10 advantages of building with mass timber

StoraEnso

If you're reading this, you're hopefully considering building with wood, and that makes us smile! To help you get on board with this incredible shift in construction, we've created a list of the top ten advantages of building with wood.

This simple, straightforward guide answers the most common questions and makes that journey from "What if it was built with wood" to "Timber all the way!" easy.

Each advantage is designed as an entry point for further inquiry to help you make informed decisions in an uncomplicated, easy-to-understand way.

Obviously, we are a bit biased about using wood as a construction material; after all, we're Europe's largest supplier of wood products. We've supplied over 20,000 construction projects globally, from biophilic award-winning architectural wonders to everyday easy-to-build homes.

However, we would not have our roots in the oldest known stock-listed company in the world if we did not share trustworthy information like this freely.

And it's not just us who think this way. All around, we are seeing more **examples of timber architecture**. We graciously thank our partners for sharing images of their work with us. Thank you B&K Structures, ByggPartner, CBD, EURBAN, Madergia, WiEHAG, WO2, Woodcon, Woodeum, Raimund Baumgartner and ZMP Holzbausysteme.

And thank you for being here! Enjoy this guide, and let us know if you have more questions. We have offices and partners across the globe, so reach out to us to find out more.

Cover
Arding & Hobbs, London, United Kingdom
Architect Stiff + Trevillion
Stora Enso partner B&K Structures
Photo Richard Chivers

Høyt Under Taket, Skien, Norway
Architect Snøhetta
Stora Enso partner Woodcon
Photo Snøhetta/Eirik Evjen

Advantage #1

It's a material world

Concrete is an important building material, but it's also one of the most destructive materials on Earth.[1] The concrete problem is so big mainly because of how much we use: over 14 billion cubic metres every year![2] That's enough to fill up Sydney Harbour every two weeks with concrete!*

The world is literally getting greyer by the day, but it doesn't have to be that way.

If you are involved in the daily decision-making about our built environment, you're perfectly positioned to make one of the most significant differences by simply specifying wood. Even micro shifts in construction habits that substitute 1% of concrete with a sustainable material can make a long-lasting and positive impact.

Estimates show[3] a reduction of 60% in emissions when you substitute a wooden load-bearing framed building for a similar concrete load-bearing framed building. We will explain more about this in the next few pages.

The only commercial construction material available today that can match concrete's load-bearing capacity[4] in mid to large-scale building projects is mass timber. Not even steel can match this.

The most popular is **cross-laminated timber (CLT)**. CLT is made from several layers of solid wood bonded with a structural adhesive at alternating right angles. CLT is particularly versatile and can be used with other materials (like concrete and steel). There are several other great mass timber alternatives like **laminated veneer lumber (LVL)** and **glued laminated timber (GLT/glulam)** too. See the **full range** here.

HOSTA, Porte Brancion, Paris, France
Architect Hardel Le Bihan Architectes
Stora Enso partner Woodeum
Render Hardel Le Bihan Architectes

**Sydney Harbour (Port Jackson, inlet of the Pacific) is 19 km long with a total area of 55 square km containing approximately 500 gigalitres of natural water (500,000,000 m³). 14,000,000,000 m³ concrete poured in a year / 365 days = 38,356,164 m³ a day x 14 days = 536,986,296.*

Advantage #2

Economic sense

You can feel good about purchasing mass timber because you're supporting sustainable forestry and because it's a smart investment. The number of mass timber buildings is expected to double every two years through 2034[1] and there are solid reasons why this is projected to occur.

Wood:

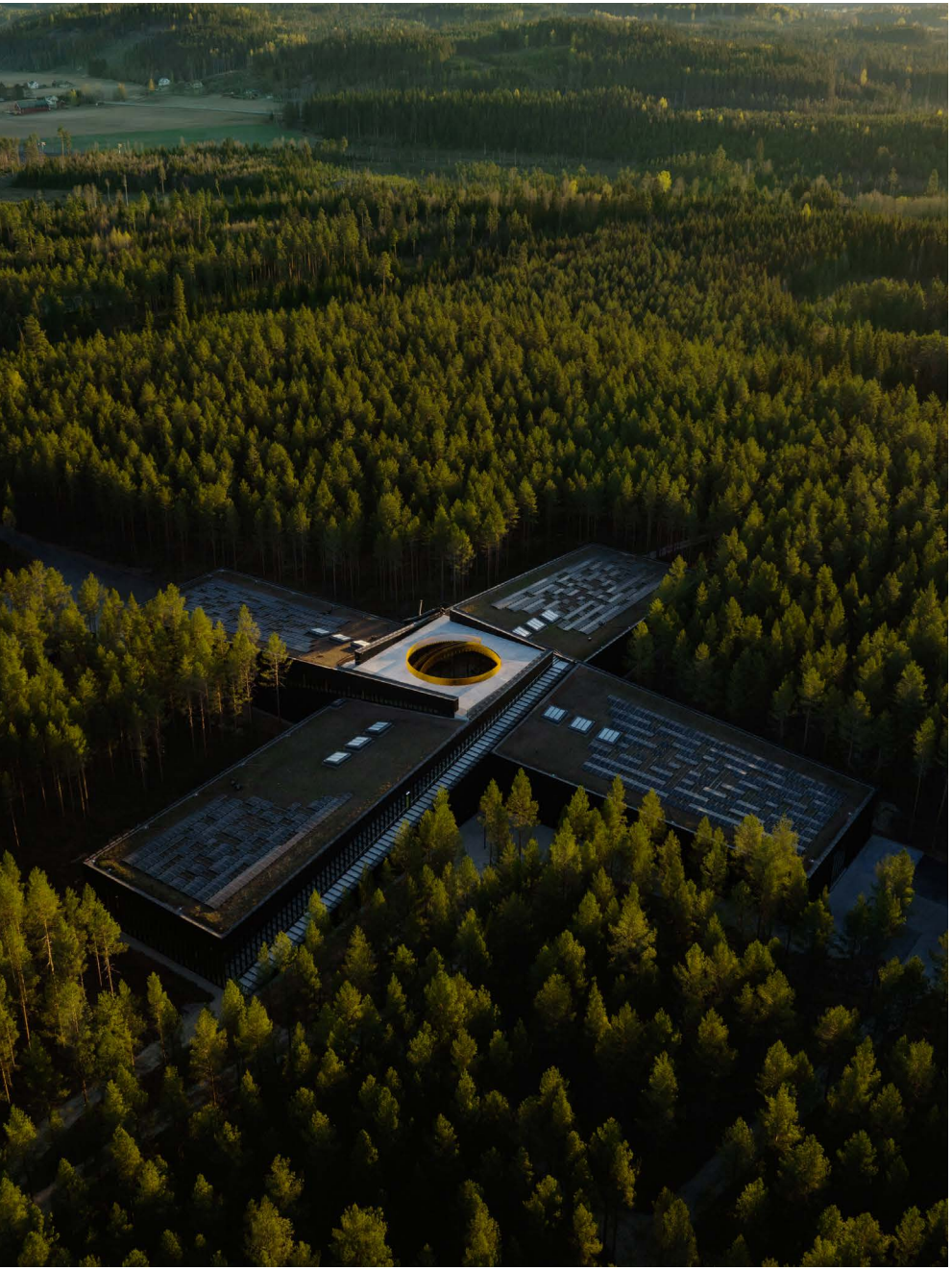
- Adds a unique selling proposition to your portfolio with natural and aesthetically pleasing architecture. Some developers are reporting higher sales[2], rentals, and lease rates for wood buildings than non-wood structures as the climate-conscious generation increasingly chooses beautiful and natural wood architecture.
- Helps you estimate your overall budget with more accuracy. When building with prefabricated wood, much of the decisions are front-loaded in the design phases, so it is more manageable to accurately estimate the overall price of a build.
- Reduces your construction costs due to the high degree of prefabrication that requires 50–70% fewer labourers than concrete on-site and lowers your logistics costs with 80% fewer deliveries (Waugh Thisleton architects).[3]
- Typically, when framing with wood, less concrete is required in the substructures because the superstructures are more lightweight.
- Faster construction often results in faster return on investment.
- Can decrease a building's operational costs. As energy costs remain high, energy-efficient buildings continue to be in strong demand. Wood's excellent insulating capacity and precise prefabricated exterior envelopes that fit perfectly result in airtight buildings that typically have low operating costs and energy bills.

But isn't wood expensive?
Prices fluctuate with markets, years and the design of your building, but studies[4] indicate timber is often cost-competitive with concrete. Mass timber buildings are more cost-effective in large, regularly shaped structures and in situations where fabrication is repetitive. Therefore, wood often has the competitive edge for projects such as office buildings or apartment blocks where the floor layout is similar throughout.[5]

All this just adds up to sound economic sense. It's no wonder major brands like Volvo and Porsche Digital are building their corporate buildings with mass timber.

Hope Street, Southampton, United Kingdom
Architect Snug Architects
Stora Enso partner EURBAN
Photo EURBAN/Fotohaus

World of Volvo, Gothenburg, Sweden
Architect Henning Larsen
Stora Enso partner WiEHAG
Photo Christian Badenfelt



Advantage #3

Replace the fossil economy

While others research experimental ways to capture carbon for 2030 or 2050 and spend vast sums to store climate heating and damaging carbon dioxide (CO_2), natural wood offers a viable and ready-made climate solution today. Approximately one cubic metre of wood product stores about one tonne of CO_2.* And the trees keep growing back!

Trees seize CO_2 while growing in the forest and safely store it as carbon in the building, making it one of the most efficient ways to reduce your carbon footprint immediately.

If wood is taken from sustainably grown forests (and ours always is), then more new forests will grow and absorb more CO_2 and continue the positive cycle. Forests should grow but also be used[1] to have best possible climate impact.

But are there enough trees to do that? In short, yes. With the rise of mass timber construction, forests are getting bigger in the US and Europe. True story! **Hear it here**.

The Plus // Vestre Color & Wood Factory, Magnor, Norway
Architect Bjarke Ingels Group
Stora Enso partner Woodcon
Photo Einar Aslaksen

**Arno Frühwald, University of Hamburg. Stora Enso wood products use mostly pine and spruce, where the carbon storage is approximately 700 kg CO_2/m^3.*

Advantage #4

It’s easy-to-build

Design for manufacturing and assembly (DfMA) enables and optimises manufactured products and prefabricated assemblies by design, dramatically reducing a project’s cost, time, complexity, uncertainty, and environmental impact. DfMA is rapidly changing how everything is built.

You can make an entire building today from a kit of parts much like you would a car. Rather than starting from scratch every time with the project approach, you can produce buildings like products and get them right the first time every time.

Stora Enso is one of the world leaders of the ready-to-go timber kit of parts: **Sylva™**. Made-to-order Sylva Walls, Floors, Roofs, Stairs, Beams and Columns optimise the use of sustainable wood to suit any application and requirement.

And everyone can use them. Even in areas where labourers and carpenters have varying skills it’s possible to get trained to assemble a kit of parts. Building with off-site customisation broadens the available labour pool and often alleviates the shortfall in skilled labour[1].

Typically, there is also, less need for on-site tradespeople with highly specialised skills as much more work is done with computer aids in factory-controlled settings before delivery. The results are fewer labour shortages and less construction downtime.

Mass timber professionals are widely available to help. See our global list of **go-to building solution partners** who can bring your ideas and designs to life.

SONNENTOR High Bay Warehouse, Sprögnitz, Austria
Architect BM-WERNER
Stora Enso partner ZMP Holzbausysteme
Photo SONNENTOR

Advantage #5

Wood shortens construction time

Prefabrication results in rapid assemblies. An entire floor of a building is commonly installed within a day. Precut walls and floors can arrive with **protective coatings** already applied and with lifting devices preinstalled. Lightweight cranes can position them into place in a matter of minutes.

Entire schools can be built with wood over the summer holidays, and large-scale factories can be erected during the winter months, as you can build year-round in all climates with minimal downtime due to bad weather.

The results show **30% faster construction than with concrete**. Often with higher quality, shorter and successful on-site inspections, and little to no need for re-medial work. All those pesky things that can cause costly construction downtime are reduced or eliminated altogether.

Bad Sankt Leonhard Kindergarten Extension, Bad Sankt Leonhard, Austria
Architect M Hermann Joham
Stora Enso partner Raimund Baumgartner

Advantage #6

Wood raises our spirits

Biophilia is a word to describe our innate human attraction to nature. With proper design, timber absorbs sound, maximises sunlight and creates spaces where you can truly focus and fully relax.

Extensive research proves that exposed wood has multiple positive impacts on us, from lower heart rates to improved focus and creativity.[1] Employees in wooden buildings experience greater productivity, fewer sick days, and more social connection.[2]

Recovery rates are reported to be faster in biophilic designed hospitals[3] and care facilities. One study[4] shows that people in wooden spaces have higher NK blood cells – the ones used to improve our immune system. Wood-based materials can also reduce the amount of volatile organic compounds in interior spaces resulting in better air quality.[5]
When you consider the effects of air pollution on everyone's health, especially children, building schools with wood is a no-brainer.*

Learn more about the multiple health benefits of stress-reducing wood in our white paper on the **wellbeing effects** of wood.

GAIA, Nanyang Technological University, Singapore
Architect Toyo Ito & Associates, RSP Architects Planners & Engineers,
RSP Architects Planners & Engineers
Specialist Mass Timber Engineer EURBAN/Main Contractor Steeltech
Photo Steeltech Industries

**Exposure to air pollution[6] is the second leading cause of deaths from noncommunicable diseases (NCDs), after tobacco-smoking. World Health Organization*

Arboretum, Nanterre, France
Architect Nicolas Laisné Architectes, Dimitri Roussel, Leclercq Associés
Stora Enso partner WO2
Photo WO2/Patrick Raffin

Advantage #7

Delivers immediate results for cities tackling climate change

Many cities/regulatory bodies are, in effect, mandating wood, as mass timber is the only option to fulfil their sustainability requirements, such as with **RE2020 in France**. Amsterdam also mandated that 20% of all new housing projects in the capital must be constructed with wood or other biobased materials from 2025. With cities generating 75% of global CO_2 emissions[1] governing bodies are under enormous pressure to find low-carbon solutions so more ambitious targets are bound to come.

Governing bodies can legislate this way because mass-engineered wood upholds many rigorous regulations when it comes to moisture management, fire, wind and seismic resistance.

Several countries have relaxed their limits for the number of stories in timber buildings. Tall wood buildings were approved in the 2021 International Building Code (IBC) to go up to 270 feet (82.2 meters)/approx. 18 stories, a significant signal of confidence.[2]

Rain or shine: with the **range of protective coatings** available today, you can minimise the effects of UV light, moisture and insects and dramatically extend the lifespan of buildings.

The burning question?
Modern mass timber buildings have comparable structural performance in maintaining structural integrity in fire conditions to steel and concrete buildings. Mass timber is held to the same building code standards as other materials.

Build like there is tomorrow
Some of the world's oldest buildings are wooden ones. Some wooden Norwegian churches still in use today, date back to the 11th century. Some temples in Japan built nearly 1,400 years ago are still standing. In our modern world, we tend to design buildings for a much shorter time frame, 50-75 years. While mass-timber buildings may not last a thousand years, they can last a long, long time.

Walworth Town Hall, London, United Kingdom
Architect Feix&Merlin Architects
Stora Enso partner B&K Structures
Photo B&K Structures

Advantage #8

Wood boldly goes where no other material can

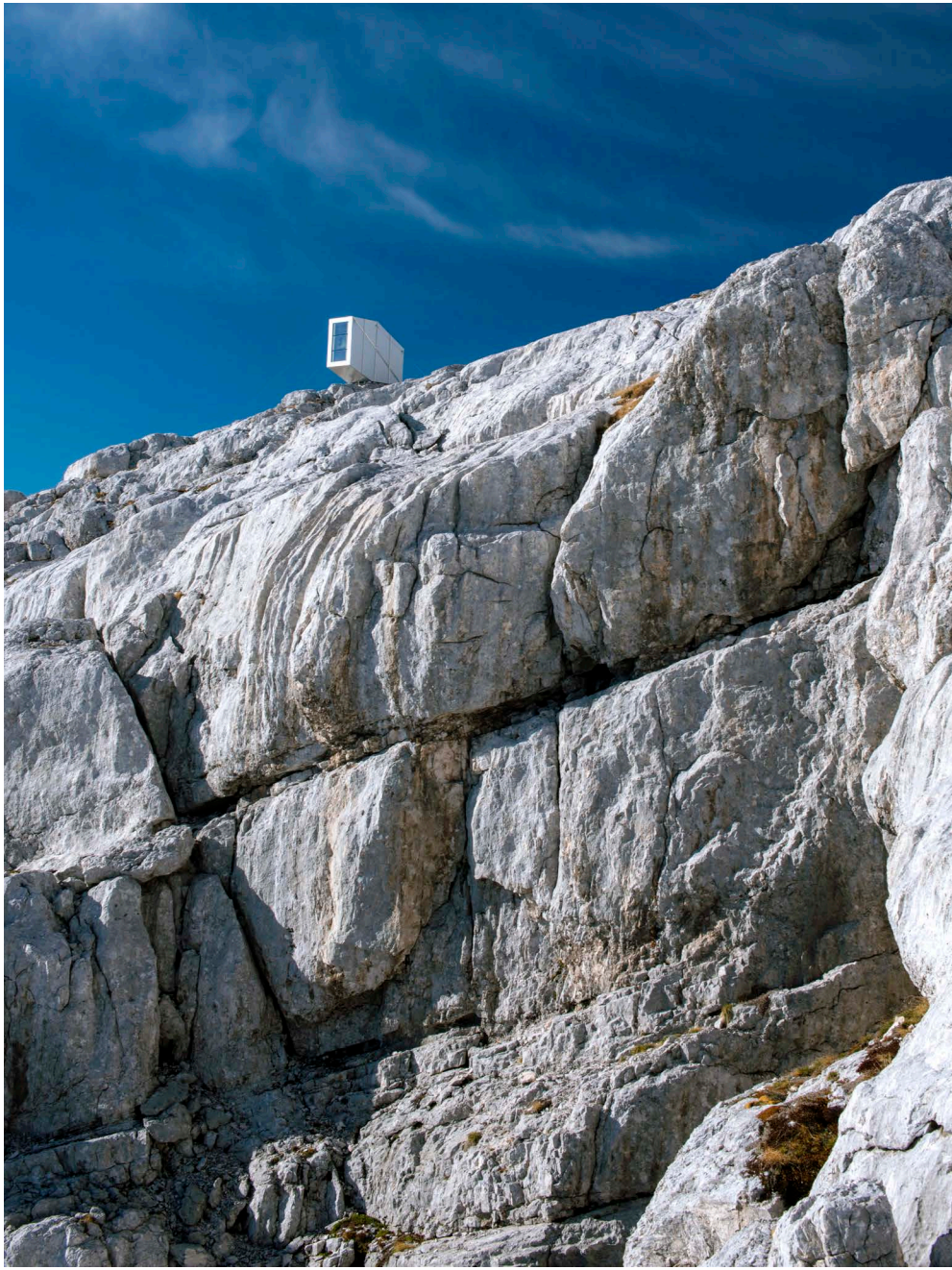
Wood is the material of choice for remote locations and retrofits because it is five times lighter than concrete and incredibly workable with other materials. Wood can be installed in hard-to-reach places and used to build on top of existing structures in dense urban areas. Flat packed to the middle of the Indian Ocean and **suspended on the Maldives** or shipped to **Earth's Geostation** deep in the Arctic Ocean; Sylva™ has reached the most remote destinations on earth.

Sylva™ also works very well in in tight urban spaces to renovate and **heighten existing building stock**. Lightweight and robust, Sylva can bridge **existing roads** and **infrastructure**. In densely populated areas, retrofits are increasingly the only option as land availability becomes increasingly scarce.

Another way wood helps ensure buildings stand the test of time is to build in a way that makes them easy to repurpose. More often than not, buildings are demolished not because they are starting to fall apart but because the owners/occupants change their needs for the building. But, when you build in a **regenerative** and circular design-based way[1] that allows for long term flexibility.

When mixed-use properties exceed their initial intended use, there's no need for climate-damaging demolition–simply adapt and voila! Longer service life, amortisation of emissions and resilience of your assets. There are many excellent examples of **flexible adaptable buildings** made with wood.

Our **Building Concepts** can help get you started with a Sylva building kit, and ensure you maximise the environmental, social and financial benefits of building with wood in nearly any climate or location.



Winter Cabin on Mount Kanin, Bovec, Slovenia
Architect OFIS arhitekti
Stora Enso partner CBD
Photo Janez Martincic

Eilean Donan Castle Visitors Centre, Kyle of Lochalsh, United Kingdom
Architect ANTA
Stora Enso partner EURBAN
Photo John Paul Photography

Advantage #9

The neighbours, their pets and your workers will thank you

Construction sites are notoriously loud, dirty and unsafe. That all changes with wood. The reduction in noise and dust is so significant that the working environment is almost incomparable. Since a large part of the work takes place off-site in factory-controlled settings, much of the hammering, drilling and sawing is completed before delivery.

The construction team arrives to assemble the parts of the puzzle rather than engineer elements to work with one another. Less cutting is required on-site in snow, rain and intense heat, which immediately reduces the number of worksite injuries.[1] We may have already made this point, but at Stora Enso, safety is a top priority, and we cannot say it enough.

Safer, cleaner and quieter with timber
Wooden building sites are quite simply cleaner, safer and quieter working environments. This is not only good news for employees but also for neighbouring residents, businesses and schools because they are safe to continue operating as usual. And the surrounding wildlife and domestic animals appreciate the noise reduction, too.

Finally, using prefabricated kits leaves little waste as only items sent to the site are used in the final structure.

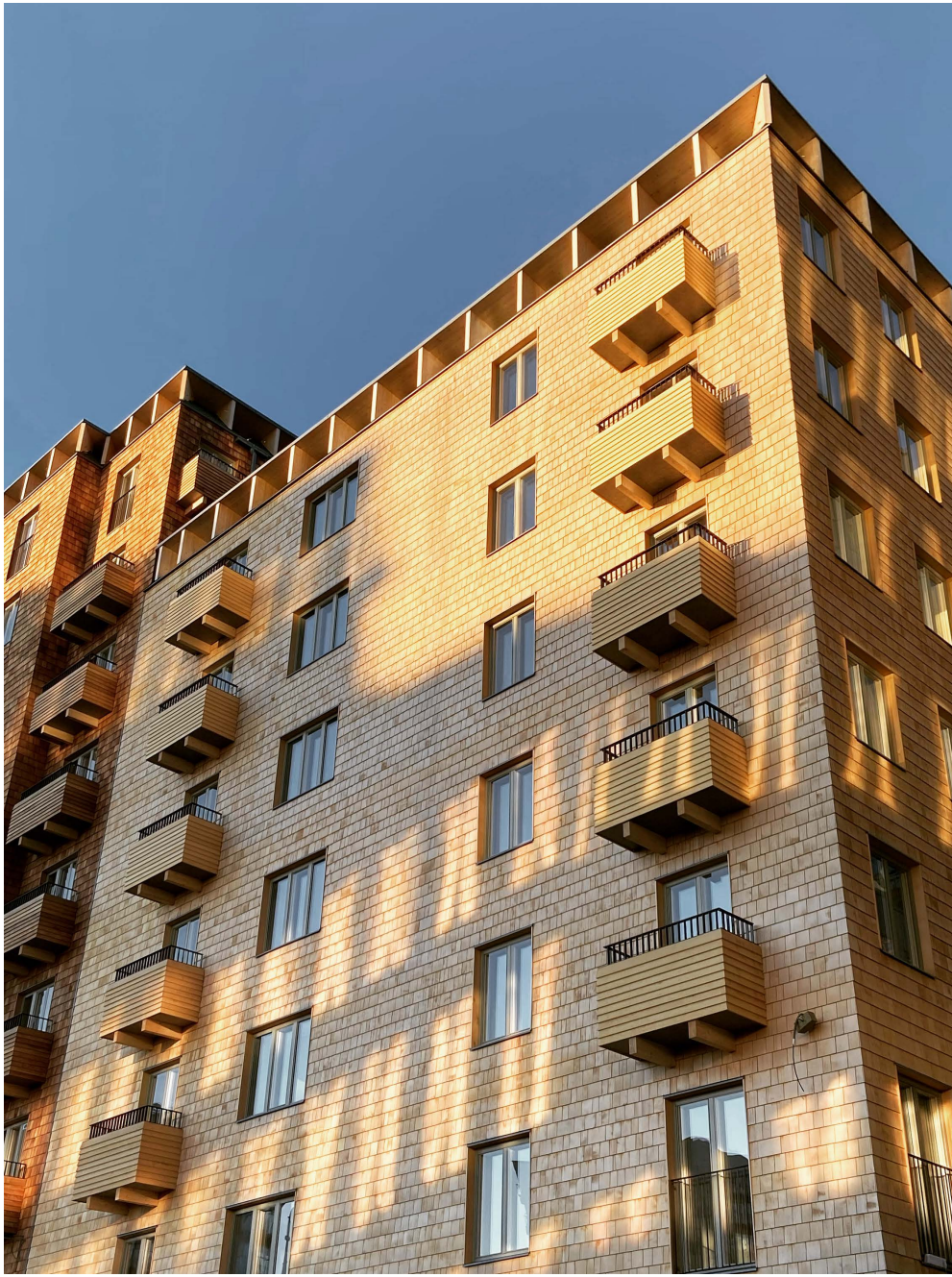
HQ Office for Porsche Digital, WittyWood Building, Barcelona, Spain
Architect Ballarin & Grinyó
Stora Enso partner Madergia
Photo Madergia

Advantage #10

Wood smells, looks and feels gorgeous

Do we need to say more?

Humboldt Cederhusen, Stockholm, Sweden
Architect General Architecture
Stora Enso partner ByggPartner
Photo Folkhem



Notes

Advantage #1
It's a material world

[1] https://www.theguardian.com/cities/2019/feb/25/concrete-the-most-destructive-material-on-earth

[2] https://gccassociation.org/concretefuture/societal-demand-for-cement-and-concrete/

[3] https://today.oregonstate.edu/news/use-structural-wood-commercial-buildings-reduces-greenhouse-gas-emissions

[4] https://www.hrpub.org/download/20210730/CEA13-14823835.pdf

Advantage #2
Economic sense

[1] https://theforestsdialogue.org/sites/default/files/2021_29junebackgroundpaperclimate_interactive.pdf

[2] https://www.sciencedaily.com/releases/2021/05/210520133943.htm

[3] https://mithun.com/wp-content/uploads/2021/12/MassTimberSchools_Report.pdf

[4] https://www.turnerandtownsend.com/en/perspectives/mass-timber-reducing-carbon-in-the-built-environment/

[5] https://m-m.net/insights/7-benefits-of-panelized-mass-timber/

Advantage #3
Replace the fossil economy

[1] https://www.youtube.com/watch?app=desktop&v=-RNxibDXa9I

Advantage #4
It's easy-to-build

[1] https://www.thinkwood.com/wp-content/uploads/2018/04/TALL-MASS-TIMBER-REPORT-2.pdf

Advantage #5
Wood shortens construction time

Advantage #6
Wood raises our spirits

[1] https://duurzaamgebouwd.lingacms.nl/upload/dg_8fd9sluf/files/Kurzfassung_Holzklassen-Schule_Haus_v1.1%20-.pdf

[2] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6125719/

[3] https://www.terrapinbrightgreen.com/reports/the-economics-of-biophilia/#:~:text=Over%20fifty%20studies%20have%20been,daylighting%20and%20views%20to%20nature.

[4] https://www.researchgate.net/publication/257326017_VOC_sorption_and_diffusion_behavior_of_building_materials

[5] https://www.researchgate.net/publication/257326017_VOC_sorption_and_diffusion_behavior_of_building_materials

[6] https://www.who.int/health-topics/air-pollution#tab=tab_1

Advantage #7
Delivers immediate results for cities tackling climate change

[1] https://www.unep.org/explore-topics/resource-efficiency/what-we-do/cities/cities-and-climate-change

[2] https://www.turnerandtownsend.com/en/perspectives/mass-timber-reducing-carbon-in-the-built-environment/

Advantage #8
Wood boldly goes where no other material can

[1] https://unece.org/sites/default/files/2023-05/ECE_TIM_DP95E_web.pdf

Advantage #9
The neighbours, their pets and your workers will thank you

[1] https://www.chubb.com/content/dam/chubb-sites/chubb-com/microsites/construction-risk-engineering-portal/global/documents/pdf/Chubb_Mass_Timber_Construction_Resource_Guide.pdf

Advantage #10
Wood smells, looks and feels gorgeous

Thank you!

We hope this guide has given you more information to consider using wood in your next building project.

We encourage you to reach out and talk to us without any obligation wherever you are in your decision-making process:

Contact | Stora Enso

Next steps:

- Share this guide and talk to others who are building with wood.
- View the **latest buildings** made from Sylva™ by Stora Enso to get a sense of what's possible with our **Building Concepts**.
- Sign up for our **newsletter**, up-to-date and trustworthy content in your inbox.
- Follow us on **LinkedIn**, **Facebook**, **Instagram** and **YouTube**, where we regularly post relevant news about wood as a construction material.

The renewable materials company