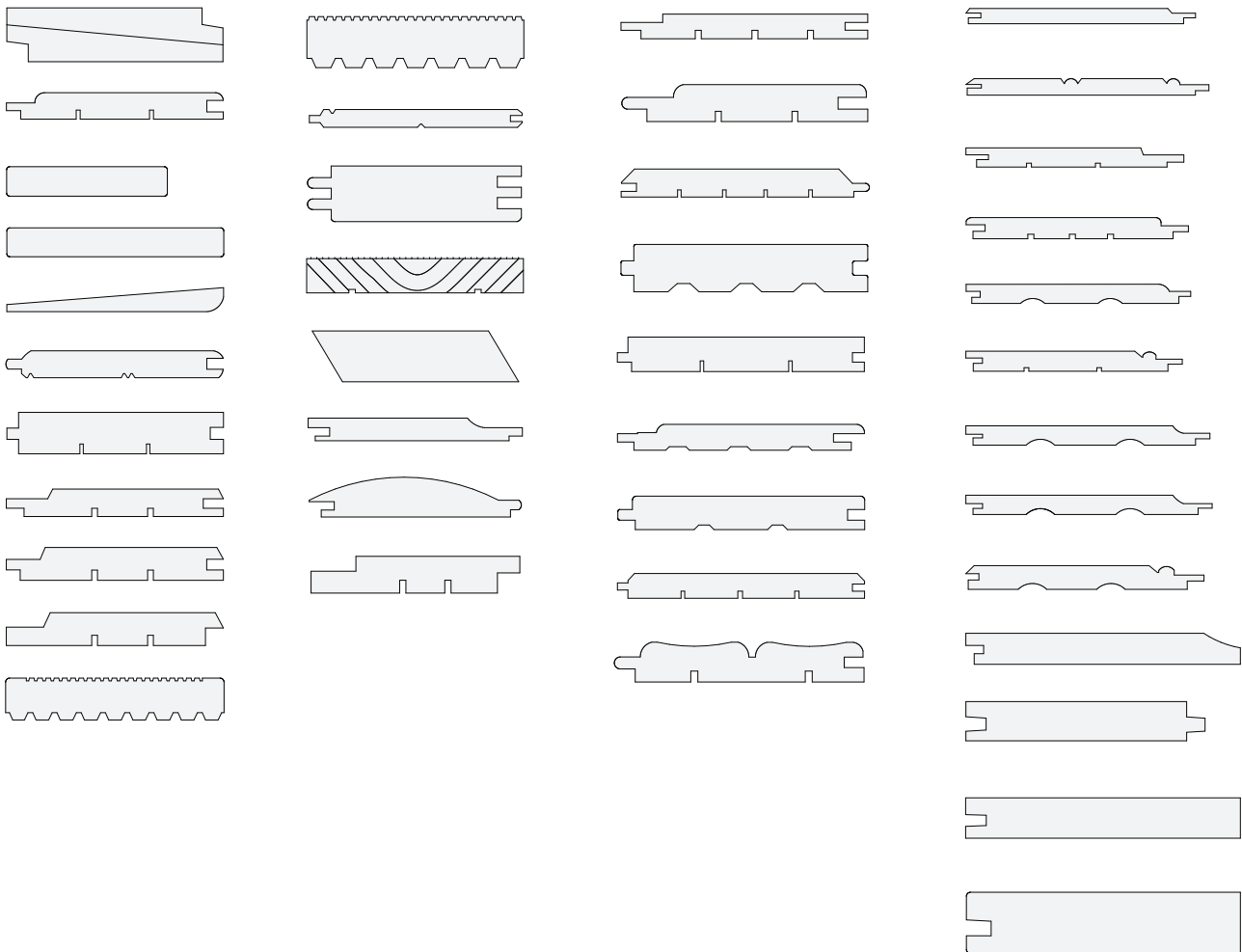
A wide range of uses for wood cladding and decking including:

- Exterior and interior cladding
- Wall and floor panels
- Decking and garden furniture/fences
- Saunas
- Facades
- Building sunshades

## Benefits

Our wood cladding and decking panels are lightweight, feature precise tongue-and-groove joints, and have uniform, high quality. This makes them easy to install and cost-effective. When properly maintained, they last for decades.

### Profiles produced by Stora Enso







Wood Hotel,  
Vienna, Austria

Developer:  
Katharo Lodges GmbH

Architecture &  
structural design:  
Zieritz + partner ZT  
GmbH

CLT

LVL

Rib Panels

GLT

Sawn and  
planed wood

Cladding and  
decking

KVH

Window & door  
components

Thermowood

Wood pellets

## Types of cladding and decking

### Exterior cladding

Exterior cladding in wood adds a warm, natural look and feel to a building. Choose natural, factory primed, or ready finished and painted panels from all colours on the exterior paint colour chart. Priming will prolong durability and help protect the cladding panels from sunlight and moisture as well as provide an excellent adhesion surface for any top paint coat.

### Interior cladding and wall panels

Wood cladding can add interest, warmth and comfort to an interior space. It's perfect for softening a more industrial design and giving it some character.

Our wood interior cladding panels come uncoated or ready finished with wax or varnish. A popular treatment is a white wax varnish with water-based pigment content, which lets you leave the wood grains visible.

### Wooden flooring

Solid timber floorboards provide elegant flooring that's pleasant to the touch.

Our floorboards are crafted from sustainably sourced, sound-knotted pine or spruce and feature beautiful grain patterns. This durable product balances indoor humidity and has natural sound insulation properties.

Read more about  
cladding and  
decking here



Stora Enso Wood  
Products provides  
wood-based innova-  
tions and solutions  
for everyday living  
and housing needs.

Family Riegler House  
St. Thomas am  
Blasenstein, Austria

Architect:  
Lotte Santner







CLT

LVL

Rib Panels

GLT

Sawn and  
planed wood

Cladding and  
decking

KVH

Window & door  
components

Thermowood

Wood pellets







# KVH®

KVH structural timber (Konstruktionsvollholz) is a technically-dried, strength-graded and generally finger-jointed solid wood product made from softwood (mainly spruce) and designed for a wide variety of applications in modern timber construction. Alternative types of softwood are also available for special uses, such as for thresholds or for outdoor areas not directly exposed to the elements.

## Applications

KVH is a solid structural timber typically made from spruce softwood and used in modern timber construction. Other softwood types, like pine, are available on request for special uses like wooden thresholds or outdoor areas not directly exposed to the weather.

**Extension of the  
Andel Elite Dental  
Center, Hlohovec,  
Slovakia**

**Partner of Stora Enso  
CLT Slovakia**

**Architect:  
Ing. arch. Daniel  
Kubiš, Ing. arch.  
Mária Šebová, Ing.  
Martin Plošický**

**Contractor:  
Ing. Ľuboš Mesarc**

## Benefits

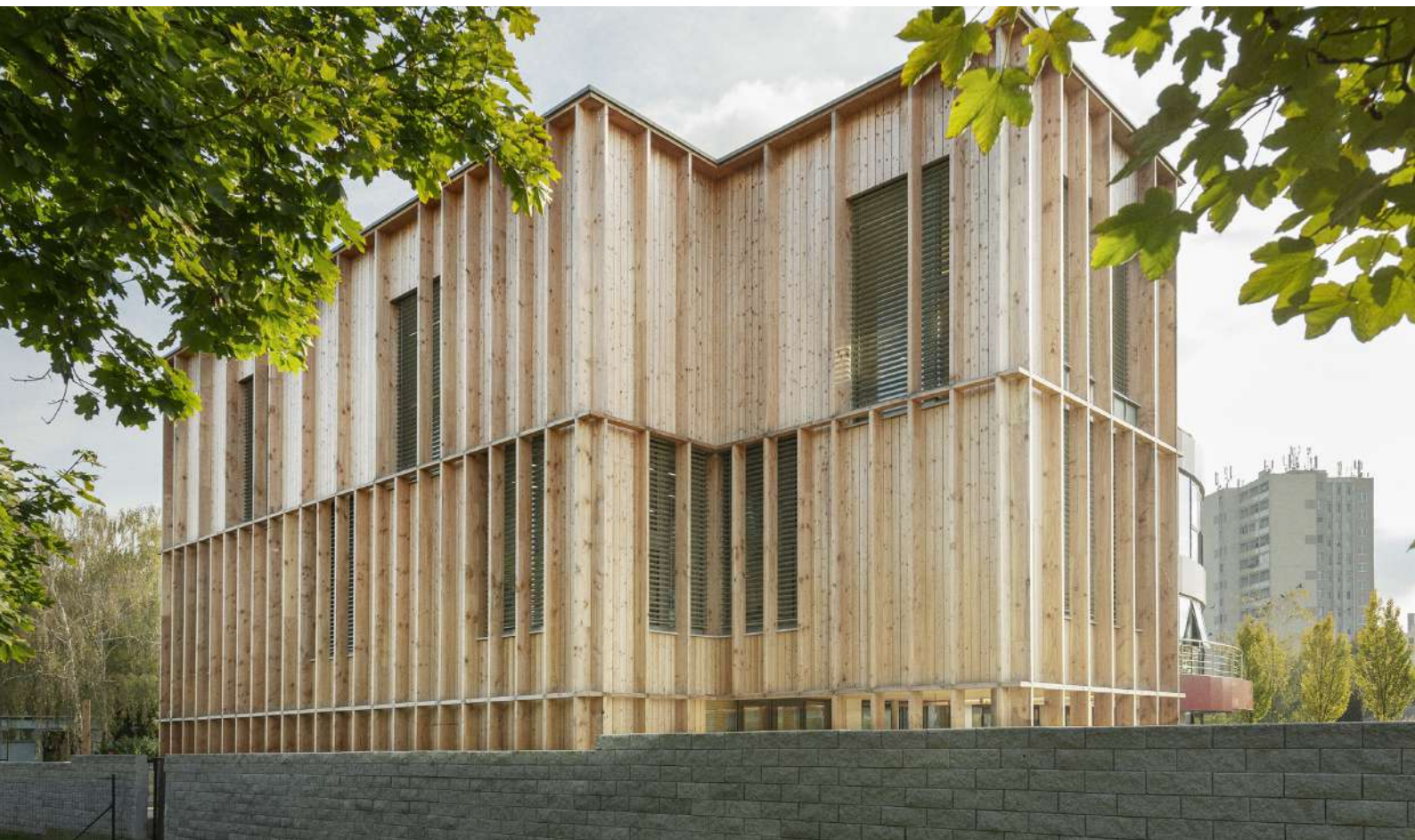
- Superior dimensional stability
- Attractive solid wood appearance
- Finger jointing enables lengths up to 16 m
- Surpasses requirements specified in German grading standard DIN 4074-1 and other European grading standards
- Insect-resistant due to kiln drying, so you can eliminate preservative treatment in compliance with national standards for wood preservation
- Custom orders on short notice possible



See our KVH  
brochure for more



Read more about  
KVH on our website





## Types of KVH structural timber

Depending on the intended use, we manufacture two ranges which essentially differ only in terms of their visual appearance:

- KVH-Si for visible areas
- KVH-NSi for non-visible structures

### KVH tech specs at a glance

Grading criterion	Requirements KVH-Si	Requirements KVH-NSi	Comments
<b>Technical standard</b>	EN 15497 EN 14081	EN 15497 EN 14081	Finger jointed timber Non finger jointed timber
<b>Strength class<sup>1</sup> (acc. EN 338)</b>	Min. C24	Min. C25	Important properties (strength, stiffness and density) needed for dimensioning acc. EN 1995-1-1
<b>Grading standard</b>	DIN 4074	DIN 4074	Assignment of visual grading standards acc. EN 1912
<b>Wood moisture content</b>	15% ± 3%	15% ± 3%	Technically dried at minimum 55°C. The specified wood moisture content is a prerequisite for dispensing, for the most part, with preservative treatments, and also the precondition for gluing
<b>Type of cut</b>	The cut is made taking into account the fact that on an ideally formed log, the pith is cut through with two-strand cutting		For KVH-Si the cutting of a centreboard is possible (≥ 40mm) upon request
<b>Wane (acc. DIN 4074)</b>	Not permitted	≤ 10% of the smaller side of the cross section permitted	
<b>Dimension stability of the cross section (acc. EN 336)</b>	Tolerance class 2: < 100 mm: ± 1.0 mm d/b ≥ 100 mm: ± 1.5 mm		The tolerance of the stability of the length needs to be defined, principally no negative deviations permitted
<b>Knot condition</b>	Loose and dead knots are not permitted; occasionally faulty knots or part of knots up to max. 20 mm Ø are permitted	Acc. DIN 4074	
<b>Knot diameter ratio</b>	Acc. DIN 4074 (e.g. S10/C24: A ≤ 2/5, not more than 70 mm)		Knot ratio A, determined acc. DIN 4074
<b>Ingrown bark</b>	Not permitted	Acc. DIN 4074	
<b>Cracks, radial shrinkage cracks (dry cracks)</b>	Crack-width b ≤ 3% of the width of the surface	Acc. DIN 4074	KVH-Si full fills higher needs as the requirements acc. S10/C24, DIN 4074
<b>Resin pockets</b>	Width b ≤ 5 mm	–	Additional criteria
<b>Discolouration</b>	Not permitted	Acc. DIN 4074	KVH-Si full fills higher needs as the requirements acc. S10/C24, DIN 4074
<b>Insect damage</b>	Not permitted	Acc. DIN 4074	KVH-Si full fills higher needs as the requirements acc. S10/C24, DIN 4074
<b>Twist</b>	Acc. DIN 4074	Acc. DIN 4074	The permissible extent of twisting is not specified in further detail as no unacceptable twisting should be expected if all the other criteria are complied with
<b>Crook</b>	Acc. DIN 4074 (free of heart centre cutting ≤ 4 mm/2 m)	Acc. DIN 4074	KVH-Si full fills higher needs as the requirements acc. S10/C24, DIN 4074
<b>End finishing</b>	Trimmed perpendicular	Trimmed perpendicular	
<b>Surface properties</b>	Planed and chamfered	Levelled and chamfered	
<b>Packaging</b>	Per package 4 sides green wrap (single pieces upon request 4 sides black wrap)	Per package 4 sides green wrap	White wrap upon request
<b>Marking</b>	Marked on surface		
<b>Certificates</b>	Certificates can be sent on request – or downloaded from Stora Enso homepage		

1) Higher strength class upon request





# Window and door components

Stora Enso specialises in quality components. We draw on generations of innovation to create the best-in-class products for windows, doors, mouldings, thresholds, and much more.

Our extensive portfolio of offerings caters to a wide range of luxury and everyday applications. Everything we make is tailor-made. And naturally, as sustainability leaders, we ensure the most efficient use of raw materials with minimal waste.

As Europe's leading industrial component manufacturer with multiple production units, and sourcing pine and spruce from our own forests, we provide peace of mind for our customers that we can deliver.

## Quality

All raw materials are carefully selected from our sustainably managed forests and scanned (x-ray, visual grading) to guarantee the best possible quality, according to customer specification. We exceed standards for all materials and processes. Quality certificates from the forest to our mills ensure we meet the most rigorous controls. Production certificates include ISO 9001, ISO14001, ISO 5001, ISO 45001.

Country specific product quality certificates include Nordic Certified Scantlings, RISE/CR022 and VinduesIndustrien (DVV).

Precision fabrication of all our products deliver uniform quality with highly accurate size tolerances, enabling maximum performance for windows and doors for decades to come.

## Sustainability

We know the origin of all the wood we use. We fully support our customers with their sustainability needs and requirements. Third-party certification under FSC®, PEFC chain of custody or both ensures full traceability of the raw material from sustainably managed forests.





## Our offerings

### Door components

Stora Enso offers high-quality joinery timber for door frames, jambs, posts, stiles and rails. The quality starts at the source with carefully selected raw materials from sustainably managed forests at the heart of our entire product range.

### Window components

Stora Enso offers high-quality joinery timber for window sashes, frames, posts, skirtings and more – uniquely engineered to your needs. We provide finger-jointed and glue laminated products that feature continuous and uniform quality and highly accurate size tolerances, enabling maximum performance for windows for decades to come.

Our wide service offering includes both horizontal and vertical finger-jointing, planing, cut-to-length, continuous grain, WoodHeart® content and more.

### Effex® Dura—this is one special product!

Its innovative thin-lamella structure is ideal for long-span windows and sliding doors where extra rigidity is needed. Its strength and visible properties are also excellent for wooden stair handrails, furniture, etc.

- Thin lamella structure on visual surface is beautiful (stained or lacquered)
- Dimensionally stable up to 6 m
- Versatile for use with smaller dimensions in sashes/frames and maximises the overall glass area for expansive panoramic views.



## Door and door frame components tech specs at a glance

<b>Thickness / Widths / Lengths</b>	Customer selectable
<b>Wood species</b>	Pine and spruce
<b>Moisture content</b>	10, 12% $\pm$ 2%
<b>Processing</b>	Planed, finger-jointed, laminated, module length cut
<b>Surface</b>	Planed, rough
<b>Glued products</b>	Edge or face glued products into block profiles
<b>Grades</b>	1–4 side clears, sound knot quality

## Window components tech specs at a glance

<b>Thickness / Widths / Lengths</b>	Customer selectable
<b>Wood species</b>	Pine
<b>Moisture content</b>	10, 12% $\pm$ 2%
<b>Surface</b>	Planed
<b>Strength class</b>	N/A
<b>Processing</b>	Planed, finger-jointed, glue laminated, module length cut
<b>Glued products</b>	Edge- or face-glued products into L or Block profiles
<b>Grades</b>	1–4 side clears & sound knot quality

## Effex® Dura tech specs at a glance

<b>Thickness</b>	45–126 mm
<b>Widths</b>	45–306 mm
<b>Lengths</b>	Up to 6 m
<b>Wood species</b>	Pine
<b>Surface</b>	Planed, finger-jointed, laminated
<b>Moisture content</b>	Max. 10% $\pm$ 2%
<b>Strength class</b>	MoE up to 14.4 [kN/mm <sup>2</sup> ] depending on structure
<b>Grades</b>	Depending on customer requirement



More Window and door product inspiration



From forest to windows, Stora Enso brings you only the best joinery timber. We are constantly innovating to help the window industry respond to the increasing need for energy-efficiency and productivity. With permission from Elitfönster AB.



CLT

LVL

Rib Panels

GLT

Sawn and  
planed wood

Cladding and  
decking

KVH

Window & door  
components

Thermowood

Wood pellets

Current spread and  
next spread:  
After thermal treatment,  
the wood exhibits a  
uniform and rich, gold-  
en-brown tone through-  
out that showcases the  
natural vein of the wood.



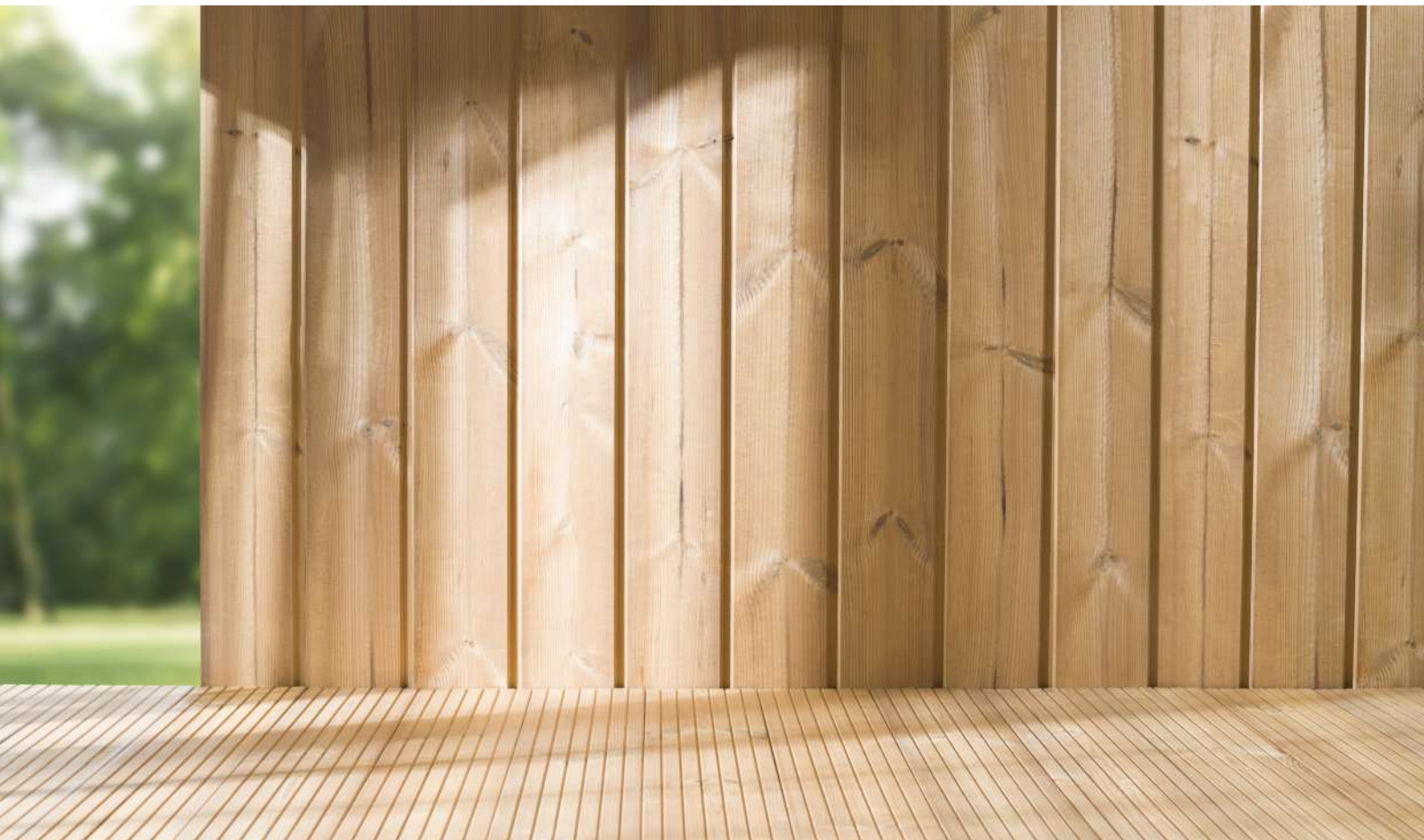


# Thermowood®

Warm, safe and sound wood for decking, cladding and sauna interiors. Stora Enso Thermowood is thermo-treated wood produced using completely natural methods – heat and steam. The thermal treatment improves the wood's properties, opening up a wide range of applications for use outdoors or indoors.

Thermowood uses a patented production process and is a registered trademark that may only be used by licensed companies that are members of the International ThermoWood Association.

The raw material for Thermowood comes from premium-quality pine and spruce from responsibly managed forests. Since no harmful chemicals are added during the treatment process, Thermowood contains only renewable substances. This makes Thermowood also the perfect solution for a warm, attractive deck that's pleasant to walk on and safe for kids to play on, and is also an excellent choice for interior cladding, spa and sauna interiors.



## Applications

Thermowood is an environmentally sound alternative to pressure-impregnated wood. Its natural high-temperature treatment makes this wood resistant to varying weather conditions, fungi and rot.

Because of its decay resistance, lower moisture content and lower thermal conductivity compared with untreated wood, Thermowood is dimensionally stable, durable and possesses good insulation. It keeps its shape and stands up to changing climate conditions. Typical uses include exterior cladding and facades, wooden decking, fences, garden furniture and sun shades for buildings as well as saunas.

## Benefits

- 100% natural processing with no chemical additives, biodegradable and recyclable
- Third-party certification under FSC®, PEFC chain of custody or both ensures full traceability of the raw material from sustainably managed forests
- Superior performance outdoors, indoors or in different weather conditions thanks to special thermal treatment
- Possesses high dimensional stability, durability and decay resistance, has colour uniformity and reduced thermal conductivity
- No resin leakage, easy to paint or apply surface treatments



More Thermowood  
inspiration



## A versatile product, a variety of uses

Thermowood is a very popular choice for **exterior cladding**, decking, and facades. We provide standard and custom wood profiles, or the raw material for further processing. Because, Thermowood is resin and pith free, you can easily apply glue, paint, oil finishing or surface treatments like a fire-retardant coating or simply leave it natural. Thermowood is also an ideal material for **interior panelling** and flooring, furniture and other building components. With reduced thermal conductivity and resin-free, it works very well in saunas too.

To ensure the best technical performance, Stora Enso's Thermowood is available in two standard thermal treatment classes, Thermo-S and Thermo-D. Thermo-S has improved stability, an attractive light golden-brown tone, and is mainly suitable for interiors. Thermo-D has improved durability, a darker brown tone, and is used in both interior and exterior applications.

## Thermowood tech specs at a glance

<b>Application</b>	External and internal cladding and decking, industrial productions like joineries, window and door manufactures
<b>Heat treatment classes</b>	Two standard thermal modification classes – Thermo-D and Thermo-S
<b>Standard dimension</b>	Rough Thermowood out of pine and spruce is available as standard: 25x125 / x150; 32x125 / x150; 50x125 / x150 Planed sizes are often 19, 26, 42 mm thick and 117 and 140 mm wide. Other sizes available on request.
<b>Use class</b>	Stora Enso Thermowood with Thermo-D treatment is suitable for use class 3 (EN 335)
<b>Durability/resistance to rot</b>	Thermo-D is falling into durability class 2 (EN 350). Without additional treatments Thermowood by Stora Enso is not resistant to termites.
<b>Dimensional stability</b>	The thermal treatment process greatly reduces wood's tendencies to warp, swell or shrink in different humidity conditions. The wood's equilibrium moisture balance may be decreased to less than 40–50 % compared to untreated timber
<b>Thermal properties</b>	0,09 W/(m K) according EN ISO 13787 + EN 12667
<b>Resistance to fire</b>	FD -s2, d0 according SFS-EN 13502-1 + A1
<b>Leaching</b>	As no substances are added during the Thermowood process, no chemical leaching will occur. In addition, as the resin is removed during the process, the problem of resin leakage through the knots or pitch pockets is removed
<b>Ecological &amp; safe</b>	Thermowood is produced using high temperature and steam. Since no chemicals are added during the process Thermowood contains only renewable substances. Disposal of offcuts can be burned or given into the normal waste system.
<b>Certification</b>	PEFC, FSC, CE, KOMO, International ThermoWood Association member





# Wood pellets

Wood pellets — reliable heat from a renewable resource. Stora Enso's quality wood pellets made only from wood shavings, dry chips, and sawdust by-products from our sawmills offer a reliable, renewable energy source for residential, commercial, or industrial heating. Heating with our pellets leaves a much smaller CO<sub>2</sub> footprint than heating with natural gas – and an even smaller footprint than oil, making them both an economical and environmental positive choice. Our pellets are also a popular choice for horse bedding that's comfortable, hygienic, and hassle-free.

We take responsibility for the entire supply chain from forest to front door. As we integrate our wood pellet production from several mills across Europe and only sell locally we can ensure stable pricing, efficient delivery times and environmental certification. Stora Enso is one of only a few pellet producers in Europe with a fully transparent, third-party verified, Environmental Product Declaration (EPD).

## A complete portfolio to serve diverse needs

### **Pellets for residential heating**

At Stora Enso, we source, make and deliver biomass pellets. Heating with our wood pellets is a natural, sound way to heat homes and districts that's gentle on the environment. With less smoke out the chimney and less money from your wallet, Stora Enso has your heating and environmental needs covered. Heating an average-sized house with our premium pellets instead of natural gas can save 2,7 tons CO<sub>2</sub> annually. We offer wood pellets by the bag or in bulk available year-round in easy-to-store containers thanks to their compact nature. And, because our biomass pellets are a dense form of fuel with high energy content, they burn up to 25–50% on average less than fossil heating fuels.

### **Pellets for industrial heating**

Stora Enso biomass wood pellets offer an environmentally friendly alternative to gas, oil, and electricity to power industrial plants and commercial premises. We use only wood shavings, dry chips, and sawdust to manufacture our pellets, meaning our pellets are highly energy-rich and produce a minimal volume of ash.

When burned in pellet boilers, our consistently high quality premium pellets lower both heating bills and CO<sub>2</sub> emissions. Pellet pricing is more reliably stable vs speculation-driven energy like electricity and fossil fuels. This makes budgeting both affordable and predictably accurate. Depending on your country, you could also benefit from tax incentives and renewable energy credits.

For companies participating in supplier transparency and traceability programs, our pellets come with third-party certification from FSC® and PEFC.

### **Pellets for horse bedding**

Pellet horse bedding can make a great alternative to wood shavings or straw. Stora Enso's premium horse bedding pellets are sourced from local and sustainably managed softwood. Our horse bedding pellets quickly absorb moisture, transforming them into a fluffy bed, soft and comfortable underfoot. Our pellets contain natural resins and oils to combat ammonia, keeping your stable smelling sweet.

Our pellets are also heat-treated and are therefore naturally antiseptic, free from mould and bacteria. They are a safe choice and provide a healthy hoof and limb environment for all ponies and horses. The virtually dust-free pellet bedding can also benefit horses prone to respiratory conditions. Unlike other bedding materials, this super-absorbent and long-lasting bedding results in fewer muck heaps. As a result, it's possible to cut mucking out time by more than half. Thanks to the compact nature of wood pellets, the bags take up minimal space compared with similar alternatives.











## Applications

Pellets are an energy-rich, low-ash, low-moisture and clean-burning heating source for wood pellet heaters and boilers in residential, commercial and large-scale industrial heating applications.

Our premium wood pellets also make a natural and comfortable choice for equine bedding. They are highly absorbent, drastically cut mucking out time, reduce bedding consumption, and are easy to store and transport.

## Benefits

- Thanks to years of ambitious and continuous work in our operations to replace fossil-sources with non-fossil or renewable energy solutions, and by removing unnecessary transport, our premium pellets have up to 70% lower carbon footprint than most producers in the countries we operate.
- Reduces environmental impact – a clean-burning renewable fuel source
- We surpass all legal requirements including FSC® and PEFC Chain of Custody certified wood traceability system for responsible sourcing. Our pellets are certified A1 by the leading independent testing authorities, including ENplus® DINplus
- Cost efficient – costs much less on average than fossil heating fuels
- Energy rich – with its high energy content and density, it burns more efficiently than traditional firewood
- Easy online ordering from the comfort of your own home and superior customer service and delivery reliability
- Convenient to use – can be bought in bulk or bags and stored in less space than other biomass fuels
- Absorbent as equine bedding

## Pellets webshop

Stora Enso's quality wood pellets for home use or equine bedding can be ordered directly to your home from our webshop



Pellets webshop



Read more about Pellets on our website

## Pellets tech specs at a glance

<b>Diameter</b>	6/8 mm
<b>Dry content</b>	Approx. 92%
<b>Ash content</b>	Approx. 0.4%
<b>Ash melting point</b>	Approx. 1 400 °C
<b>Density</b>	Approx. 650 kg/m <sup>3</sup>
<b>Energy per kg</b>	Approx. 4.85 kWh
<b>Energy per m<sup>3</sup></b>	Approx. 3 250 kWh





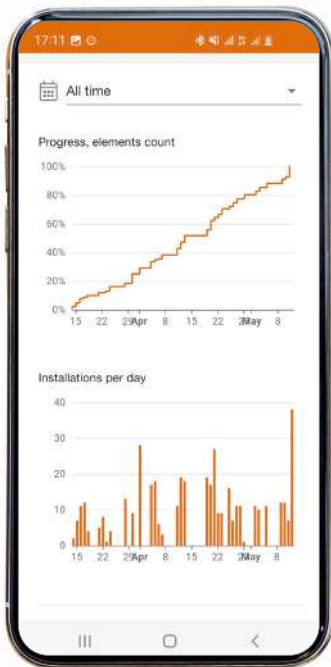
# Digital tools

Stora Enso is continuously developing new digital tools and services to help everyone in the construction sector build in wood. These range from online design tools to on-site apps that streamline logistics in the construction process. Stora Enso's BIM (Building Information Modelling) Toolbox brings digital online resources to every building engineer and architect's desktop – including Stora Enso's BIM object data and downloadables from building concepts.

Prodlib is a comprehensive and up-to-date online catalogue of Stora Enso's building components for building designers. ProdLib libraries are free to download and include CAD and BIM files for architects and structural engineers.

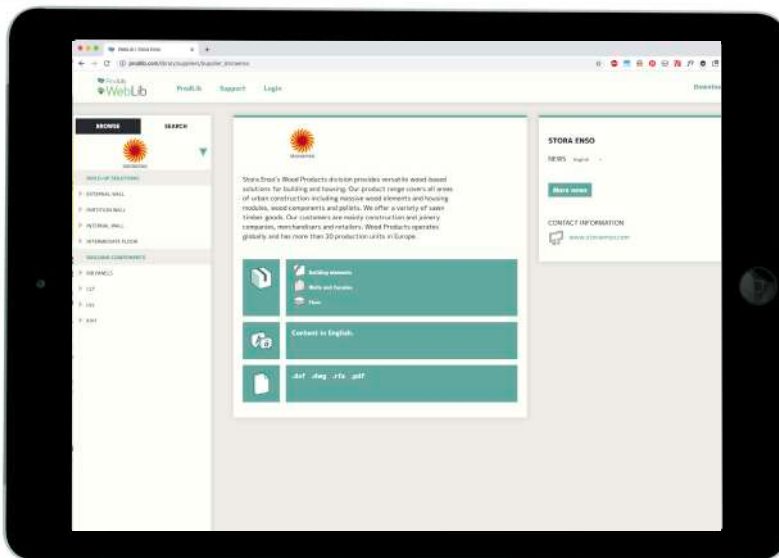
Sylva 360 is the app for CLT construction sites. It streamlines construction site logistics by allowing a user to scan the QR code of a CLT panel and immediately see it displayed in a 3D model.

Calculatis by Stora Enso is a free professional online design tool for timber structures.

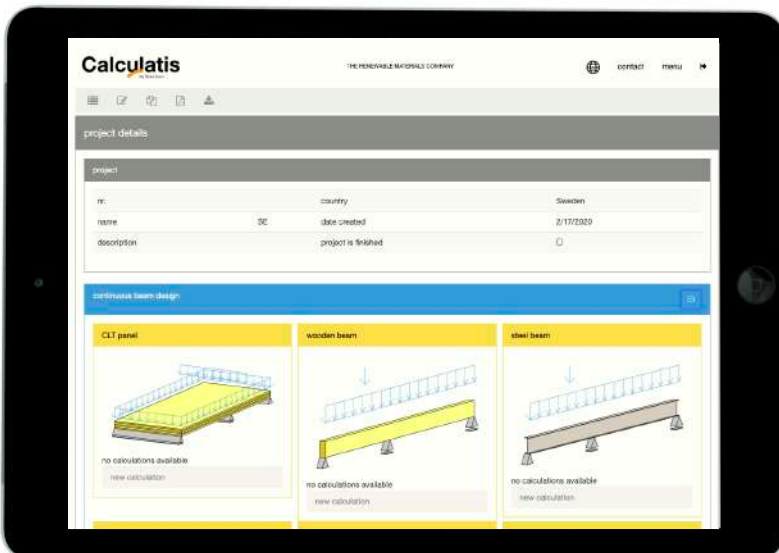


# Sylva360™

by Stora Enso



Read more about  
ProdLib  
<https://www.prodlib.com/stora-enso/>



Read more about  
Calculatis



Read more about  
Sylva360



## BIM Toolbox

Stora Enso's BIM Toolbox brings digital online resources to every building engineer and architect's desktop – including Stora Enso's BIM object data and downloadables from building concepts. BIM is a digital 3D model-based process to more efficiently plan, design, construct, and manage buildings and infrastructure. BIM objects combine product or system specific information, including product properties, geometry as well as visualisation data.

Stora Enso's BIM Toolbox provides architects and building engineers with BIM object data and Building Concepts manuals for Stora Enso's building components. Wall and floor components as well as wall and floor structures based on CLT or LVL are now available as digital objects in the ProdLib and WebLib digital libraries – and the library is continuously updated and developed.

### Benefits

- Easily downloadable Stora Enso BIM objects
- Facilitates building design
- Free
- Supporting app: Sylva 360

## Sylva 360

Sylva 360 is the app for CLT construction sites. It streamlines construction site logistics by allowing a user to scan the QR code of a CLT panel and immediately see it displayed in a 3D model. The user can also see where the panel should be assembled on the construction site as well as the quality and weight of the panel.

The 3D file can be loaded as an email attachment or from a cloud drive (iCloud, Dropbox, OneDrive). When the file has been loaded, no more internet connection will be required so it's possible to work with the app on site even if there is no internet coverage.

It's also possible for two or more devices to connect to the same Sylva 360 account which means that a crane operator and an installer can both see the information simultaneously on their devices with all the relevant information such as weight and position.

## ProdLib

ProdLib is a comprehensive and up-to-date online catalogue of Stora Enso's building components for building designers. ProdLib libraries are free to download and include CAD and BIM files for architects and structural engineers. The BIM objects can be integrated seamlessly in the designers' software of choice for speedy and accurate digital modelling.

## Calculatis

Calculatis by Stora Enso is a free professional online design tool for timber structures.

Calculatis can be used to design floors, roofs, columns, beams, headers, supports, and CLT and LVL elements. The tool can also conduct thermal and condensation analyses, fire design (E and I criteria) and Swiss building code (SIA).

### A tool for everyone

Anyone can use Calculatis. It is free and can be used directly through your web browser. The software is also available in six different languages.









Sawmill Ybbs, Austria





# About Stora Enso

Part of the global bioeconomy, Stora Enso is a leading provider of renewable products in packaging, biomaterials, wooden construction and paper, and one of the largest private forest owners in the world.

We believe that everything that is made from fossil-based materials today can be made from a tree tomorrow. Sustainability and responsible business practices are deeply embedded in our strategy.

Our low-carbon, fiber-based products are renewable and recyclable. They offer solutions to climate change and promote positive impacts on the environment, thus enabling our customers to become more eco-friendly .

We employ some 22 000 people . Our shares are listed at the Helsinki (STEAV, STERV) and Stockholm (STE A, STE R) stock exchanges . In addition, the shares are traded in the USA as ADRs .



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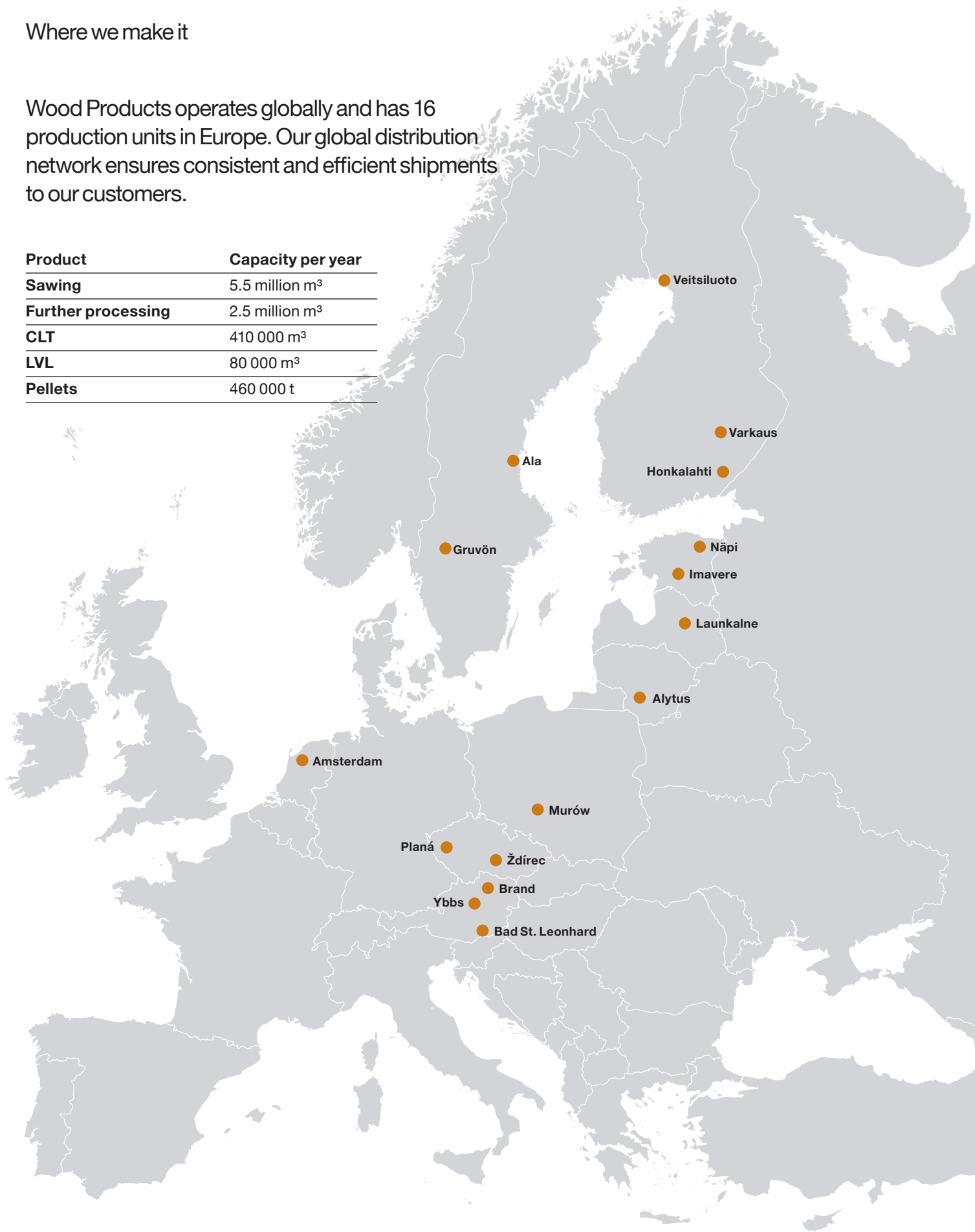
Design  
Anna-Kari Lejon  
Studiomatic LLC



## Where we make it

Wood Products operates globally and has 16 production units in Europe. Our global distribution network ensures consistent and efficient shipments to our customers.

Product	Capacity per year
Sawing	5.5 million m <sup>3</sup>
Further processing	2.5 million m <sup>3</sup>
CLT	410 000 m <sup>3</sup>
LVL	80 000 m <sup>3</sup>
Pellets	460 000 t





storaenso

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**THE RENEWABLE MATERIALS COMPANY**