

CLT-PANELS

WOOD, TEMPERED BY SEVERE NORTH

BUILT WITH A ZERO
CARBON FOOTPRINT



What are CLT structures?

CLT (Cross Laminated Timber) —

cross-glued wooden boards that are used for construction of residential and public buildings as elements of walls, floors, roofs and partitions. Thanks to its manufacturing technology, CLT has excellent strength characteristics that allow it withstanding heavy loads. Due to a criss-cross pattern of the layers, the panels have high bearing capacity and rigidity. Adhesive seam is stronger than wood. Only completely harmless European certified adhesive systems are used.



Production of CLT structures

CLT structures manufactured by Segezha Group became **winners in the nomination «Best International Environmental Project»** of the Ecotech-Leader 2021 award

- ✓ **CLT structures are manufactured at the Segezha Group plant** in Sokol, Vologda Region.
- ✓ **CLT production with a capacity of 50 000 m³** was launched in February 2021. Sokol CLT has procured its cutting-edge equipment from leading European suppliers like Ledinek, Imeas and SCM Group.
- ✓ **It has passed the European Technical Assessment (ETA) and received the CE certificate.**

CLT – innovative construction technologies

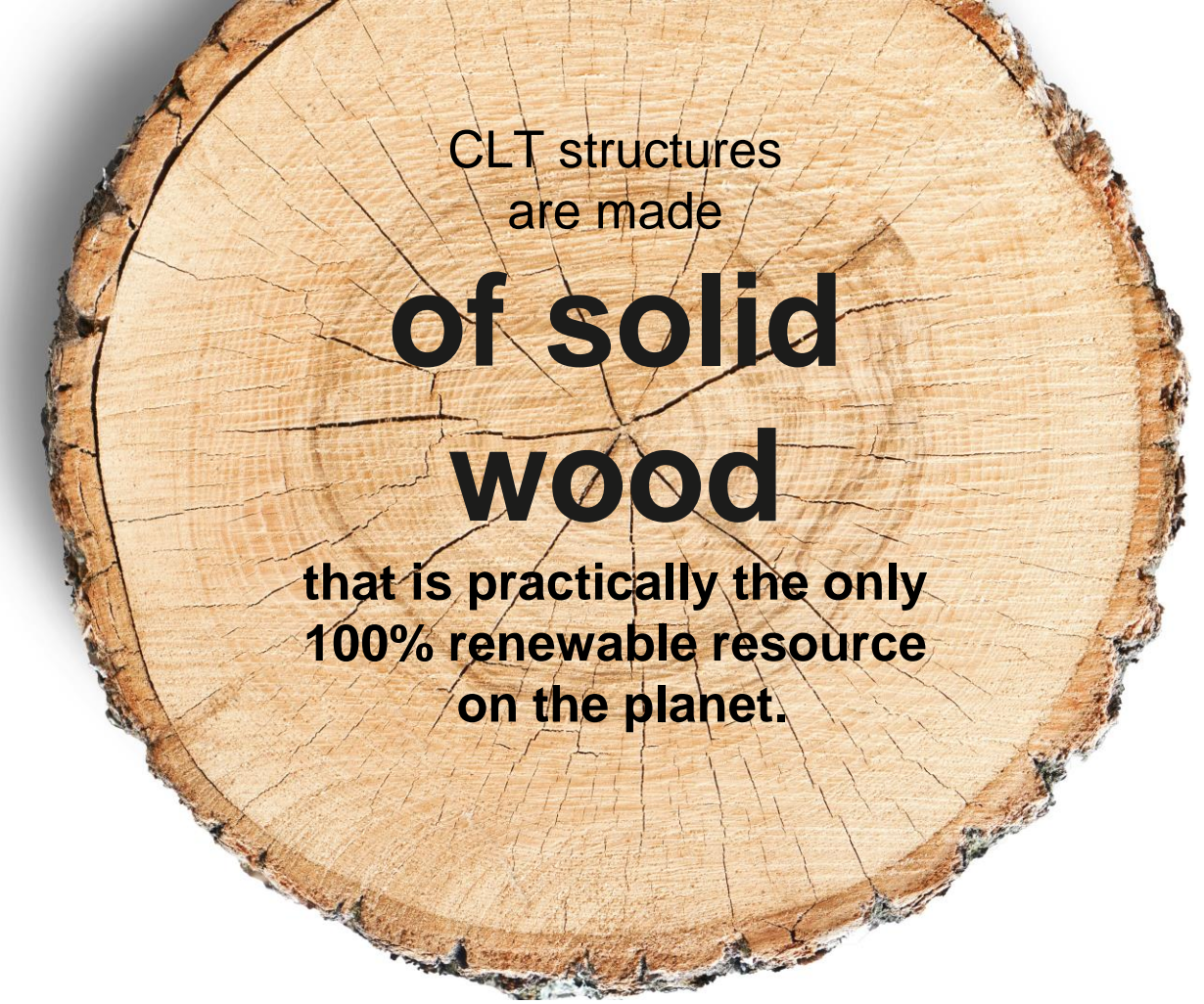
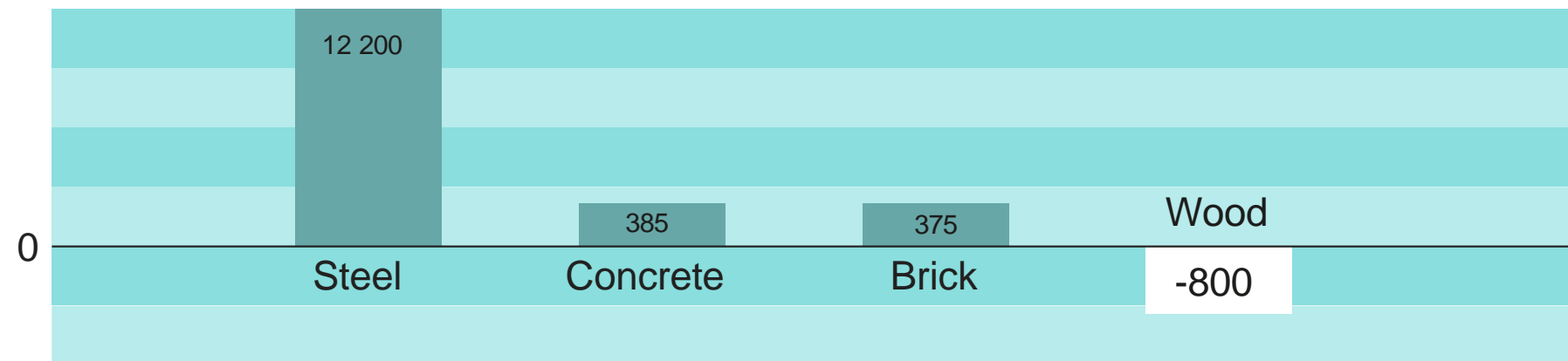
CLT structures are widely used in construction thanks to

- low weight of structures, high stiffness due to layered design, and ability to withstand heavy loads without shrinkage or deformation
- high energy efficiency and fire resistance characteristics
- wide architectural applications, quick assembly on site, possible combination with other building materials
- modern design solutions that allow building safe and durable structures; CLT can be used in the construction of buildings in seismic zones



Environmental sustainability of wood in construction

Wood products are replacing many traditional materials with a high CO₂ content and a significant carbon footprint.



- Waste-free full-cycle production process.
- Construction process leaves minimum waste and construction debris.
- Production of CLT structures uses an environmentally friendly adhesive without formaldehyde.
- Temperature inside CLT buildings can be maintained using as little as one third of the energy needed for heating or cooling of an individual house.

Applications

Multi-apartment and multi-storey residential buildings

The load-bearing frame of a building may include combinations of CLT structures, steel and reinforced concrete structures.



Non-residential premises and social facilities

Natural wood has a positive effect on the microclimate inside premises, creates an emotionally comfortable environment for people in the premises.



Individual residential buildings

CLT structures are widely used in the creation of comfortable and high-quality individual houses.



World's tallest CLT building

Mjøstårnet (Norway) is the tallest wooden building in the world.*

Height: 85.4 m
Floors: 18
Area: 11,300 m²
Completion date: March 2019
CLT producer: Moelven

The building accommodates apartments, a hotel, offices, a restaurant, a rooftop terrace and public spaces. The project was inspired by the Paris Agreement and conceived as a real example of how to reduce CO₂ emissions – most of the building is made of local and renewable materials. The construction process took a year and a half.

*As of 2021





Benefits of using CLT panels

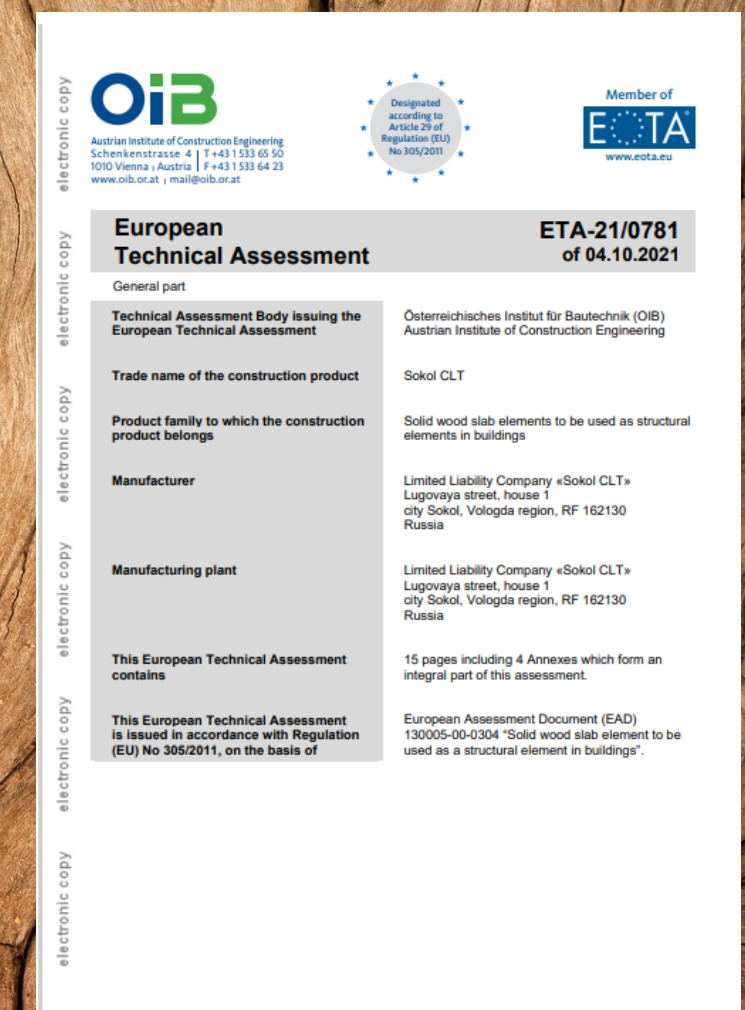
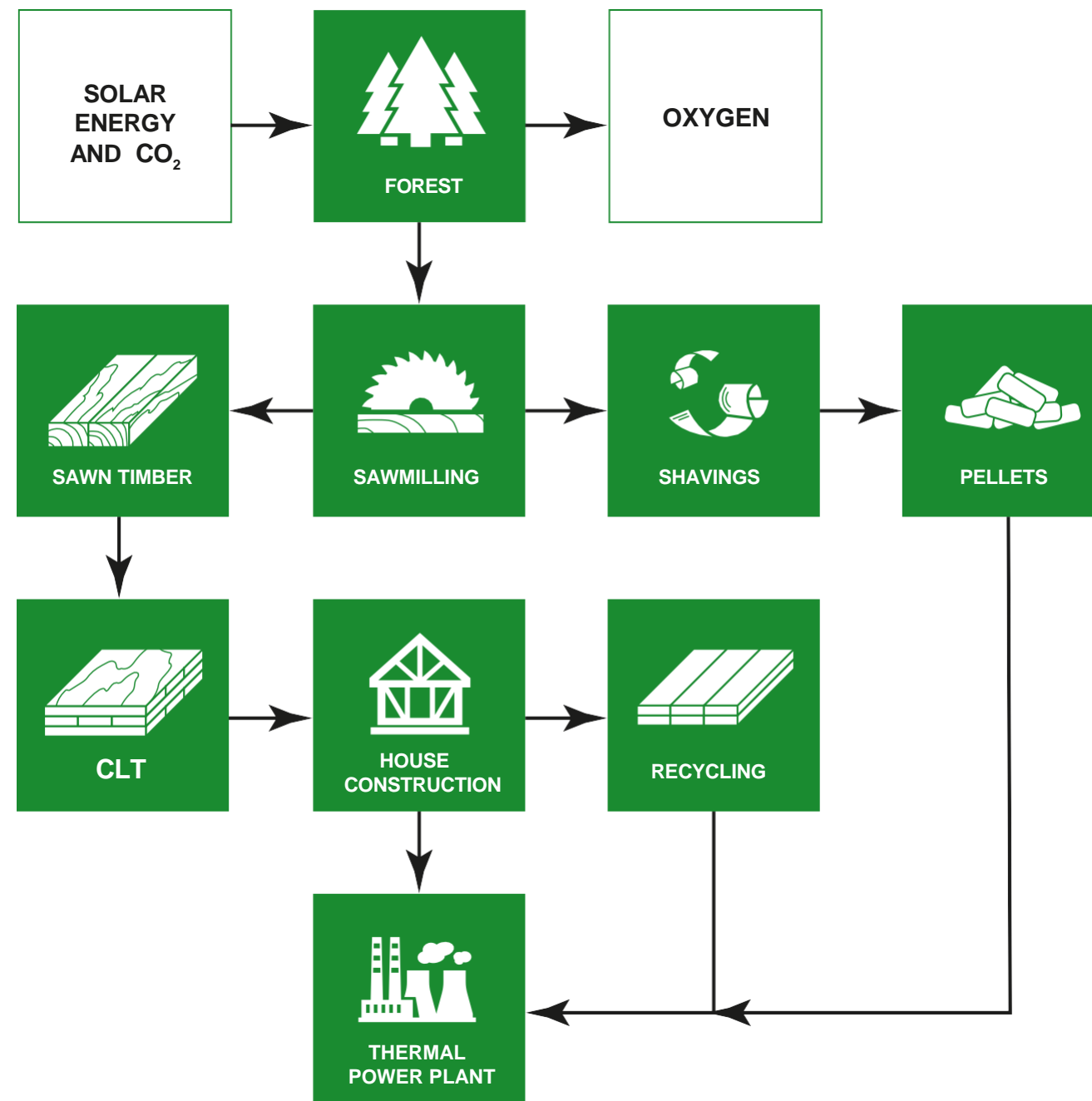
in the construction of buildings and structures

- **Minimum impact on the environment** allows achieving a positive CO2 balance.
- **Prefabrication** – industrial manufacturing in a factory.
- **Creation of a favourable microclimate** for human comfort due to the natural moisture and heat balance.
- **Thermal efficiency** – CLT buildings have a high degree of natural thermal insulation and tightness.
- **Variety of applications** – they can be load bearing and enclosing structures at the same time; can be used as walls, ceilings and floor slabs.
- **High bearing capacity.**
- **Cost efficiency** – five times lighter than concrete, less load on the foundation, high speed of construction; high-tech installation is carried out using mechanisation.
- **Safety** – high fire resistance and the ability to maintain structural integrity of a building in case of fire.
- **High seismic resistance.**

Environmental sustainability of production and certification

Segezha Group's CLT

is characterised by consistently high quality achieved by the use of high-quality materials, a state-of-the-art production process, and control of all stages of the production process.



Production technologies

Panels are made of softwood boards. Sawn wood is preliminarily kiln dried until reaching 12% \pm 2% moisture content. Dry lamellae are processed, stacked and glued under press.



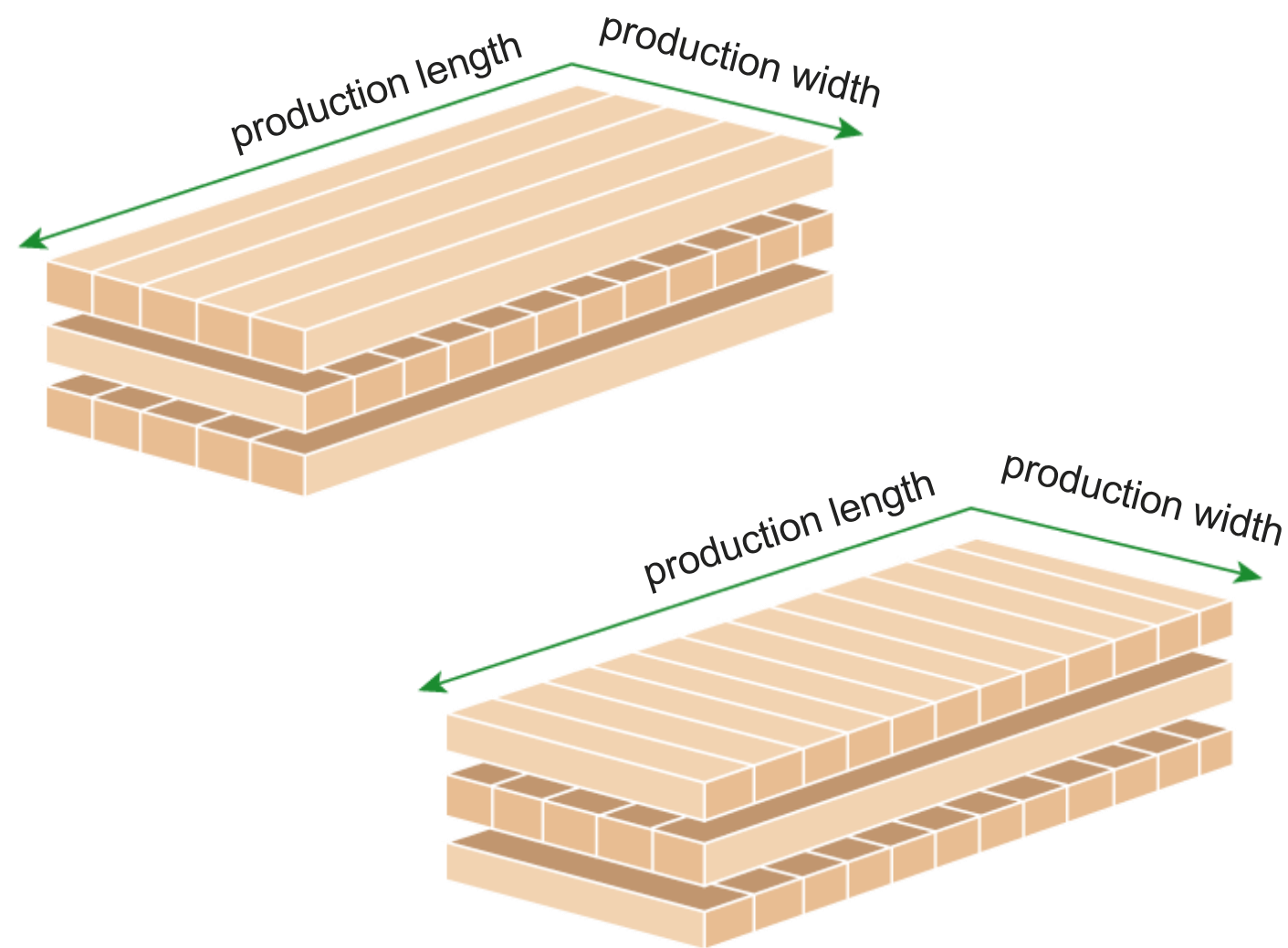
Technical specifications

Dimensions	Length up to 16 m	Width up to 3.5 m	Layer thickness 20 mm 30 mm 40 mm	Standard width 2.40 m 2.50 m 2.70 m 3 m
-------------------	-----------------------------	-----------------------------	---	---

Production capacity	50,000 m ³ per year	Surface quality	Industrial and visual
Purpose	Bearing and enclosing elements of walls, floors and roofs	Surface	Sand
Lamellae	Kiln drying Sorted Spliced	Humidity	12% (± 2%)
Wood species	Spruce	Dimensional stability	Longitudinal (0.010% per % change in moisture content) Perpendicular (0.025% per % change in moisture content)
Lamella strength class	C24 according to GOST 33080-2014	Thermal conductivity	About $\lambda = 0.12$ W/(m-K)
Glue	Formaldehyde-free polyurethane adhesive – approved for indoor and outdoor use	Specific heat capacity	About $c = 1.60$ kJ/(kg-K)
Weight	About 470 kg/m ³ (to determine transport needs) 500 kg/m ³ (for static calculations)	Sound insulation	Depends on wall or ceiling design
		Combustibility	G4 combustible
		Charring rate	0,8 mm/min

Types of boards

depending on the direction of the outer layer of lamellae



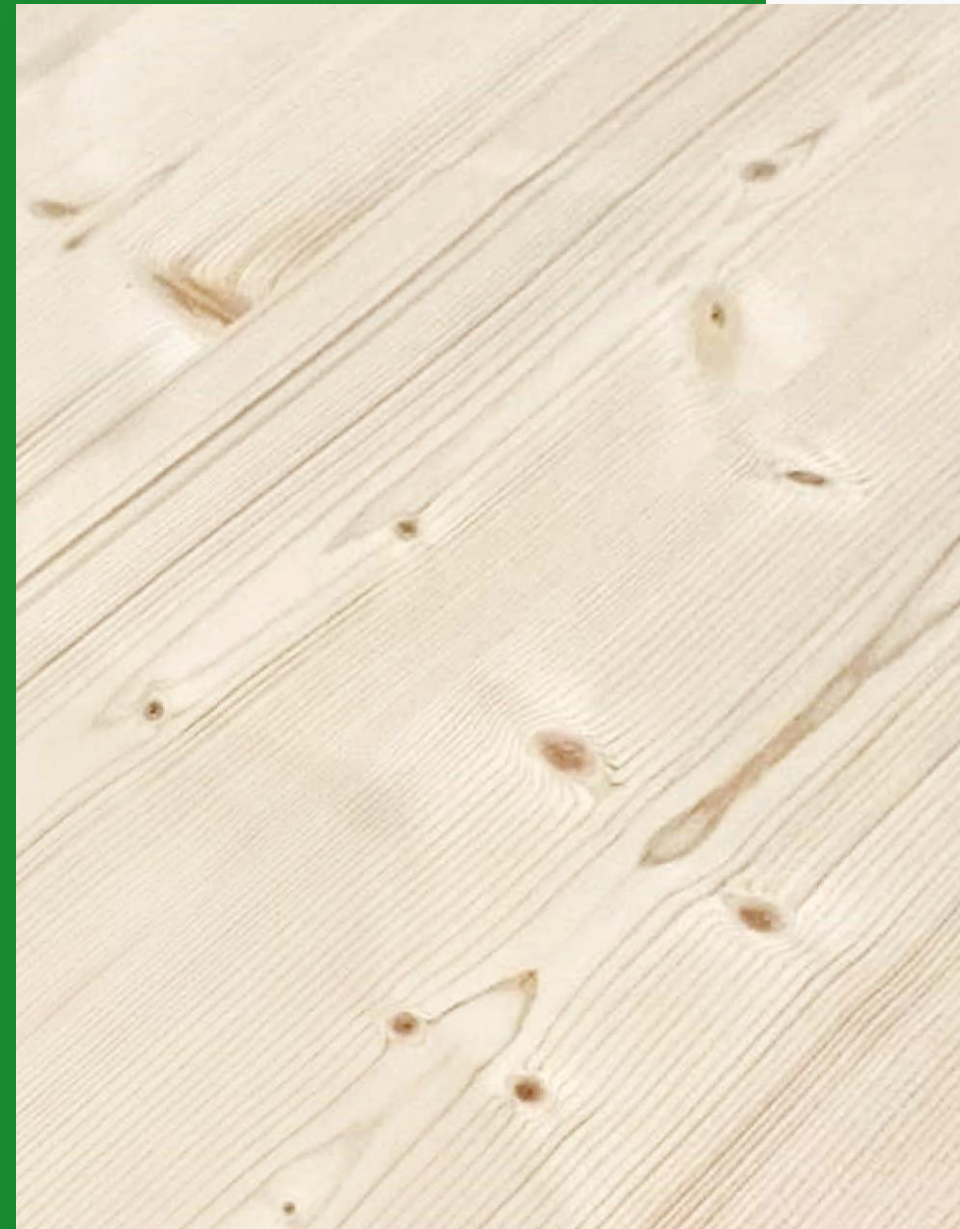
Range of standard WPC board structures

Panels thickness, mm	Number of layers	Lamellae thickness, mm							
60	3				20	20	20		
80	3				20	40	20		
90	3				30	30	30		
100	3				40	20	40		
120	3				40	40	40		
140	5		40		20	20	20	40	
160	5		40		20	40	20	40	
160	5P2			30 + 30		40		30 + 30	
180	5		40		30	40	30	40	
200	5		40		40	40	40	40	
220	7	40	20		40	20	40	20	40
220	7P2		40 + 40		20	20	20		40 + 40
240	7	40	40		20	40	20	40	40
240	7P2		40 + 40		20	40	20		40 + 40
260	7	40	40		40	20	40	40	
260	7P2		40 + 40		40	20	40		40 + 40
280	7	40	40		40	40	40	40	
280	7P2		40 + 40		40	40	40		40 + 40
300	8P2		40 + 40		30	40+40	30		40 + 40
320	8P2		40 + 40		40	40+40	40		40 + 40

Surface quality

Visual:

Visual quality is applied to the visible parts of the structure.



Industrial:

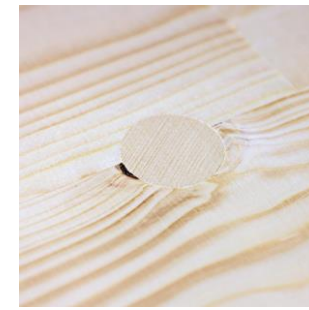
Industrial quality is applied to building load-bearing structures, which are subject to further panelling.



Permissible defects of wood

Depending on the segment of application and the requirements of the client, the Sokol CLT plant can offer the following types of surface quality: visual and industrial. They have qualitative differences:

Visual quality:



Knotting



Normal knots



Pith



Black knots surrounded by bark

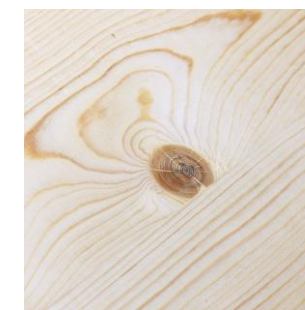


Microcracks on the plate

Industrial quality:



Fallen-out knots



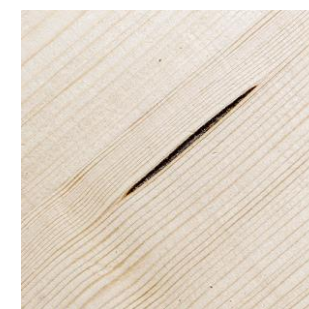
Normal knots



Colour change



Pith



Resin pockets



Crack on the plate



Black knots surrounded by bark



Knotting

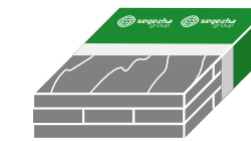
Logistics

Kind of transport	Overall dimensions, m
Container transporting	2,3 x 11,9
Euro trailer with curtains	2,4 x 13,6
Euro trailer with removed sides	2,5 x 13,6
Euro trailer with special permission	3,2 x 13,6
Panel trailer	3,3 x 9,5

SHIPMENT



of CLT structures is carried out by various types of transport: euro trailer, mega trailer, panel trailer, lowbed trailer, and it is possible to use container transportation



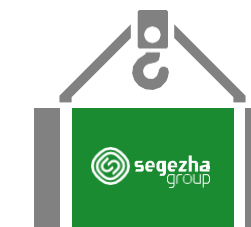
CLT STRUCTURES

are packed individually in foil



WHEN LOADING

CLT structures, 41–47 x 150 mm spacers are installed every 1.5 m with gaps of 5–10 cm on the sides of the trailer. Weight per 1 m³ of CLT – 0.47 tonnes with packaging



CLT STRUCTURES

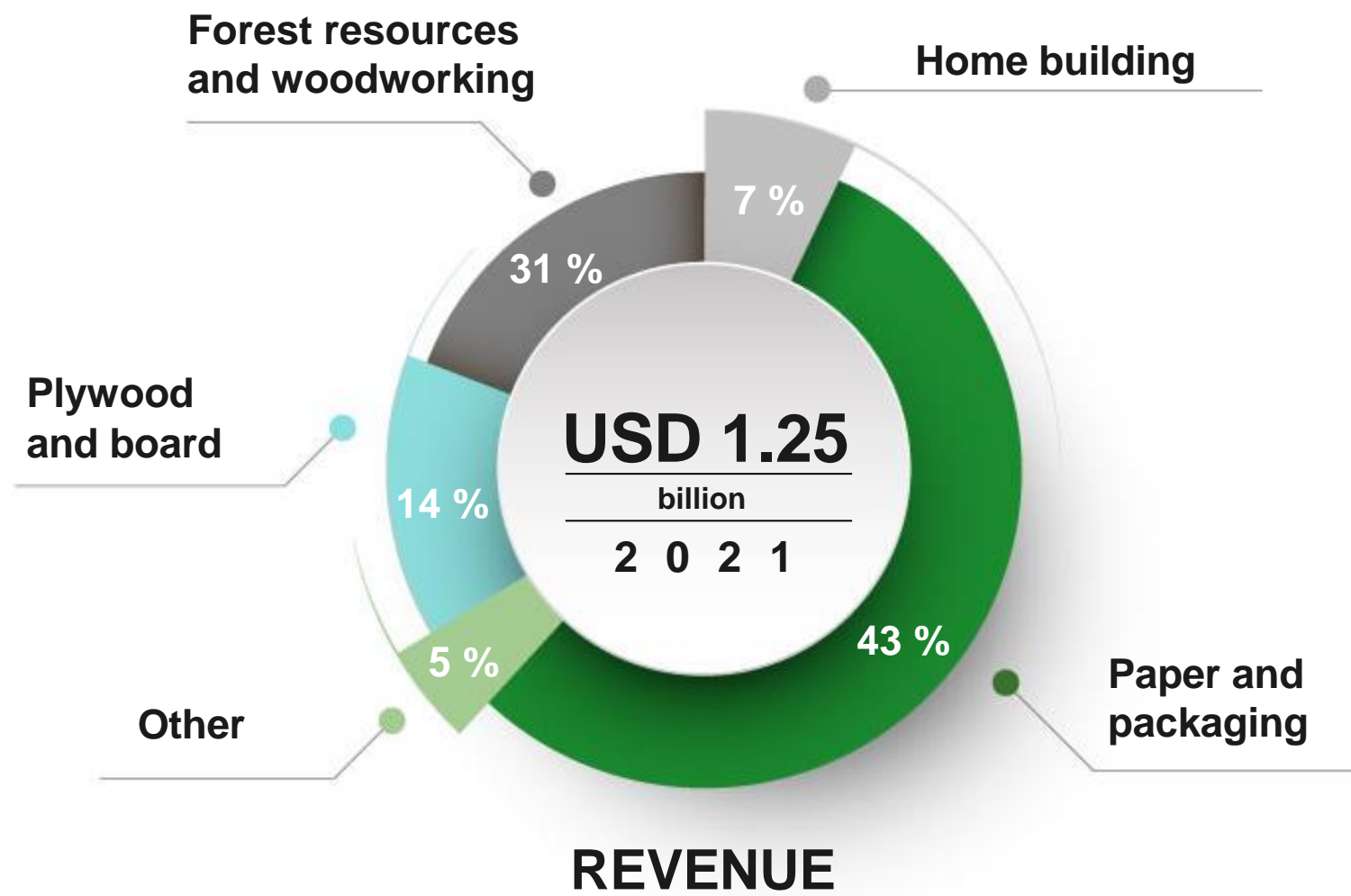
are loaded either in the workshop by a girder crane or on the street by a jib crane



CLT STRUCTURES

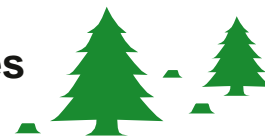
can be unloaded using a crane or a forklift

Leading international timber holding



RAW MATERIAL SECURITY

5,8 million cubic metres
10% YoY



80 % of the needs are covered by our own logging enterprises



No.1 in Russia
No.2 in the world
in the production of paper bags

No.1 in Russia
in the production of bag paper

No.2 in the world
in the production of paper for multilayer bags

No.3 in Europe
in sawn softwood production capacity

No.5 in the world
in the production of large-size birch plywood

No.1 in Russia
in the production of glued structural beams and prefabricated housing from glued beams

Global Reach

REGIONAL REP AND SALES OFFICE



Wood processing plant



Pellet plant



CLT
CLT Glulam plant
Prefabricated houses



Plywood production



Pulp and paper mills



Production of paper bags



R&D
Innovation centres



Sales offices

Segezha Group is a unique Russian timber holding company with a full cycle of its own logging and specialisation in the production of a wide range of high-margin products. The group is one of the largest forestry companies in the world. The annual allowable cut is 22.7 million cubic meters. Business stability is guaranteed by the high degree of self-sufficiency in raw materials, as 84% of the company's timber needs are covered by its resources.



Segezha Group's sawn timber business in 2022

SEGEZHA'S POSITION IN SAWN TIMBER INDUSTRY

No3 IN EUROPE

No1 IN RUSSIA

location in **5** Russian regions

8 Sawmills

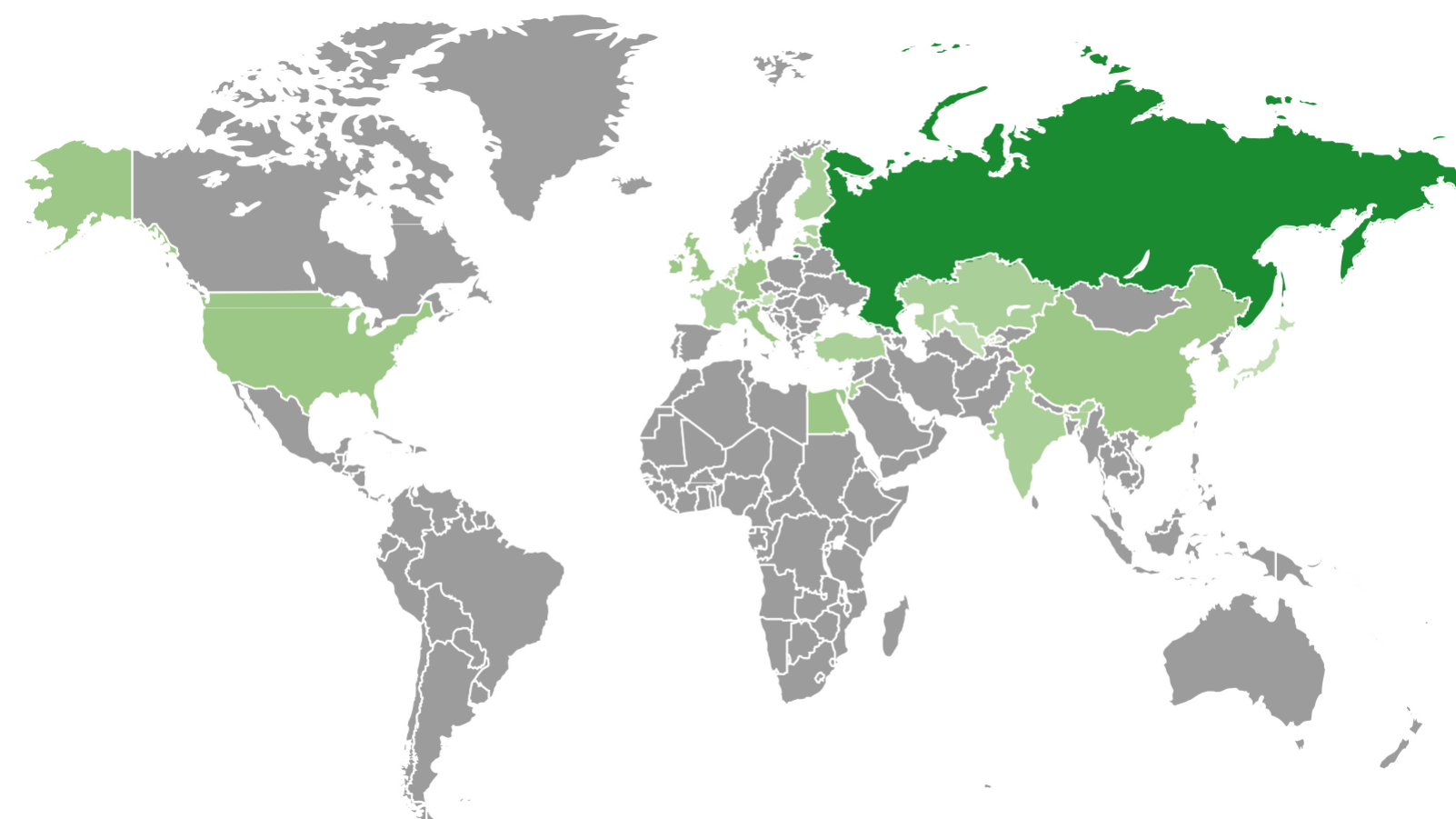
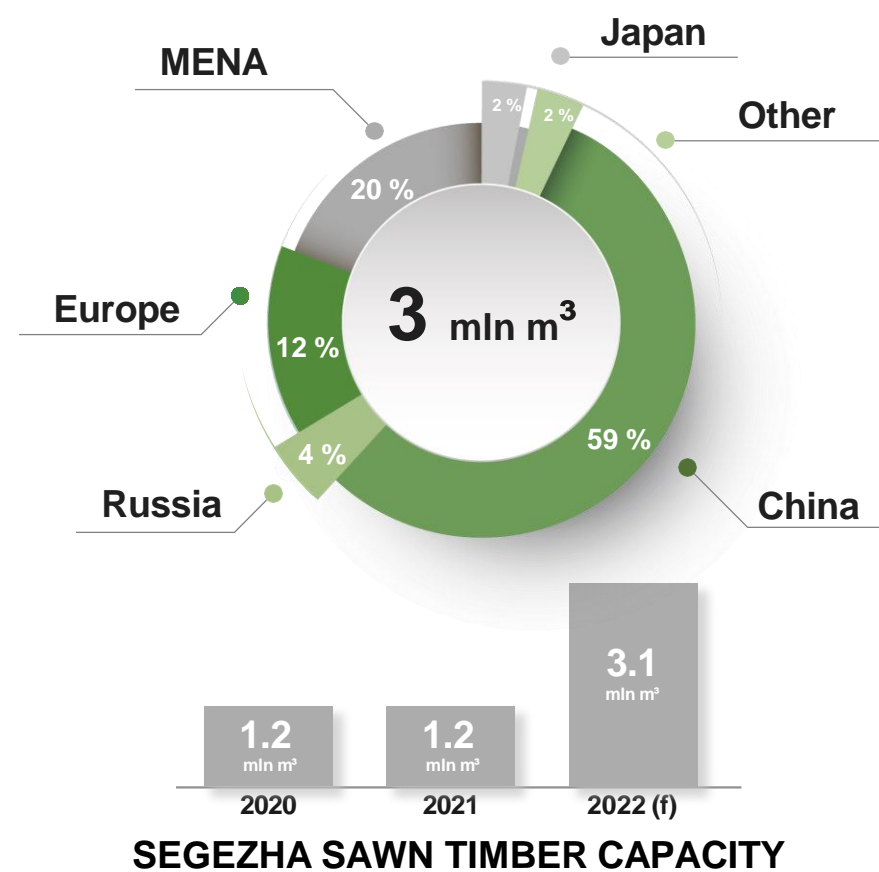
2,950 ths m³
Rough Sawn Timber

100 ths m³
Planned Timber

70 ths m³ Glulam

50 ths m³ CLT

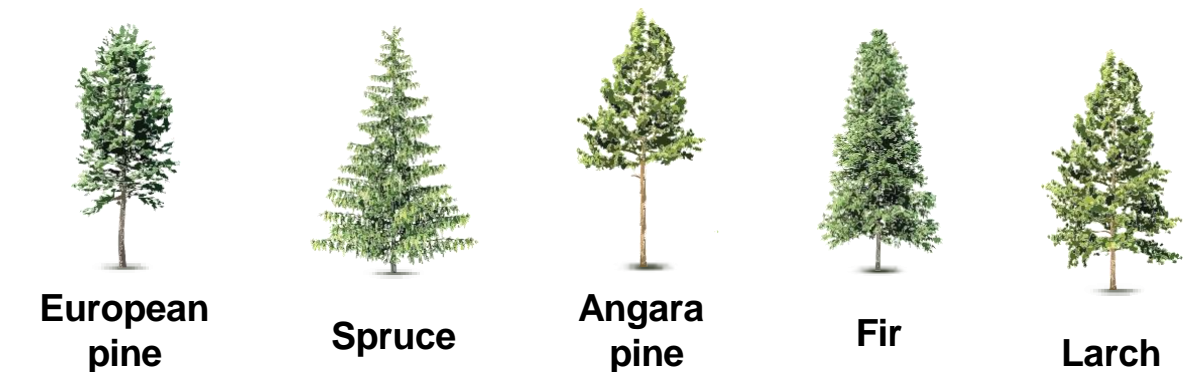
30 ths m³ Prefabricated Houses



OPPORTUNITIES

- Global lack of raw materials
- Stable growth in demand
- Environmental regulations
- CO2 neutral building program, transition to a "low-carbon future"
- Growth in the supply rate from Russia

TYPES OF TREES used in the production





Liliya Azizova

Head Export Sales of Glulam & CLT
Russia, Central Europe, Asia, MENA

Azizova_LK@segezha-group.com
+7-985-319-77-14

Ksenia Matsenko

Head Export Sales of Glulam & CLT
Russia, India, USA, Canada

Matsenko_KS@segezha-group.com
+7-910-470-32-18

Aleksandr Sokolov

Head Export Sales of Glulam & CLT
Russia, South Europe, Latin America, Israel,
Japan, Iran

Sokolov_AV@segezha-group.com
+7-910-419-07-35



Thank you for attention!