

# TIMBER CONSTRUCTION

## BARRIERS AND SOLUTIONS

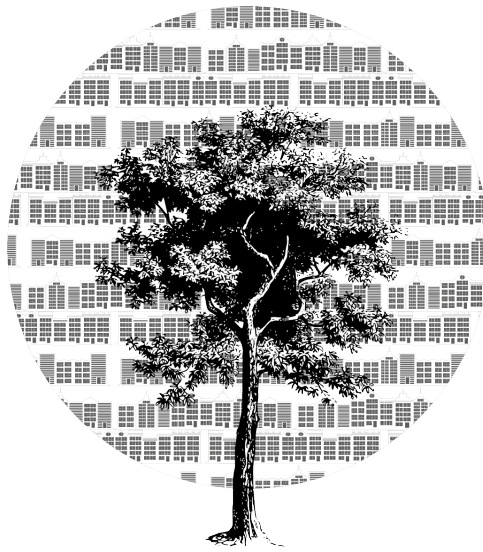
A report for the All-Party Parliamentary  
Group for the Timber Industries  
JUNE 2023



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THE ALL-PARTY PARLIAMENTARY GROUP  
Timber Industries



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# **TIMBER CONSTRUCTION**

## **BARRIERS AND SOLUTIONS**

A report for the All-Party Parliamentary Group  
for the Timber Industries



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# FOREWORD

**Climate change is increasingly central to global policy discussions and for good reason. If we are to ensure a sustainable future for all we must take action, and we must do it now.**

It is a cross-party issue, with all the major UK political parties committed to decarbonising the UK and achieving net zero emissions.

To do this, we must tackle one of the key sources of emissions – the built environment. Our buildings often get ignored in climate debates, as we focus on the more obvious polluters like energy and transport.

The built environment directly accounts for 25% of emissions in the UK, stemming from the day-to-day use of buildings (operational carbon) as well as their manufacture and construction (embodied carbon).

If we are to tackle these emissions, a foundational shift in the way we build and operate our buildings is required. This means prioritizing low-carbon materials in construction and moving away from energy-intensive, non-regenerative resources. It also requires avoiding demolition in favour of the retrofit and improvement of our existing buildings.

In our capacity as Chairs of the APPG for the Timber Industries, we have looked to encourage the use of low-carbon building materials, like wood, in construction.

The benefits of timber construction have been well-documented in recent years. It is the construction material with the lowest level of embodied carbon,

requiring little energy for its manufacture. It acts as a carbon store as a building product and when sustainably sourced, is responsible for expanding forests in both the UK and abroad.

Timber is also the material of choice for modern methods of construction (MMC), a revolutionary way of building that creates efficient, high-quality homes capable of satisfying the growing demand for housing. It is a truly exciting, low-carbon solution to our built environment emissions and a crucial component in our bid to reach net zero.

This has been recognised by the government who, in late 2021, created the Timber in Construction Working Group, which is creating a roadmap to expand timber usage in the UK. This working group has fostered extensive collaboration between government and industry, identifying the barriers and potential stumbling blocks to expanding timber construction in the UK.

This APPG report seeks to understand what is behind these barriers and provide a set of policy solutions that will allow for the safe expansion of low-carbon timber construction in the UK.

This, we hope, will provide inspiration for the government and other parties in their bids to formulate green built environment policies.

We feel the arguments for timber have been made and to good effect. It is now time to take the next step and turn them into reality.

# 25%

of UK total carbon emissions are directly attributed to our built environment.

# 20%


reduction in embodied carbon is achieved by substituting timber frame for masonry.

# 0.9T

of CO<sub>2</sub> is sequestered for every cubic metre of timber used in construction.

# 50M

tonnes of CO<sub>2</sub>e are released every year into the atmosphere from new buildings and infrastructure alone.



*"If timber frame were used to build **270,000 new homes**, we could increase the amount of carbon sequestered in UK homes to **3 million tonnes of carbon dioxide equivalent**"*

# INTRODUCTION

**The UK Government has set up the Timber in Construction Working Group, which looks to outline a roadmap to increase timber use in construction by the end of this year. This working group is a joint government initiative run by DBT, DESNZ, DEFRA, DLUHC and the Forestry Commission.**

The working group was created following increasing recognition of the benefits of timber construction by government advisory bodies, such as the Climate Change Committee<sup>1</sup> and Environmental Audit Committee<sup>2</sup>. The group was also created to assist the UK's bid to achieve net zero by 2050, with timber construction offering a safe and effective means to decarbonising the UK's built environment.

This report looks to assist the government's work, outlining how we can safely and effectively expand low-carbon timber construction in the UK.

The report will be structured around key themes identified by the government. These are:

**Demand** | How do we make wood the number one material for housebuilders?

**Supply** | How do we ensure timber supply is capable of meeting long-term demand?

**Building Safety** | How do we tackle misconceptions about timber and fire safety?

**Labour and Skills** | How do we upskill future generations towards low-carbon construction and tackle labour shortages in the economy?

Each chapter will investigate where barriers exist to expanding timber use, and what solutions are available to government to address them.

The report will primarily focus on timber frame housebuilding in the UK, which offers the quickest avenue for large-scale timber expansion in the UK.

In doing this, we hope to provide a set of useful policy recommendations to aid the government in its bid to expand timber use and decarbonise construction in the UK.

## KEY FACTS

The UK timber industry is an existing supply chain which employs more than 150,000 people.

UK's housing stock of around 28 million is amongst the most inefficient in Europe.

Embodied carbon emissions account for up to 75% of a building's total emissions over its lifespan.

Timber products have the lowest embodied carbon of any mainstream building material.

Every cubic metre of timber used in construction has absorbed 0.9 tonnes of carbon dioxide which will be stored for the lifetime of the product.

Timber is the safest and cheapest form of carbon capture and storage available.

As a result of sustainable forest management, forests across Europe, including the UK, have grown by 5% over the past 25 years.

The forestry and timber industry is a key part of our environmental and industrial heritage and a vital part of our low-carbon future.

## Why should we expand timber construction?

### The original low-carbon material

Timber has been increasingly seen as essential for tackling built environment emissions.

Figures state that the built environment, both residential and commercial, is responsible for 25% of our national emissions<sup>3</sup>. This comes from both operational emissions, such as heating, as well as embodied emissions from construction and production of materials<sup>4</sup>.

Using timber reduces the carbon emissions from construction in several ways:

- It acts as a form of carbon capture and storage, as the carbon dioxide sequestered by trees is stored in the wood product for the product's lifetime.
- It increases the number of trees grown in sustainably managed forests, which helps to sequester even more carbon dioxide.
- It requires very little energy throughout the supply chain of harvesting, processing, and manufacturing.
- It displaces carbon-intensive materials to reduce the carbon footprint of a building.

For these reasons, the CCC estimates that if timber frame were used to build 270,000 new homes, we could increase the amount of carbon sequestered in UK homes to 3 million tonnes of carbon dioxide equivalent (MtCO<sub>2</sub>e), while reducing embodied emissions by around 20% per building<sup>5</sup>.

### **A better way to build**

Timber lends itself well to modern, offsite methods of construction, with improved efficiency and performance.

Using state-of-the-art technology, offsite timber construction provides buildings with a superior thermal envelope, requiring minimal maintenance and a 'fit-and-forget' solution for the lifetime of the building. These homes are extremely thermally efficient compared to those constructed in many other materials, reducing energy demand.

Additionally, offsite timber systems are far less labour-intensive than traditional methods of construction, with offsite manufacture producing factory-controlled, higher-quality outputs and requiring fewer people onsite. This has revolutionised the once noisy building site, with quieter assemblies, fewer deliveries and less waste than ever before.

In an era of labour shortages, offsite timber systems will prove invaluable in plugging the chronic skills gaps in the economy.

### **Ripe for expansion**

The timber industry boasts a truly national supply chain, with offsite factories and businesses dotted across the UK. Each factory is relatively low-cost and has low energy inputs, using generic machinery and technology. Additionally, the industry provides jobs across the skills spectrum, ranging from machine operators to designers and engineers.

This supply chain is ripe for expansion, and a potential source for green investment, jobs and skills in every region of the UK.

### **Good for our health**

Timber interiors have been shown to help reduce stress, blood pressure and heart rate as well as allow 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<sup>6</sup>.

Given we now spend around 90% of our time indoors, timber is the ideal material for turning affordable houses into healthy homes.



A photograph of a lumber yard. In the foreground, there are numerous stacks of light-colored wood planks, likely spruce or pine, neatly piled and secured with metal bands. The stacks are arranged in rows. In the background, a large, rugged mountain range stretches across the horizon under a blue sky with scattered white clouds. A tall, thin pole with a light fixture is visible on the left side of the image.

***“The UK Climate Change Committee (CCC), the independent advisor to government on how to achieve net zero by 2050, has repeatedly advocated for increasing the use of wood in construction as a way to reduce carbon emissions.”***

# DEMAND

## INCREASING THE UK'S LOW-CARBON MANUFACTURING CAPACITY

To expand timber construction, we must find ways of incentivising demand and making wood the material of choice for housebuilders in the UK.

Demand for timber has been steadily growing in recent years, with the UK's largest housebuilders increasingly investing in offsite timber frame manufacturing:

- Barratt Developments has acquired a timber systems manufacturer and is investing in expanding capacity whilst partnering with third parties to support its volume demand<sup>7</sup>.
- Taylor Wimpey has committed to using timber systems for 25% of its output and partners with key manufacturers across the UK to meet this growing demand<sup>8</sup>.

Timber is already the established housebuilding material in Scotland, where 92% of homes are built using wood, and around 22% in Wales.

Despite this positive picture, overall timber frame use remains underutilised in the UK. This is particularly prevalent in England, where just 9% of homes are built using timber systems<sup>9</sup>.

## Why is timber frame use so low in England?

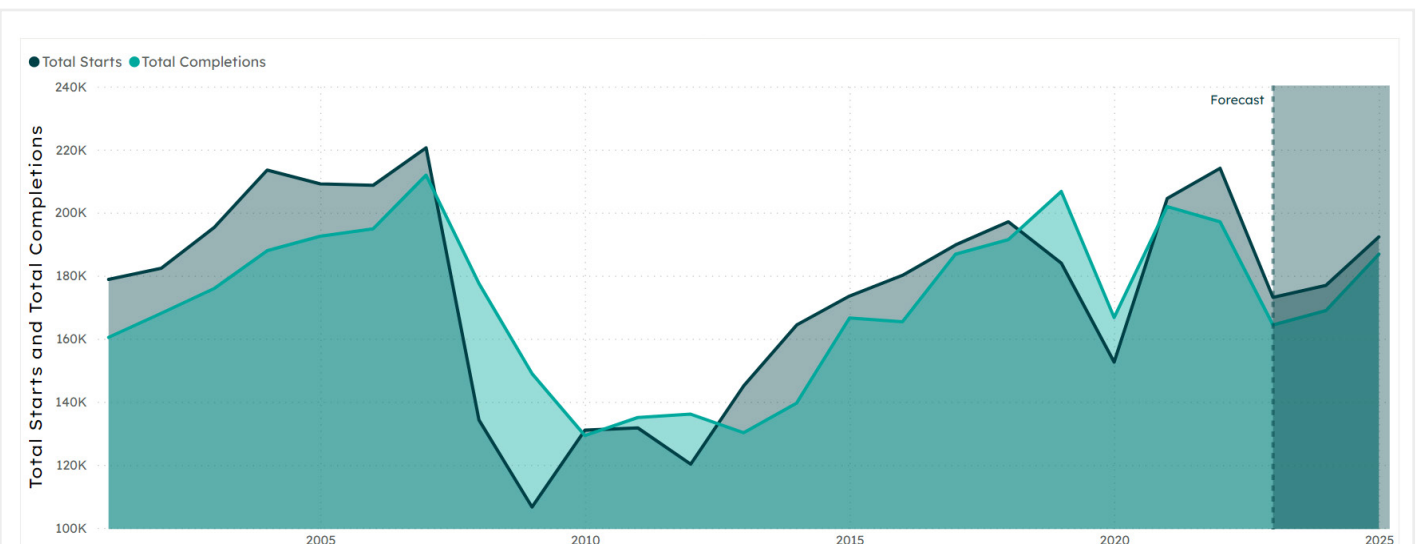
### Resistance to change

The UK construction industry is risk-averse and often unwilling to invest in new materials and methods of construction.

A key reason for this is the volatility of the UK housing market, where inconsistent demand attaches high risk to new research and investments. Because of this, the level of investment in industry innovation is very low, with R&D spending lagging heavily behind other UK industries<sup>10</sup>.

### Historical factors

Timber frame is underutilised due to historical reasons, with the material falling out of favour sharply in the 18th century. Supply constraints caused by energy demand, Royal Navy expansion and agriculture, together with building codes and strict regulations stemming from the Great Fire of London, rendered the material uncompetitive - ushering in an era of masonry construction. This path dependency has continued today, with nearly 80% of UK homes today built using masonry<sup>11</sup>.



Volatile demand in construction can be seen in housing starts and completions in England over the last 20 years. This inconsistent demand attaches high risk to new research and investments. Instead, successful house building models in the UK have been focused on minimising and outsourcing their risk down the supply chain.

## Price perception

Price perception is another barrier, with many developers believing timber frames to be more expensive than masonry. In recent years, studies have proven this to be untrue, with independent reports indicating timber systems to be a similar price, and often cheaper, than masonry per m<sup>3</sup> used in construction, which is further enhanced through reduced disruption and quicker build times<sup>12</sup>.

## Misplaced safety concerns

In many countries across Europe and North America, lightweight timber frame is very popular. Nearly everything in a building will be made from timber, from doors to floors and all points in between – without concern from residents or policymakers that their homes are made from this particular material.

Fire safety, just as with structural safety, is primarily related to design and installation within a building project, rather than its component parts.

## What policies would help boost demand for timber in construction?

It should be stated that timber does not need policies which would artificially inflate its use.

Rather, growing demand for timber in construction will come about through sensible policies aimed at reducing carbon emissions, increasing affordable housing supply, and stimulating the low-carbon and circular economies. Specific policies include:

### Embodied carbon regulation

If the government is to achieve net zero by 2050, it must regulate embodied carbon emissions. These emissions are unregulated and currently account for 10% of our national carbon output<sup>13</sup>.

This can be achieved by:

- Expanding the Building Regulations to include requirements to assess, report and reduce embodied carbon.
- Introducing clauses to the National Planning Policy Framework with requirements for Whole Life-Cycle Carbon Assessments to be submitted as part of pre-application enquiries, full planning submissions, and at practical completion.

Embodied carbon legislation has been seen across Europe in recent years, including in France, the Netherlands and Denmark<sup>18</sup>.

- France has legislated RE2020 which introduced embodied carbon limit values which will tighten in stages over the years<sup>19</sup>.
- The Dutch “Building Act” was updated in January 2013 to require all new residential and office buildings, that are larger than 100 sqm, to calculate and report their embodied carbon emissions to obtain a building permit<sup>20</sup>.
- Denmark has set legal limits on embodied carbon emissions (legislated Bæredygtighedsklassen)<sup>21</sup>.

- Setting limit values on embodied carbon emissions for all developments<sup>14</sup>.

Regulation of embodied carbon emissions would inherently incentivise the use of timber, which has the lowest embodied carbon of all the mainstream construction materials and can sequester 0.9 tonnes of CO<sub>2</sub> in every cubic metre<sup>15</sup>.

This regulation would also support the creation of green jobs in UK manufacturing by stimulating demand for sustainable building products.

The *Carbon Emissions Buildings Bill* was introduced to parliament by MP Duncan Baker in February 2022. This Bill requires the whole-life carbon emissions of buildings to be reported, and limits set on embodied carbon emissions in the construction of buildings.

This private member’s bill failed to pass due to parliamentary timetable restrictions. However, similar legislation should be put forward by the government if we are to tackle built environment emissions.

### Affordable housing procurement

By linking ambitious affordable housebuilding programmes across the country to low-carbon MMC housing, the government could provide the continuity of demand required for more private investment into manufacturing and research and development.

Through a focus on the lower end of the market, which is currently poorly catered to by the private

and largely 'for sale' housing model based on individual home ownership, the government can help address systemic inequities while avoiding undercutting private home developers.

This would help timber manufacturing systems, which are a low-carbon, low-waste, and high-performance form of housing delivery, to escape the boom-and-bust cycles – provided funding can be allocated towards these forms of construction.

## How can finance support timber in construction?

Timber construction should be seen within the context of a green industrial strategy, and should be a destination for green grants. Coupled with growing international recognition of timber in construction as a certifiable Carbon Capture and Storage (CCS) solution, which could potentially be a source of carbon credits for businesses to purchase, there are potential powerful levers in both the public and private spheres.

In recent years, OECD countries have been providing considerable public finance to low-carbon industries in a bid to incentivise green transition.

In the UK, the timber industry is a source of green jobs, and low-carbon, localised manufacturing which is ripe for expansion.

Incentivising timber construction and expanding this supply chain will assist in decarbonising construction, promoting forest growth (both domestic and international), and levelling up the UK. Government departments could do this through:

### Green manufacturing grants

In recent years, the Department for Business, Energy and Industrial Strategy (BEIS) has looked to provide funding to assist high-carbon industries to reduce their emissions. For example, in 2020 with the proposed £250 million Clean Steel Fund<sup>16</sup>.

Funding should instead go to existing low-carbon industries like timber to encourage expansion and assist with new research and development.

The Department for Environment, Food and Rural Affairs (DEFRA) touched upon this in 2022 when they

## POLICY RECOMMENDATIONS

**The Department for Levelling Up, Housing and Communities should:**

- Bring Whole Life Carbon Assessments (WLCAs) into building regulations and introduce limits on embodied carbon limits in construction.
- Mandate a low-carbon procurement plan for all social and publicly funded building projects.
- Build more affordable homes strongly linked to low-carbon MMC construction.

**Government departments should include a focus on a low-carbon timber sector within the context of a green industrial strategy.**

**The government should take up the National Retrofit Strategy to improve UK housing as set out by the CLC.**

pledged £20 million to “drive long-term woodland creation efforts” and to “help to improve timber security”<sup>17</sup>. Schemes like this should be expanded across the timber supply chain, encouraging innovation and catalysing low-carbon construction across the country.

### Low-carbon housing grants

The government’s Heat and Building Strategy focuses on operational carbon – the emissions from the use of a building – through grants for technologies such as heat pumps.

Funding should also be expanded to include embodied carbon emissions, by providing financial incentives for housing developers to employ the use of low-carbon building systems and use materials like timber in construction. In doing this, we can significantly reduce the emissions from both the operation and construction of our buildings.

This should be mirrored in the retrofit market through a wider policy framework, as set out through Construction Leadership Council’s National Retrofit Strategy v2.

# CASE STUDY: DONALDSON GROUP

**This family business began in 1860 as a timber merchant in Tayport, Fife, run by James Donaldson and his two sons. Over the last two centuries, the Group has seen two world wars, several recessions and the evolution of the timber industry.**

## Betting big on timber

The business has since made a number of acquisitions, including Stewart Milne Timber Systems (now Donaldson Timber Systems) in December 2021. This saw the business enter the timber frame market for the first time.

What began as a single timber merchant has grown to become a 1,600+ employee business, with 11 trading subsidiaries and 17 separate brands

## Creating a one-stop-shop

While James Donaldson Timber remains as a discrete entity, the group now has three new divisions, giving it the ability to build and fit out an entire house:

- Donaldson Off-site: Donaldson Timber Systems; Donaldson Timber Engineering; Donaldson Direct; and Rowan Manufacturing
- Interiors: Kitchens International, MGM Kitchens, Smith & Frater, Stonecare, Optima Kitchens, and Buzz Home Office
- Retail & Distribution: MGM Timber, Nu-Style Products, James Donaldson Insulation, Perform Panel, TimberCut4U, and online DIY marketplace, Plane & Simple ([itsplaneandsimple.com](https://www.itsplaneandsimple.com))

## Backing timber in construction

Rising construction costs, increasing housing demand and the significant skills shortage, coupled with the carbon reduction agenda, provide an opportunity for new innovative building solutions, especially those involving timber and off-site building.

## Localised manufacturing

Donaldson Group, like many other offsite timber manufacturers, has factories scattered across the country.



**Timber businesses like Donaldson Offsite can produce an abundance of high-quality homes around the UK at a significantly lower carbon cost compared to steel and concrete.**

In small towns like Ilkeston (Derbyshire), Donaldson Group has created a localised manufacturing base, providing low-carbon jobs across the skills spectrum.

The UK timber industry is ripe for expansion, and with proper government incentives, this abundant and localised manufacturing base can be levelled up right across the country.



# SUPPLY

## STRENGTHENING THE RESILIENCE OF OUR TIMBER SUPPLY

To expand timber construction in the long term, the government must ensure adequate supplies at home and support strong trading relationships abroad to match demand.

It should be stated that timber supply is not currently an issue, with more than enough wood in the market to satisfy growing demand, with room for growth<sup>22</sup>.

### Timber supply and demand in the UK

While there has been concern expressed recently, following a short-term squeeze on price experienced during the pandemic, the price and volume of timber in the UK market have been stable for decades

However, there are potential supply risks in the long term, with rising international demand and limited domestic supply likely to squeeze the UK timber market<sup>23</sup>.

Huge markets such as the USA and EU are increasingly looking to timber to tackle their high built environment emissions. For this reason, the World Bank predicts that timber demand will quadruple by 2050, potentially tightening global timber stocks<sup>24</sup>.

The UK is the second largest importer of timber in the world behind China, which makes us subject to movements in the international market<sup>25</sup>. Importing timber should not however be viewed through a negative lens.

As a strong importer of wood products, the UK can influence global forest management practices to be more sustainable – as it has done so for many years.

Instead, imports should be complemented with a drive to increase the UK's productive forestry as an engine of growth for low-carbon construction.

With just 13% tree cover in the UK, compared to a European average of roughly 40%, there is room for improvement in our approach to restoration, afforestation, and forest management<sup>26</sup>.

### Why is productive forestry so low?

Woodland targets set out in the England Trees Action Plan have not been reached, with just 13,840 hectares

## HOW DO WE ENSURE LONG-TERM TIMBER SUPPLY?

To ensure supplies are adequate to match demand, the UK needs to increase its productive forestry and continue promoting sustainable forest management with our trade partners.

of woodland planted in 2022 despite an "overall target of planting 30,000 hectares per year"<sup>27</sup>. Three key reasons have been identified by the Confor<sup>28</sup>.

- 1. Uncertainty:** There is uncertainty as to what land trees can be planted on. New planting often requires consultation with many different local and national interest groups, many of which present issues that need to be overcome as part of the planning process.
- 2. Tree species:** Regulations mean productive softwoods cannot form more than 20% of new planting in England, with a presumption in favour of broadleaf planting instead. These species are less useful for commercial construction products and take longer to grow.
- 3. Bureaucracy and paperwork:** There is currently a multitude of forms that need to be completed and signed off by the Forestry Commission before a tree planting scheme can go ahead.

### Increase tree planting

The UK Government should streamline the planning process by making the application and approval process for woodland creation simpler and quicker. This involves reducing bureaucracy and prioritising the planting of productive softwood species.

Scotland offers a good example of this, where the government has published clear productive woodland planting targets. This has had excellent results:

- Projects validated since 2019 have created 9,381 hectares of woodland.
- Between 2019 and 2021, it is estimated that around 7.5 million cubic metres of Scottish timber was used in construction in the UK<sup>29</sup>.

This policy can be emulated across the country to increase the supply of UK timber, making the market more resilient to large uptakes of global supply from rising international demand.

While UK timber is currently put to use in a variety of different products, the proportion of UK timber which is turned into long-term, low-carbon construction products should be increased. We need to change the perception of UK-grown timber.

**Reuse and circularity**

There should be a greater focus on increasing the circularity of wood construction products. Where appropriate, they could be wholly reused, or alternatively converted into lower-grade construction products such as OSB, with wood ‘cascaded’ down through the supply chain.

This way, the sequestered carbon is retained in the built environment for as long as possible. While less than 1% of timber currently goes to landfill, there are opportunities for greater timber reuse.

**Recognise the benefits of imported timber**

It is important to note that increasing UK supply should be incentivised to complement, rather than replace, imported timber.

The UK’s supply alone cannot match demand, even in the medium/long term. Imported wood from forest economies like Sweden and Finland is essential if

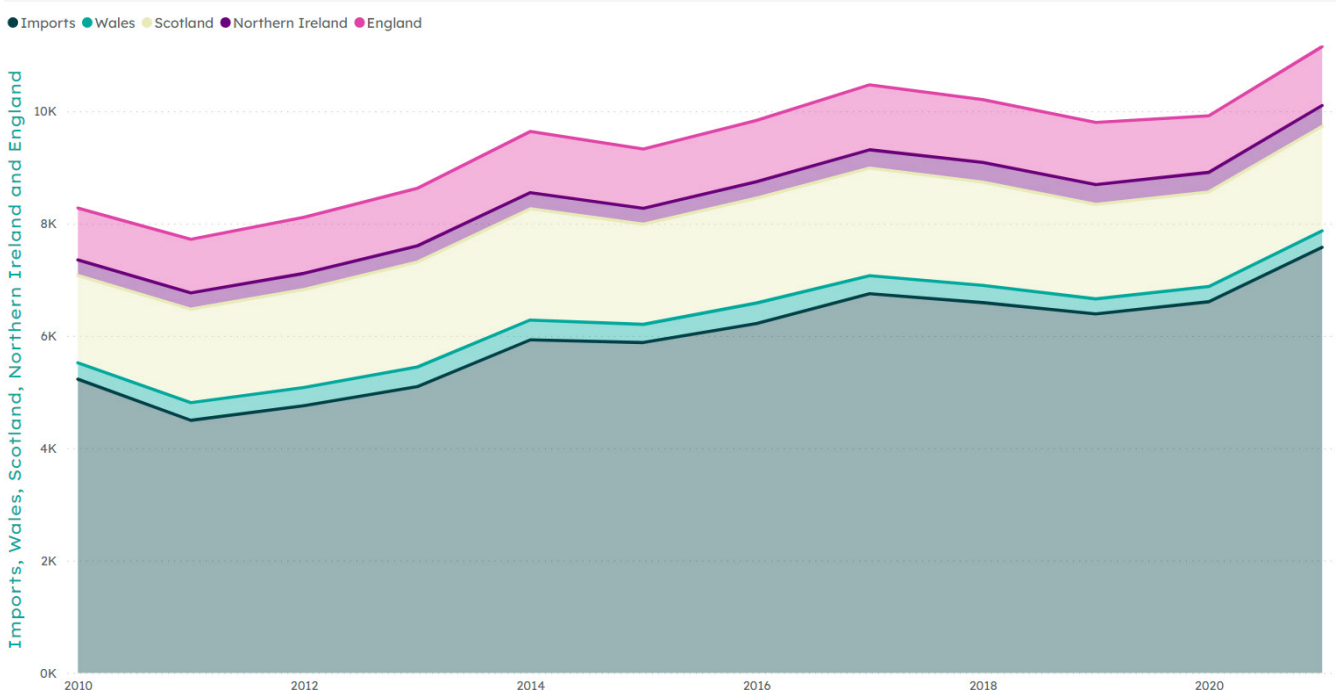
we are to scale up timber construction. In 2021, a record year for timber imports, nearly half of all our timber came from Sweden and Finland, indicating its importance in meeting increased demand<sup>30</sup>.

Additionally, the UK plays a positive role as a net importer of timber, with effective demand-side regulations promoting forest growth around the world. The effectiveness of this approach has been seen in Europe, where forests have grown by more than 5% over the past 25 years<sup>31</sup>.

**POLICY RECOMMENDATIONS**

- Streamline the planning process by making the application and approval process for woodland creation simpler and quicker.
- DEFRA and Forestry Commission to proactively promote wood production as one of the primary objectives of woodland creation and management.
- Adopt a specific target for productive softwood conifer forests in England and the UK.

**UK Softwood Production and Imports Compared**



An aerial photograph showing a vast, dense forest of evergreen trees, likely spruce or fir, with a rich green color palette. The trees are packed closely together, creating a textured, needle-covered canopy. The lighting is even, highlighting the intricate details of the branches and needles.

***“As a result of sustainable forest management, forests across Europe, including the UK, have grown by 5% over the past 25 years.”***



# BUILDING SAFETY

## DEMYSTIFYING THE USE OF TIMBER IN CONSTRUCTION

**To expand timber construction, we need to challenge the misconceptions and confusion surrounding wood and building safety.**

Timber is being used both in the UK and around the world to create many thousands of safe, sustainable buildings. It has been a crucial material for the building industry for millennia. This is because while timber itself may be combustible, it is also very predictable, so fire engineers can employ any number of passive and active forms of fire strategies to ensure the safety of buildings and their occupants.

However, in recent years, timber construction has witnessed increasing scrutiny following the Grenfell tragedy, with local and national governments growing understandably cautious over the use of combustible materials in construction.

Governments are right to prioritise building and occupant safety. However, this scrutiny has often lacked nuance and has resulted in disproportionate and confusing policies that do little to enhance the safety of our buildings.

### Misconceptions and misunderstanding

Building safety policies have often been guilty of treating timber as a one-size-fits-all material, despite having an array of different uses and systems. Because of this, governments have resorted to blanket bans on timber, which fail to understand where timber is and is not suitable as a construction material.

An example of this was in 2020 when the Greater London Authority (GLA) banned the use of combustible materials in the external walls of all homes and buildings from their 2021-2026 Affordable Homes Programme - at all heights<sup>32</sup>.

Though this is a London-only policy, this ban undermines timber's reputation as a safe building material, and contributed to further confusion in the industry; as well as among building control officers and local government planners.

On a national level, the ban on combustible materials in the external walls of buildings above 18 metres, followed by consistent negative speculation and poor understanding of timber building systems has contributed to a policy environment where timber is subject to ongoing regulatory creep.

### UNDERSTANDING TIMBER IN CONSTRUCTION

Timber in construction falls into two overarching categories<sup>34</sup>:

#### *Lightweight timber systems*

These are characterised by the use of sawn timber components regularly spaced and fastened together with nails to create floor, wall, stair and roof assemblies which form a 'skeleton' type structure. These systems incorporate prefabricated 'open panel' components that require site finishing, and 'closed panel' systems that are prefabricated with insulation, linings, and windows, increasing their premanufactured value. Lightweight timber systems are recognised as an efficient, safe and sustainable means of construction for low-rise buildings'.

#### *Mass-timber systems*

These take advantage of the technological advancements which have allowed timber to be engineered to have a stronger strength-to-weight ratio than steel. This includes products such as cross-laminated timber (CLT) whereby thin layers of timber are laid crossways before being bonded and compressed together, as well as glue-laminated timber or laminated veneer lumber (LVL). These can be employed in mid-rise building types as a low-carbon substitute for concrete or steel systems.

Within these categories, there are several distinct building methods best suited to different building types.

Timber products are also used across a variety of building system elements - including walls, floors and roofs - so while the structural elements of a building might use masonry, often this building will still have a trussed rafter roof and a suspended timber floor.

This GLA policy is a symptom of the lack of trust which has persisted since the Grenfell Tower tragedy - where the fire spread was accelerated due to the use of combustible aluminium composite cladding. It should be noted that timber systems were not used in Grenfell Tower.

## A nuanced approach

To legislate effective and proportionate legislation, national and local governments should:

### 1. Distinguish between timber systems

Mass timber is an important recent development but sometimes entails a more complex building system with a different set of safety challenges compared to low-rise timber frame construction. Failure to distinguish mass timber from lightweight timber frame systems is leading to regulation that is not proportional to the risk profile of the building, or the evidence which supports their use.

### 2. Distinguish between structural timber and cladding

Policymakers often appear to confuse cladding, which is placed on the outside skin of a building to provide thermal insulation, weather resistance, and to improve the appearance of a building, with the structural elements of a wall. We see this within the disparity in statements that refer to banning the use of combustible materials 'on' external walls when referring to policies which ban the use of combustible materials 'in' the external walls.

### 3. Take a systems-led, not material-led, approach

A safe building is created by considering all the elements of a building. This includes the structure, ceilings and floors, as well as electrical and plumbing systems, and how they interact together as a building system. Isolated, siloed thinking has been identified as a major contributor to poor building safety decisions by Dame Judith Hackitt in the 'Building a Safer Future' report in May 2018<sup>33</sup>.

### 4. Recognise timber as a safe material

There are often assumptions that because timber is combustible, it must be precluded from construction. A significant amount of industry research and testing has been undertaken to ensure the safety of timber frame and mass timber systems. Additionally, the timber industry has created a wealth of resources to understand timber fire performance such as timberfiresafety.org and the Timber Accelerator Hub.

The government must also be consistent in its approach to building safety. In recent years, there have been contradictory actions by the government, with rhetoric and policy often moving in different directions on timber construction. For example, DLUHC set up the Timber in Construction Working Group in 2021 to expand timber construction, while

## POLICY RECOMMENDATIONS

The government should continue taking a scientifically consistent approach to building safety by recognising that different timber systems exist and that cladding is not structure.

The government should recognise timber as a safe building material, helping to dispel confusion around its safe use in construction.

In London:

The GLA should revise their ban on combustible materials, adopting a more nuanced and scientific approach to building safety.

simultaneously pushing forward a consultation on banning the use of combustible materials above 11 metres.

Industry campaigning, such as the *Save Safe Structural Timber* campaign from the Architects Climate Action Network, meant the proposed ban, which would prohibit the use of timber in external wall elements, was never implemented. But it has contributed to a negative policy environment. There will need to be work from various government departments to dispel some of the misperceptions around the use of timber in construction - particularly if the mission of the Timber in Construction Working Group is to succeed.

### BUILDING SAFETY ACT 2022

The Building Safety Act 2022 received Royal Assent on the 28 April 2022. Full implementation of the Building Safety Act is to occur in October 2023.

This Act requires building safety to be considered at each stage of design and construction, with a 'golden thread' of information about each stage being maintained to ensure that building safety risks are managed throughout the building's life.

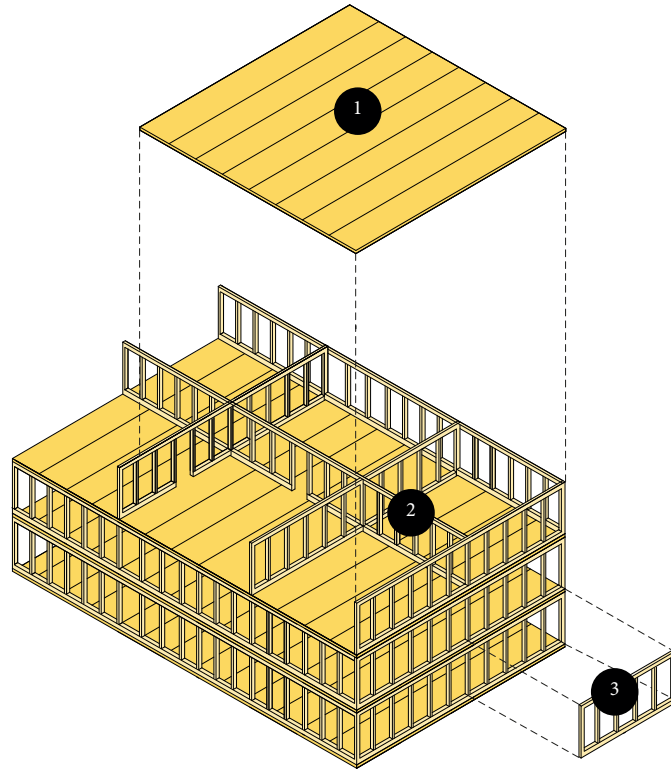
While its core focus is on 'high risk' buildings, such as those above 18 metres or care homes and hospitals, the Act will have a much wider application in practice as it seeks to create greater transparency and shared responsibility across the entire supply chain for safety.

## Lightweight timber system

**NOTE:**

Lightweight timber frame systems are suited to the construction of low-rise buildings

1. Floor panels
2. Internal walls
3. External walls

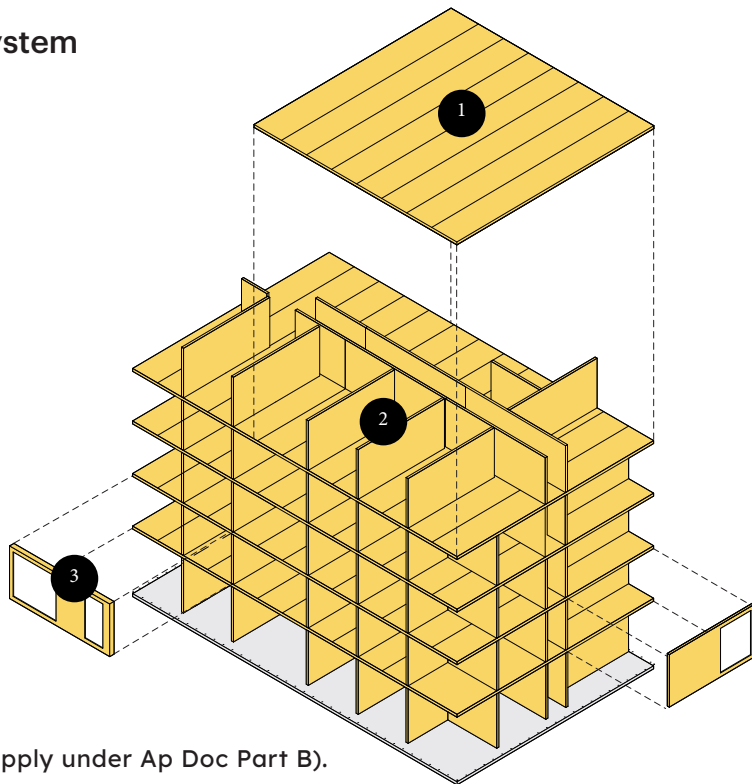


## Panelised mass timber system

**NOTE:**

Typically CLT panels create floors and walls to form a honeycomb structure.

1. Floors
2. Internal walls
3. External walls (restrictions apply under Ap Doc Part B).



# LABOUR AND SKILLS

## GROWING SKILLS AND JOBS IN THE LOW-CARBON ECONOMY

**To expand timber construction, the government must upskill future generations towards low-carbon construction and tackle labour shortages in the economy.**

Upskilling future generations is an essential component in our fight against climate change, requiring the UK Government to place education at the heart of its Net Zero Strategy.

This is particularly relevant for the construction sector, with the shift towards timber MMC (modern methods of construction) requiring new skills, education, and training for this generation and those to come.

### Labour shortages

Skills and labour shortages are key barriers to expanding timber construction.

Reduced post-Brexit immigration and early worker retirement induced by the Covid-19 pandemic has created a perfect storm for the construction industry, with labour shortages reaching “alarming proportions” in recent years<sup>35</sup>.

This has been compounded by an ageing workforce and difficulties in attracting new staff, with an estimated 50,000 vacancies in construction across all trades, including professional and managerial roles<sup>36</sup>.

The CITB estimate that an extra 350,000 full-time workers will be needed in construction by 2028 to deliver the built environment’s net zero targets by 2050<sup>37</sup>.

These skills shortages are particularly prevalent in the timber sector, spanning the whole spectrum of jobs from architects and engineers to carpenters and joiners.

### A timber revolution in education

Timber often plays only a small part in architecture and engineering courses, leading to ‘graduates emerging without the knowledge, ability, or confidence to employ timber systems’<sup>38</sup>.

To undertake a timber revolution in the UK, there must be both reform and investment in the education

system to provide more practical opportunities to aspiring builders, architects and engineers. There must also be a focus on MMC, which is less labour-intensive than traditional methods of construction

### The role of MMC and timber

As it stands, there isn’t enough skilled labour to work productively on-site to deliver new-build requirements, along with 27 million housing retrofits and the non-domestic retrofits required in the legal time frame to deliver net zero. Offsite timber systems will be invaluable in plugging the chronic skills gaps in the economy.

Offsite timber systems are far less labour-intensive than traditional methods of construction, requiring roughly 70% less labour onsite<sup>39</sup>. This was echoed in a National Audit Office report, which found that using MMC could reduce construction time by more than half and enable up to four times as many homes to be built with the same on-site labour.

MMC also promotes skilled jobs, matching a highly trained site assembly workforce to skilled factory-based employment. Higher productivity and efficiency results in up to 80% less waste than traditional construction and as much as 97% of that being recycled<sup>40</sup>.

### CHAMPIONING MMC CONSTRUCTION

Championing MMC construction is an excellent, low-carbon way of building more homes with fewer people. Converting raw timber resources into high-value, high-quality, low-carbon construction products should be a focus for the UK.

Homes England have made supporting MMC a core part of their strategy through to 2022–23, and the 2021–26 Affordable Homes Programme has made large grants conditional on the use of MMC in 25% of new housing.

But further intervention will be required to unlock the full benefits of MMC, and to train up a net zero workforce.

Structural timber, including timber frame systems and mass timber systems, spans all forms of MMC.

It fits into Category Solutions ranging from 1 (volumetric modular timber construction) to Categories 2 and 3, indicating a wide implementation of offsite manufacturing precision ready for assembly on site.

## How can we upskill the next generation?

Though timber MMC requires less labour than traditional construction, chronic skills gaps remain. The UK government must still ensure there is adequate labour in the economy capable of responding to increased timber MMC demand.

### Schools: Scale up Design and Technology (DT)

Design and Technology (DT) teaching in schools has the potential to be a key influence on young people, inspiring them and providing an insight into how sustainable materials such as timber can be used to achieve a green built environment.

However, currently there appears to be a general downgrading of the importance and provision of DT teaching, with some schools not offering the subject at all, leading to a lack of clear pathways through school into further and higher education courses.

The Education Policy Institute estimates that the number of students taking DT at GCSE level in England fell from 44% in 2009 to 22% in 2020, with a corresponding fall in the number of DT teachers from 14,800 in 2011 to 7,300 in 2020<sup>41</sup>.

Additionally, the government is consistently failing to meet its DT teacher recruitment targets – 75% below target in the academic year 2022/23<sup>42</sup>.

The government should look to scale up DT classes, with a core focus on sustainable materials like timber, to increase interest and uptake in practical skills professions.

### Higher and further education: incentivise timber courses

Colleges and universities are often reluctant to undertake construction courses due to high costs, often opting for more generic courses.

## POLICY RECOMMENDATIONS

The government should reform the Apprenticeship Levy to include short courses, which are more suited to the construction supply chain.

The government should look to scale up, not roll back, Design and Technology (D&T) classes in schools.

The government should incentivise the creation of more timber construction and MMC courses at higher and further education levels.

This has led to a shortage of timber training courses at higher education levels, reducing the opportunities and pathways into the timber construction industry.

The government should look to incentivise the creation of timber and construction courses at higher and further education levels.

Where there are courses, they have typically not been updated to cover newer materials such as engineered I-joists, airtight OSB or methods of construction that minimise energy use and optimise the longevity of materials.

Timber courses such as NMITE's Timber Ted course have proven successful in recent years – more courses like this will go a long way in increasing future labour supply<sup>43</sup>.

### Apprenticeships in need of reform

Timber industry training is often made up of several short modular courses which provide a smaller certificate for a specific application or job function, and which can then build to a larger qualification.

These courses, however, do not qualify for the Apprenticeship Levy, which is only available for use on 12-month courses or longer.

Reforming the levy to include short courses would provide further funds for timber companies to train workers and increase the timber skills base.

# CASE STUDY: NEW MODEL INSTITUTE FOR TECHNOLOGY AND ENGINEERING

## Skills for our future workforce

NMITE's Timber TED short courses have been devised in response to the current skills crisis in the construction sector. These courses are designed to upskill the built environment professionals of the future to address the climate emergency and have a better understanding of timber's role in the path to net zero.

### Timber TED

The Timber TED (Technology, Engineering & Design) courses have created comprehensive and flexible upskilling and reskilling training for modern methods of timber construction.

- The Timber TED 1 course covers design, materials and sustainability
- Timber TED 2 will cover design, construction, technology and manufacture.

These courses aim to give students an understanding of the principles of timber design construction and engineering methods within the context of the built environment, providing students with an understanding of the principles of sustainability as an outcome of climate change and its relationship to the built environment.

The 12-week courses are available to anyone working in the built environment industry. They will use a blended learning approach of online and in-person teaching at the NMITE campus in Hereford.

Timber TED is the only UK equivalent CPD course that directly addresses timber in construction on this scale of detail. If we are to address skills gaps in the workforce, the government should look to incentivise the creation of more courses like Timber TED.





***“Though timber MMC requires less labour than traditional construction, the UK Government must ensure there are adequate skills and labour in the economy capable of responding to increased demand.”***

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