Linesight

Understanding Timber

for Construction

2025

Content

Introduction

The construction industry is undergoing a significant transformation, driven by the urgent need to address climate change. The sector, which accounts for about 25% of the UK's greenhouse gas (GHG) emissions[1], will play a vital role in the government's commitment to achieve net-zero emissions by 2050.

Timber has emerged as a critical component in this transformation. Carbon dioxide (CO_2), which makes up more than 75% of global GHG emissions[2], is absorbed by trees as they grow, and timber products continue to store it throughout their lifecycle. This means that the embodied carbon of timber-based materials tends to be lower than those, such as steel and concrete, that are made using energy-intensive industrial processes. As a result, buildings constructed with timber can achieve significant reductions in their whole-life carbon footprint.

Combined with technological advances in strength and performance, this is making timber an increasingly attractive option for modern construction projects. Several major challenges remain, from technical barriers and regulatory constraints to market volatility and supply chain issues. Addressing these will require a concerted effort from industry stakeholders, policymakers, and researchers. However, overcome these challenges and the opportunities will be substantial.

The embodied carbon of timber based materials tends to be lower than those of steel and concrete, as these are made using energy intensive industrial processes.

The re-emergence of timber construction

Timber has been used in construction for centuries. Historically, it was the primary material for building homes, barns, and other structures. It was readily available, easier to transport than stone, and capable of being cut and formed, making it useful for a range of applications.

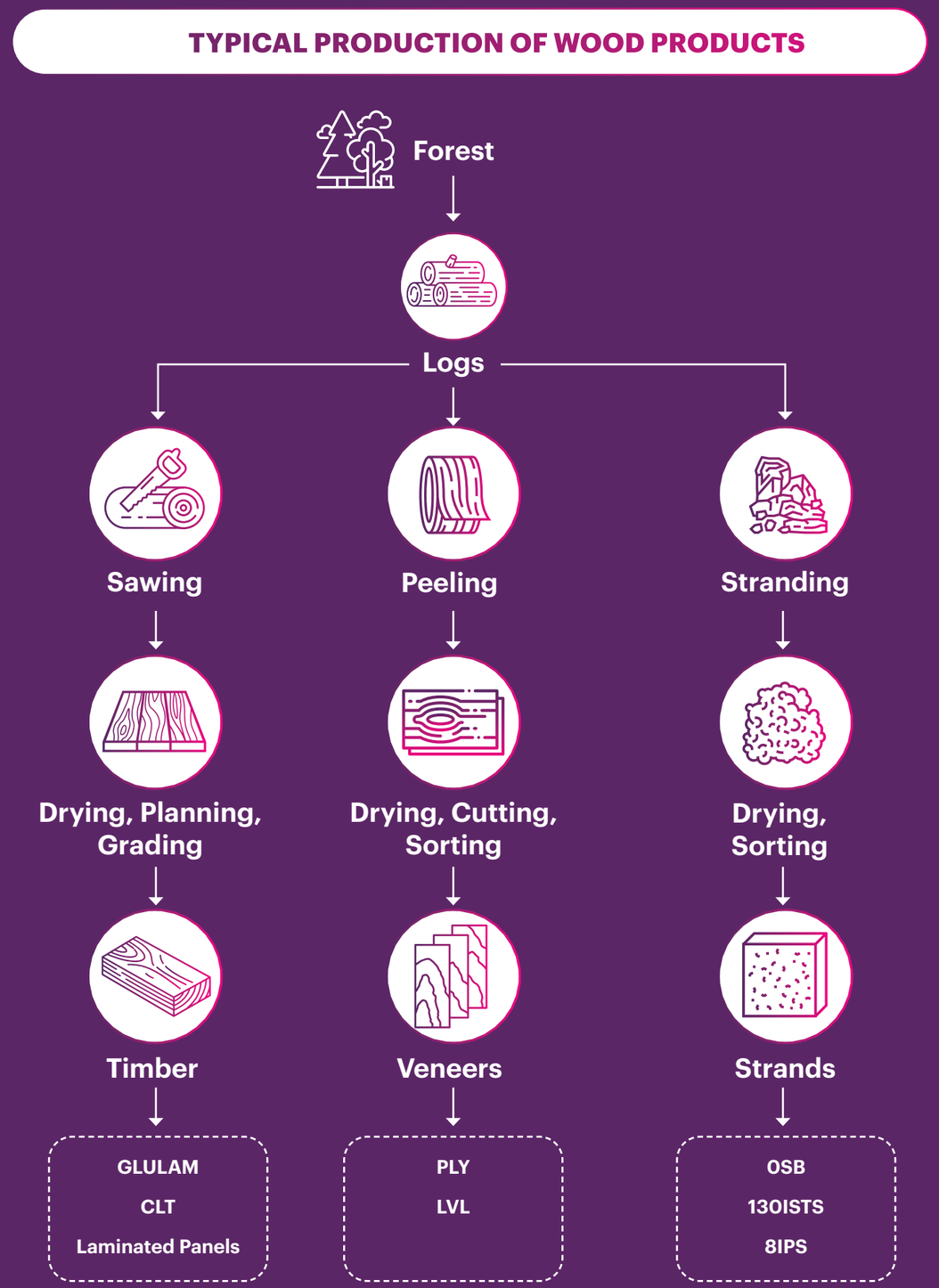
The emergence of the industrial age, however, led to a decline in timber's use. Materials such as steel and concrete offered significant structural advantages, including higher strength, durability, and fire resistance. In recent decades, the issue of CO_2 emissions has risen up the sustainability agenda and the development of engineered 'mass timbers' has addressed many of the material's traditional limitations. Glued laminated timber, or glulam, made by gluing together layers of small pieces of lumber under pressure and heat, offers dimensional stability and stronger structural beams and columns. Laminated veneer lumber (LVL) uses the same principle but with multiple layers of dried wood veneer. Cross-laminated timber (CLT) comprises layers of timber, each perpendicular to the one before, making it ideal for panelized applications such as walls, floors and roofs.

Evidence also suggests that demand for structural timber products is rising. According to the National House Building Council (NHBC), timber frame accounted for 22% of the housebuilding market in 2021, up from 19% in 2015. The NHBC suggests this could rise to 27% in 2025[3]. Meanwhile CLT and glulam are facilitating a new generation of larger industrial and commercial timber buildings, such as 'The Office Group's Black & White Building', the tallest timber office building in central London when it was completed in 2022. The rise in demand for timber is also reflected in statistics for new planting and restocking of UK forests: up 59% and 28% respectively in 2023-24[4].

UK forest statistics reflect the rise in demand for timber (2023-24)

for new planting
up 59%

restocking
up 28%



TYPICAL PRODUCT USE

			Wall	Floor	Roofing sheathing	Roofing beams / trusses	Beam	Columns	Joist	Headers	Rim board	Panel	Arches in structures	Scaffold planking
1930s	Laminated Veneer Lumber	LVL						✓	✓	✓	✓			✓
1940s	Glued Laminated Timber	Glulam				✓		✓					✓	
1960s	Oriented Strand Board	OSB	✓	✓	✓							✓		
1980s	Parallel Strand Lumber	PSL						✓						
1990s	Cross-Laminated Timber	CLT	✓	✓	✓		✓	✓		✓	✓	✓		
1990s	Nail-Laminated Timber	NLT	✓	✓	✓							✓		
2017-2018	Mass Plywood Panel	MPP	✓	✓	✓							✓		

NET ZERO STRATEGY

Timber construction has gathered momentum as national and regional government and industry bodies continue to set ever tougher sustainability targets. A report for the House of Commons Committee on Climate Change in 2019 stated that the use of structural timber can reduce the embodied CO_2 emissions of a building by 20-60% compared to materials such as concrete and steel[5]. The UK government's *Timber in Construction Roadmap,* published in 2023, placed timber at the heart of it's net-zero strategy, highlighting the importance of driving demand and promoting its use, as well as increasing skills, capacity, and competency across the supply chain[6].

Challenges to wider adoption

Despite the inherent sustainability advantages of timber construction, significant challenges must be addressed to fully leverage its potential. This section outlines several of the primary issues facing its wider adoption, from technical and regulatory challenges such as fire safety and durability, to economic challenges such as the current reliance on imports and increased administrative requirements and logistical complexities following Brexit. Government policies, such as those set out in the 2017 Clean Growth Strategy and the 2023 Powering Up Britain plan[7], will be crucial in overcoming economic and regulatory barriers.

FIRE PROTECTION AND SAFETY

One of the most significant barriers to the widespread use of timber in construction is unease over fire safety. Timber is inherently combustible, raising concerns about its suitability for high-rise, highly serviced and densely populated buildings. Stringent fire safety regulations and the need for comprehensive testing can delay project approvals and increase costs. Modern methods of construction (MMC) can pose additional challenges as modular systems in particular, can leave voids between stacked units that create pathways for fire to spread. However, advances in fire-retardant treatments, such as impregnation with fire-resistant chemicals and the development of fire-resistant coatings, are significantly enhancing timber's fire performance. These treatments slow down the ignition and combustion processes, providing critical time for evacuation and fire-fighting efforts. Instigating a robust fire protection strategy in the early stages of design development is crucial. This includes evaluating the effectiveness of fire-retardant treatments, design solutions such as encapsulation, and fire safety systems.

Thorough risk assessments need to consider specific fire hazards, such as deep floor plates, lack of sprinkler protection, and adjacent party walls. Obtaining appropriate insurance cover – addressing not only life safety but property protection – is critical to mitigating the financial risks associated with timber construction. Insurance providers are expanding their coverage of timber buildings, but stress the importance of integrating strategies early in the design and construction phases.

DURABILITY AND PERFORMANCE

Timber can be susceptible to moisture, pests, and decay, affecting its durability and performance over time. Ensuring that timber used in construction is adequately treated and maintained is crucial to its long-term viability. Innovations in treatments and protective measures are necessary to address these concerns and improve confidence in timber as a reliable construction material.

Moisture control systems and pest management measures are also needed during construction to validate insurance requirements and ensure compliance with safety standards. During construction, it's essential to apply protective measures like weatherproofing to prevent moisture damage and secure structural supports to guard against physical damage. Without proper protection, the timber frame's structural integrity can be compromised, resulting in increased risk.

SUSTAINABLE FORESTRY MANAGEMENT

Unsustainable logging practices can undermine the environmental benefits of using timber. Certification schemes such as the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (PEFC) play a crucial role in verifying sustainable forestry practices.

However, only 44% of UK woodland is currently certified under these schemes[8], raising concerns about the potential impact of timber construction on natural habitats and biodiversity. The wider promotion of certified sources will be vital in addressing fears around deforestation.

The use of uncertified timber can impact final outcome of BREEAM and LEED certifications, as both schemes emphasize the importance of using responsibly sourced materials.

DEPENDENCE ON IMPORTS

The most productive timber forest regions in Europe are located in Sweden, Finland, Germany and Austria. Together these countries accounted for at least 50% of the total annual average roundwood production of 458 million m³ across the EU and UK between 2011 and 2021. France, Czechia, and Poland are also significant roundwood producers[9].

Despite recent increases in new planting and restocking of forests, the UK remains the second largest net importer of forest products in the world, bringing in approximately 80% of its timber, predominantly from countries such as Sweden, Latvia, and Finland[10]. This heavy reliance on imports poses risks to supply chain stability, particularly in light of global trade disruptions and geopolitical tensions. For instance, sanctions on Russia and Belarus have affected the supply of birch plywood.

Expanding domestic timber production offers the potential not just to reduce reliance on imports but also to generate opportunities for employment in forestry and wood processing sectors, contributing to both environmental and economic sustainability.

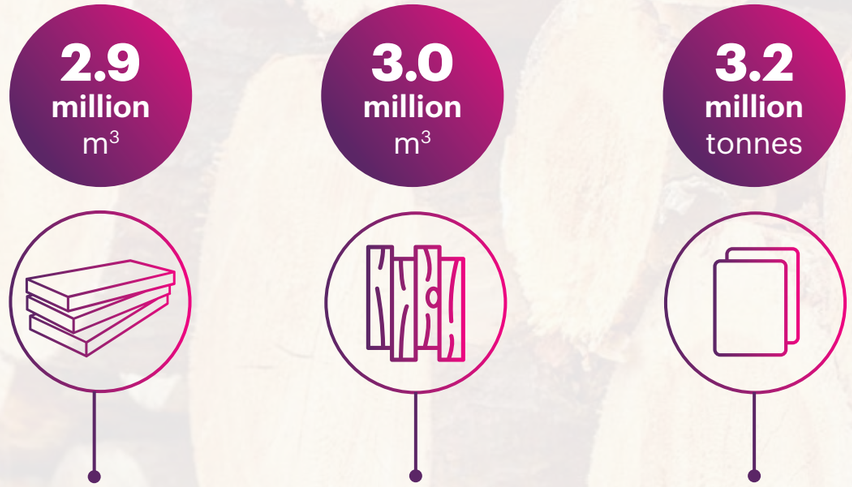
MARKET MISCONCEPTIONS

There is a general lack of familiarity within the construction industry regarding the use of timber, leading to misconceptions about timber's performance and benefits. Educational initiatives such as Timber Development UK[11] and demonstration projects are needed to promote understanding and build confidence in timber construction.

Although the environmental benefits of timber are well-documented, there is limited awareness among some stakeholders about its role in carbon sequestration and reducing embodied carbon in buildings. The manufacturing of timber products is far less energy-intensive than materials like steel and concrete, meaning that less fossil fuel-derived energy is used throughout their lifecycle, from extraction to processing.

Highlighting the lifecycle benefits of timber could make it more attractive to stakeholders focused on long-term sustainability, helping to align market practices with the UK's net-zero goals.

UK PRODUCTION OF WOOD PRODUCTS



	SAWNWOOD (000 m³)	WOOD-BASED PANELS (000 m³)	PAPER & PAPERBOARD (000 tonnes)
2019	3462	3246	3851
2020	3348	2952	3631
2021	3611	3486	3642
2022	3145	3110	3456
2023	2908	3456	3225

Cost considerations

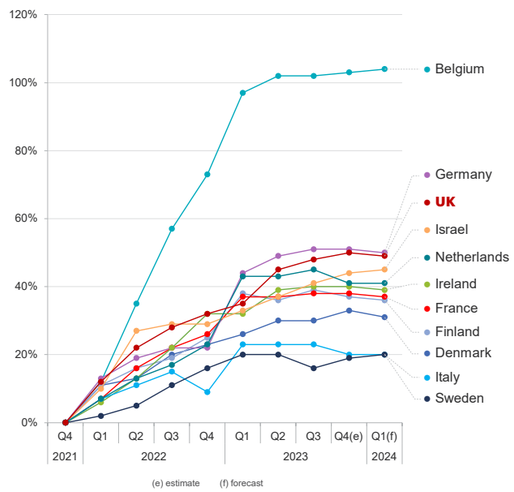
PRICE VOLATILITY

Commodity volatility creates uncertainty for builders and developers, potentially deterring investment in construction. The price of processed timber, or lumber, has experienced volatility over the past five years, driven by fluctuating global demand, supply chain disruptions, and economic conditions.

However, there is a downward trend across markets, most notably in the UK which has witnessed over a 30% reduction in timber costs since Q4 2021. This could make it more financially attractive when compared to more energy-intensive materials such as concrete and steel rebar, which continue to maintain elevated prices.

CONCRETE

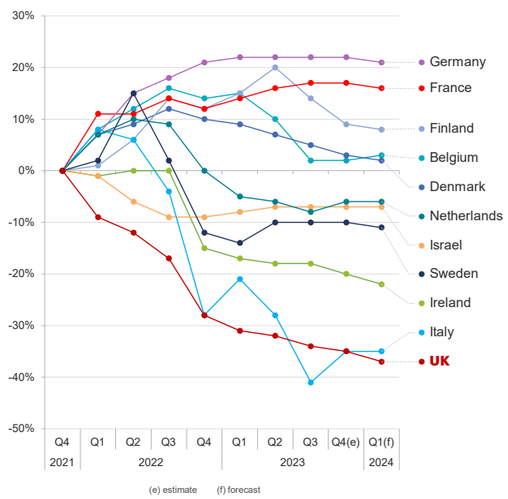
Price change comparison against Q4 2021



	YoY % price change	Level of impact on construction industry			Forecast
	Q1 '23 – Q1 '24 (f)	Price change (e) vs (f)	Material availability	General state of supply chain	Q2 - Q3 '24 (f)
Belgium	3%	■	●	◆	⇔
Germany	4%	■	●	◆	↘
UK	10%	■	●	◆	↘
Israel	9%	■	●	◆	⇔
Netherlands	-1%	■	●	◆	↘
Ireland	5%	■	●	◆	↘
France	0%	■	●	◆	⇔
Finland	-1%	■	●	◆	↘
Denmark	4%	■	●	◆	↘
Italy	-2%	■	●	◆	↘
Sweden	-1%	■	●	◆	⇔

LUMBER

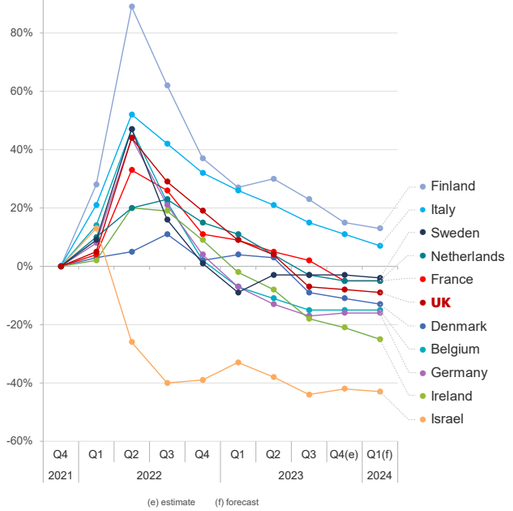
Price change comparison against Q4 2021



	YoY % price change	Level of impact on construction industry			Forecast
	Q1 '23 – Q1 '24 (f)	Price change (e) vs (f)	Material availability	General state of supply chain	Q2 - Q3 '24 (f)
Germany	0%	■	●	◆	↘
France	2%	■	●	◆	⇔
Finland	-6%	■	●	◆	↘
Belgium	-11%	■	●	◆	⇔
Denmark	-6%	■	●	◆	↘
Netherlands	-1%	■	●	◆	↘
Israel	1%	■	●	◆	⇔
Sweden	3%	■	●	◆	⇔
Ireland	-5%	■	●	◆	↘
Italy	-17%	■	●	◆	↘
UK	-8%	■	●	◆	↘

STEEL REBAR

Price change comparison against Q4 2021



	YoY % price change	Level of impact on construction industry			Forecast
	Q1 '23 – Q1 '24 (f)	Price change (e) vs (f)	Material availability	General state of supply chain	Q2 - Q3 '24 (f)
Finland	-11%	■	●	◆	↘
Italy	-15%	■	●	◆	↘
Sweden	6%	■	●	◆	⇔
Netherlands	-15%	■	●	◆	⇔
France	-13%	■	●	◆	⇔
UK	-16%	■	●	◆	↘
Denmark	-16%	■	●	◆	↘
Belgium	-8%	■	●	◆	⇔
Germany	-9%	■	●	◆	⇔
Ireland	-23%	■	●	◆	↘
Israel	-14%	■	●	◆	⇔

LONG-TERM SAVINGS

Despite the perception of higher upfront costs, savings in construction time and waste reduction can have a positive impact on overall budgets. Clear communication of the long-term economic benefits and lifecycle cost advantages of timber is needed to shift market sentiment and encourage adoption.

TIMBER CONSTRUCTION OFFERS SEVERAL COST-SAVING ADVANTAGES COMPARED TO TRADITIONAL CONCRETE AND STEEL BUILDING METHODS

ON-SITE LABOUR

Prefabricated timber components can be rapidly assembled, leading to reduced labour requirements on-site, cutting overall construction timelines and associated costs.

CONSTRUCTION TIME

The reduction in the construction programme can result in decreased overheads and labour costs, particularly in areas such as site management, equipment hire, and temporary facilities. It can also help manage risks related to cost overruns, potential delays, and resource bottlenecks.

WASTE

Timber construction minimizes waste, with precise off-site fabrication ensuring components are manufactured to exact specifications. Studies indicate that timber construction can result in up to 30% less waste than traditional building methods.

FOUNDATIONS

A structure comprising beech-based LVL with CLT floor slabs and core weighs considerably less than a comparable concrete structure. This could positively impact on the substructure design and cost. Wind loads, however, would need to be addressed.

ADDITIONAL CONSIDERATIONS

ENCAPSULATION

The expense and added construction time of encapsulating timber elements with non-combustible materials to enhance fire resistance needs to be considered and factored into the overall project budget costs.

PROTECTION

During construction, it is necessary to implement protective measures such as weatherproofing to prevent moisture damage, fire retardants to reduce the risk of fire, and secure structural supports to protect against physical damage. Without adequate protection, the structural integrity of the timber frame can be compromised, leading to increased risks and potential insurance issues.

FIXING METHODS AND METAL COMPONENTS

These need to be carefully considered, as both can have an impact on fire performance.

Design and construction approach

Early collaboration is particularly important in timber construction projects as it can help to reduce the risk of project delays and higher upfront material costs.

Pre-Construction Services Agreements (PCSAs) are integral to maximizing efficiency and cost-effectiveness. These agreements enable early contractor involvement during the design and planning phases, fostering improved collaboration between architects, engineers, suppliers, and other stakeholders.

This early engagement allows for more accurate cost estimation and risk assessment, which are crucial in mitigating potential delays and the likelihood of unforeseen expenses that can arise during the build.

PCSAs support the integration of modern construction methods such as Design for Manufacture and Assembly (DfMA), which is particularly effective in projects heavily reliant on timber. DfMA takes much of the construction process off-site by adopting prefabrication techniques, reducing on-site assembly time and labour. It is also in line with the principles of the circular economy, as timber components can be disassembled and reused or recycled at the end of a building's lifecycle.

Procurement strategies should focus on securing a stable supply of high-quality timber to help mitigate the risk of price fluctuations and material shortages, and enhance financial stability throughout the project.

MODEL VARIANCES

	DESIGN INTEGRATION	CONSTRUCTION PROCESS	PROJECT TIMELINE
TYPICAL MODEL	Design phases are sequential and often isolated from manufacturing	On-site construction is a major phase involving significant time and labour	Longer timelines due to sequential processes
DFMA MODEL	Design and manufacturing are integrated, with ongoing collaboration	Emphasis on off-site prefabrication and on-site assembly, reducing on-site construction time and labour	Shorter timelines due to parallel processes and efficiency in assembly

KEY RISKS OF DFMA AND POTENTIAL MITIGATION STRATEGIES

RISK: SUPPLY CHAIN DISRUPTIONS
Mitigation: diversify suppliers, bulk purchasing, early collaboration under PCSA, local sourcing and increased domestic capacity.

RISK: TRANSPORTATION DELAYS
Mitigation: advance planning, early material procurement and scheduling management.

RISK: QUALITY ISSUES
Mitigation: supplier certification and quality standard control, pre-construction testing and inspections, on-site inspection and protection.

PROCESS: ENGAGEMENT WITH SUPPLY CHAIN

TRADITIONAL (LINEAR) CONSTRUCTION

DESIGN — Feasibility — Design and engineering

PLANNING & PROCUREMENT — Funding — Planning — Tender — Testing / Commissioning — In use

CONSTRUCTION — Site prep — Construction — Fit-out

linear + time-consuming process;
sensitive to delays on-site

DfMA

(longer design process to ensure greater levels of coordination)

DESIGN — Feasibility — Design and engineering

PLANNING & PROCUREMENT — Funding — Planning — Tender — In use

CONSTRUCTION — Site prep — Manufacture — Assembly — Fit-out — Testing / Commissioning

Longer design phase but shorter construction period

Programme savings

Future trends and opportunities

The use of timber in construction is rapidly evolving, driven by a growing focus on sustainability, carbon reduction, and innovative building techniques.

As timber becomes more integrated into modern construction through mass timber technologies such as CLT and LVL, it offers a renewable, lightweight alternative to steel and concrete. Advances in fire safety and engineering are also addressing concerns about timber's use in high-rise and densely populated buildings.

Key trends include the increasing application of DfMA principles, which improve efficiency through off-site prefabrication, and the growing importance of circularity, where timber's recyclability and low embodied carbon make it an essential part of sustainable construction.

With the rise of net-zero policies and government incentives such as the Clean Growth Strategy, the timber construction industry is poised to expand further, offering exciting opportunities to reshape the built environment in line with the UK's sustainability goals, and opening up new green jobs in forestry, manufacturing, and construction.

This momentum positions timber not just as a material of choice but as a driver of innovation in the construction sector. Overcoming the technical, regulatory, and economic challenges and unlocking the full potential of timber will be absolutely crucial to achieving the UK's net-zero ambitions.

Sources:

1. Building to net zero: costing carbon in construction, House of Commons Environmental Audit Committee, 2022-23
2. https://www.un.org/en/climatechange/science/causes-effects-climate-change
3. Structural timber market research: residential sector October 2022, Structural Timber Association
4. Forestry Facts & Figures 2024 (forestresearch.gov.uk)
5. Wood in Construction in the UK: An Analysis of Carbon Abatement Potential, commissioned by the House of Commons Committee on Climate Change, February 2019
6. Timber in Construction Roadmap, Department for the Environment, Food & Rural Affairs, December 2023
7. Powering Up Britain, Department for Energy Security and Net Zero, March 2023
8. Forestry Facts & Figures 2024 (forestresearch.gov.uk), page 7
9. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Wood_products_-_production_and_trade#Roundwood_production
10. Forestry Statistics 2022, Chapter 3: Trade, https://cdn.forestresearch.gov.uk/2022/09/Ch3_Trade_2022.pdf
11. Timber Development UK | Build a better world through wood

Linesight

Natalia Gospodinova
Associate Director – Cost Management

natalia.gospodinova@linesight.com

Declan Furey
Associate Director – Cost Management

declan.furey@linesight.com

Jack Stewart
Senior Cost Manager

jack.stewart@linesight.com

linesight.com