HOW THE TIMBER INDUSTRIES CAN HELP SOLVE THE HOUSING CRISIS

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

SEPTEMBER 2021

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THE ALL-PARTY PARLIAMENTARY GROUP
Timber Industries

FOREWORD

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Climate change is here, we can see that in the world around us. There are going to be more severe weather events. More frequent and intense droughts, storms, and heat waves. Rising sea levels, melting glaciers and warming oceans. Both people, and the natural world, animals and ecosystems, are in incredible danger in what is the greatest challenge we have ever faced. If we are to limit the damage, now is the time to act.

The strong moral imperative to overthrow the status quo has been joined in recent years by powerful social, political, and business movements. Never has there been such broad alignment - nor opportunities - to reshape the way we live. Millions of people have taken to the streets around the world calling on governments to act now, and the UK has responded by committing to the world's most ambitious climate change target, in law, to reduce carbon emissions by 78% by 2035 compared to 1990 levels. We must match our policies and actions to the ambition of this target.

One of our biggest roadblocks to making the changes necessary is a mindset which perceives the shift to a net zero economy as down the road, in the future. Which relies upon unproven technologies to decarbonise the industries and systems which caused the problem in the first place. This is evident in our built environment, which despite being responsible for

49%

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

50M

tonnes of CO2e are released every year into the atmosphere from new buildings and infrastructure alone.

nearly half of emissions in the UK, has barely changed in nearly half a century. Houses are being built now in a near identical way to how they were 50, 80 or even a few hundred years ago. This does not match up to the threat of climate change, to which we must respond far quicker, and with far greater imagination if we are to have any chance of avoiding catastrophe.

We must create a foundational shift in the way we build, the quality of our homes, how we move around our cities, and the landscapes around them if we are to create a low-carbon future. At the centre of this shift will be our architects, designers, and engineers, and a low-carbon material revolution. While the 20th century may have been defined by steel and concrete, in the 21st we must live in greater harmony with nature, and create a stronger forestry and timber industry which works with together with our planet.

Our markets can and must play a dominant role in reducing emissions, and right now, within timber and forestry, the UK has an existing supply chain we can level up to help us meet our climate targets in construction. Using timber reduces the carbon emissions from construction in three main ways. It acts as a form of carbon capture and storage, as the carbon dioxide sequestered by trees is stored in the wood product created for the product's lifetime. It increases the number of trees grown in sustainably managed forests, which helps to sequester even more carbon dioxide. And it displaces carbon-intensive materials to reduce the carbon footprint of a building.

We already have world-leading technical expertise in our universities, architects at the forefront of sustainable design, and an enthusiastic potential workforce who are at the forefront of sustainable construction using timber. With the right policy framework, we can help this sector to flourish, and create a prosperous net zero economy.

A shift towards using more wood in construction has been repeatedly recommended by our independent advisor to government on climate policy, the Climate Change Committee. This Government has recognised the importance of this market in their recent Net Zero Strategy, England Tree Action Plan, which follows on from the Clean Growth Strategy, and 25 Year Environment Plan, each of which pledges to support more timber in construction.

This Government has already committed to building 300,000 homes in England each year to make it possible for more people to own a home – a place for people to call their own, for families to raise their kids and build their lives. Significant progress has been made – in the year before the pandemic, there were 243,700 homes added to England's housing supply – but we have an opportunity to do more.

I would like to put the case forward that we must build these homes more sustainably, and that we must build more of these homes using timber. We are placing ourselves on a pathway towards sustainability with the Future Homes Standard, which aims to make our houses more efficient, but this is only half the journey. Now is the time to put forward policies to reach net zero, and address all the emissions which come from construction.

This report seeks to outline the policies we can use to grow our timber and forestry supply chain to build more houses which will be better quality, safer, more beautiful, healthier, and more sustainable. As we work to relaunch the APPG for the Timber Industries, I hope to see MPs connect with the thousands of businesses who are working in every constituency in the UK, and the passionate people who work in them.

Following on from COP26 in Glasgow in November 2021, the UK must continue our leadership role across our cities and within the built environment.

It is time to show the world that we can build more, we can build better, and we can build lower-carbon. And we can do it now.

0.9T

of CO_2 is sequestered for every cubic metre of timber used in construction.

20%

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

THE HOUSING CRISIS

INTRODUCTION

A House of Commons Library briefing paper in 2021 estimated 345,000 homes need to be built in England per year to tackle the housing crisis.[1]

While significant progress has been made in recent years, with total housing stock in England increasing by around 243,770 homes in 2019-20, it is widely acknowledged that the market is still currently failing to balance supply with demand. Both Government and industry accept there needs to be a step change.

The current government pledged to support the delivery of a million homes by the end of 2020, and half a million more by the end of 2022, with the aim of building 300,000 net additional homes a year on average from 2025[2] - a target which may need to be extended according to the latest briefing paper.

What is the housing crisis?

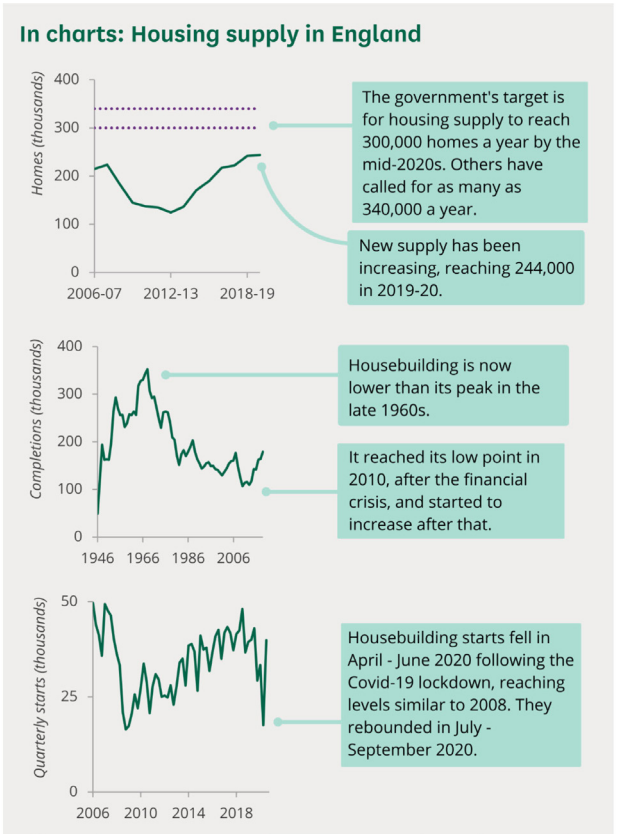
The government white paper, *Fixing our broken housing market*, laid out a complex, interweaving set of challenges which the market faces, including: low productivity, a lack of investment, an ageing workforce and poor planning, all of which have contributed to the average house costing a record eight-times what the average Briton earns.[3]

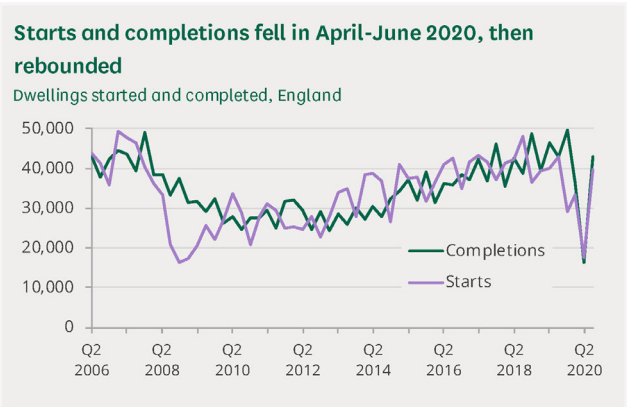
This has a material effect on people, with 8.4 million people in England alone living in unaffordable of unsuitable accommodation.[4] While a new vision for the market is being projected by the government across the *Planning for the Future* white paper, *Building Beautiful Places plan*, and for the industry with the *Building Safety Bill,* more work must be done.

Critics of the government's reform plans make the point that "the housing crisis isn't just about numbers",[5] and there remains a need for greater coordination between government and industry to overcome the strategic issues the sector faces – including achieving net zero, increasing the use of modern methods of construction, and creating safe, high quality, and beautiful buildings.

How has COVID-19 affected house building in the UK?

The coronavirus pandemic and the closure of construction sites for a period during 2020 had





Source: *Wendy Wilson and Cassie Barton, House of Commons Library Briefing Paper: Tackling the under-supply of housing in England, (14 January 2021).*

a major impact on housing delivery. Research conducted by NHBC showed a 23% decline in new house registrations in 2020,[6] which tends to be a strong indicator of overall housing delivery. Since then there appears to have been a strong rebound with overall construction activity expanding at the fastest pace since June 1997. The most recent Construction Products Association forecast predicts double digit growth of 12.9% for 2021.[7]

This recovery from the pandemic has been supported in part by government policies such as the suspension of Stamp Duty between June 2020 and June 2021, and the ongoing Help to Buy scheme. However, post-pandemic and to fulfil the governments plan to 'build back better', more sustained and targeted investment will be required to meet the UK's long-term building and carbon targets. This has also been recognised by the Construction Leadership Council (CLC), who have proven to be able to provide a strong forum for industry and government to work together over the past 20 months.

The CLC created an industry-wide recovery plan which across three phases, spread over 18 months, is seeking to Restart, Reset and Reinvent the construction industry.[8] This plan was put together in recognition that delivering to a level consistent with the industry's pre-pandemic performance is not enough – but rather measurable progress needs to be made towards reducing carbon emissions, meeting societal needs, contributing to regional economic recovery and prosperity, investing in skills and training, and creating an innovation culture.

Residential house building is a sector which for many years has not sufficiently managed to respond to demand, and reinvention at this time is crucial.

Why is house building important?

House building is a significant driver of prosperity right throughout the UK in a way which impacts everybody. These effects range from economic growth and employment throughout the UK, to our overall quality of life. Meanwhile, a lack of affordable housing is consistently linked to poverty, poor mental and physical health, and poor job prospects by NGOs such as Shelter.

House building also provides an economic boost to local communities as it brings extra jobs, tax revenue for councils, spending in local shops and services by new homes, and investment in local infrastructure. A report from the Home Builders Federation estimates £38bn of economic growth is generated by house building each year in England and Wales,[9] while the economic benefit of each home built in the UK has been estimated as twice the cost of construction.[10]

345k

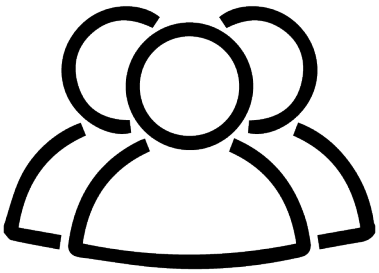
homes need to be built in England per year to tackle the housing crisis

244k

homes were built in England in the year 2019-20, which is a 33 year high.

8.4m

people in England live in unsuitable accomodation



UK TIMBER INDUSTRY

TIMBER AND THE HOUSING CRISIS

The timber supply chain employs more than 350,000 people and has a turnover of more than £10bn.[11] Manufacturing and forestry, even when taken in isolation from the wider supply chain, produce greater value than either the concrete or steel industries. A significant portion of this supply chain is within new build housing, where high-tech offsite timber frame manufacturing, among other timber building methods, is increasingly being used to help solve the housing crisis.

National House Building Council (NHBC) statistics show that timber frame was used in about 9% of new builds in England, 22% in Wales, 92% in Scotland, and 30% in Northern Ireland.[12] With most of the new build market positioned in England, where timber frame use is lower in comparison to other home nations, amidst rising pressure to build quicker, and to reduce carbon emissions, there exists significant growth potential for this industry.

Timber frame is projected to grow in popularity as house builders seek to decarbonise their business to achieve net zero, and through a preference for MMC within government procurement. While timber frame is the most common building method in the sector, the benefits it produces can extend to any approach to construction which uses wood.

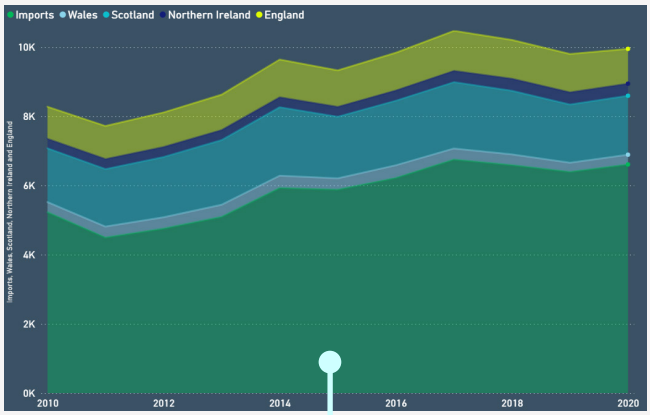
Advantages of timber frame

In addition to the reduced carbon emissions when using wood in construction, which are discussed in more detail later in this document, the other advantages of offsite timber frame methods include;

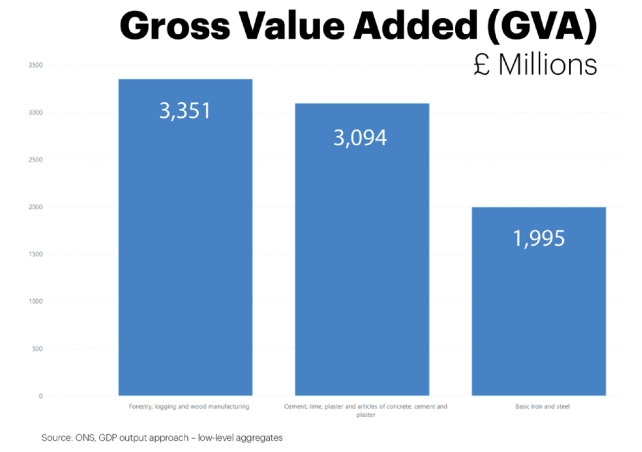
- being quieter to assemble,
- requiring fewer deliveries,
- producing fewer defects,[13]
- up to 90% less waste,[14] and
- up to 30% quicker build times.

These advantages have been acknowledged by the Royal Institute of Chartered Surveyors who said that timber frame is a "*mainstream and intelligent way to build, it presents cost-effectiveness, speed and energy-efficiency advantages from inception to construction*".[15]

In charts: Understanding the UK timber industry



On average of 2/3rds of the UK's softwood supply is imported, which is the most common timber used in construction.



The timber industry generates significantly more value than either the concrete or steel industries.

350k

people are employed in the UK timber supply chain

The Structural Timber Association (STA) estimates that there is existing capacity within the timber frame manufacturing base to increase delivery to up to 100,000 timber frame houses per year or greater in the UK, if there were a strong enough pipeline of demand.[16]

Support for MMC and timber frame

As the construction industry increases their focus on reducing its carbon emissions and growing the use of MMC, and if boosted by an appropriate policy framework from central and local government which places greater importance on these types of building approaches, the adoption of timber frame could rapidly accelerate in England.

The government has made a number of interventions to improve construction productivity and encourage the uptake of MMC in housing delivery. Some of these initiatives include the MMC taskforce, strategic grants to businesses, preference within government procurement, and research and investment from Homes England. However, it is widely expected that more work will need to be done to reach the scale needed to reap the benefits of MMC.

The wider adoption of MMC, including those which use timber, has the potential to bring about cost savings of 30%. This is due to the speed of construction, quality of build, decreased size of the workforce, and the ability to bulk purchase.[17] Barriers to MMC include the upfront capital required by businesses to establish manufacturing plants, and for timber frame, as well as other timber methods, there exist misperceptions around fire performance.

Other forms of timber construction

Timber frame is not the only advanced form of timber construction and manufacturing present in the UK, with engineering increasingly being used to strengthen timber, as well as its thermal performance, to create products able to be used in new building types, such as mid-rise buildings, including large, multi-storey apartment blocks.

Cross laminated timber is created by processing and cutting timber into sheets, before bonding these sheets under pressure in perpendicular layers. The result is a material which can be used in tall-timber construction as a substitute for high-emission materials such as concrete and steel. The UK industry was an early innovator, with the first 'tall timber building of the modern age' built in Hackney in 2008.[18]

More than 100 CLT buildings can be found across the UK.[19] However, these mark just a fraction of the engineered wood products the UK already uses to deliver sustainable, low carbon structural solutions with a unique elegance, low weight and natural beauty. Some other widely used products include I Beams, glulam, LVL (Laminated Veneered Lumber), and engineered wood flooring.

Many of these products are being used to allow for the extension and renovation of existing buildings in ways which was not previously possible,[20] as engineered timber products can deliver strength to weight ratios superior to those from steel. This is beneficial to the environment because it reduces the need for demolition, further reducing carbon emissions.

Self-build and timber

Timber is essential to the self-build market, with timber frame (35%) and SIPs (8%) the most common forms of MMC used for self-build.[21] Richard Bacon MPs review of scaling up self and custom build housing identified timber as highly suited to a customisable build with *"greater use of timber, both inside and outside, brings particular benefits to a customised model due to the increased flow through into offsite construction and the subsequent speed of assembly."*

Around 13,000 homes in the UK are self-built annually, and the government has made commitments to support growth in this market, helping to boost capacity, overall housing supply in the market, and support more competition and innovation within the house building industry, as well as fulfil net zero housing ambitions. The fate of this market is strongly linked to the timber industry. Bacon believes that reforms could lift the self-build market to build between 30-40,000 self-build homes per year.

What can government do

There has been positive words from government in support for an expansion of the use of wood in construction, most recently through the England Trees Action Plan. However, despite the importance of timber for achieving net zero emissions, there is not a coherent approach from government towards the timber industry. This was clearly evident in the *ban on the use of combustible materials in and on the external walls of buildings*, and the proposed extension of this ban to buildings below 18 metres, which has had a negative effect. While CLT has been most affected, it has also impacted mid-rise timber frame buildings, as seen through the exclusion of timber from GLA's Affordable Homes Programme 2021-25.

The government should recognise the key role timber will play in solving the housing and climate crises, and should ensure a consistent approach by:

- In building regulation, **recognising that cladding is not structure and timber is a safe material.**
- In planning policy, **recognising the importance of timber buildings for long-term storage of CO_2.**
- In government procurement, **give preference to low-carbon materials and building solutions**

NET ZERO NOW

CLIMATE CHANGE AND CONSTRUCTION

Reducing the carbon emissions from our built environment is essential, as nearly half of the UK's total carbon emissions within our borders can be attributed to the construction, operation and maintenance of our built environment (49%).[22]

There has been partial recognition by the government of carbon emissions from construction, but there remain gaps in the current policy framework. To become net zero, change is needed to the energy performance of these buildings over their lifetime, which is their 'operational carbon', and how we produce materials and construct buildings, which is known as 'embodied carbon'.

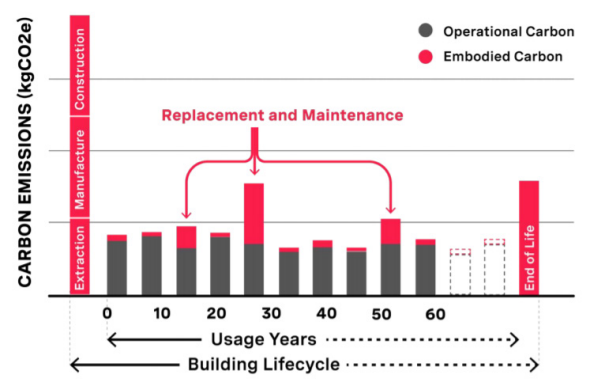
While operational carbon has long been regulated, and is being put on a path towards net zero emissions through the Future Homes Standard, embodied carbon, which can contribute up to 75% of a buildings total carbon emissions over its lifetime,[23,24] remains entirely unregulated.

As the UK national grid is decarbonised, embodied carbon emissions are growing as a proportion of UK national emissions. Currently almost 50MtCO_2e per year comes from embodied carbon emissions, which is around 10% of UK national emissions.[25] The creation, transport, and disposal of construction materials are responsible for most of these emissions – around 80%.

How timber can help reduce carbon emissions

Greater use of timber can help address operational and embodied carbon immediately. This is because the timber industry already has the capacity, technical knowledge, and track record to deliver more homes, quicker, and to a higher standard. This is recognised, with the Climate Change Committee (CCC), the independent advisor to Government on how to achieve net zero by 2050, having repeatedly advocated for growing the use of wood in construction to reduce emissions and meet climate targets.

The CCC highlights that *"the technology and knowledge to create high quality, low-carbon and resilient homes exists, but current policies and standards are failing to drive either the scale of the pace of change needed... using wood in construction to displace high-carbon materials such as cement and*



Embodied carbon can account for up to 75% of a buildings carbon emissions across their lifetime.

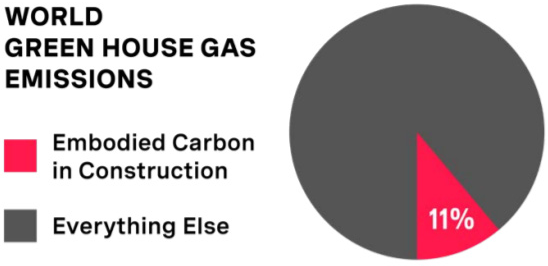
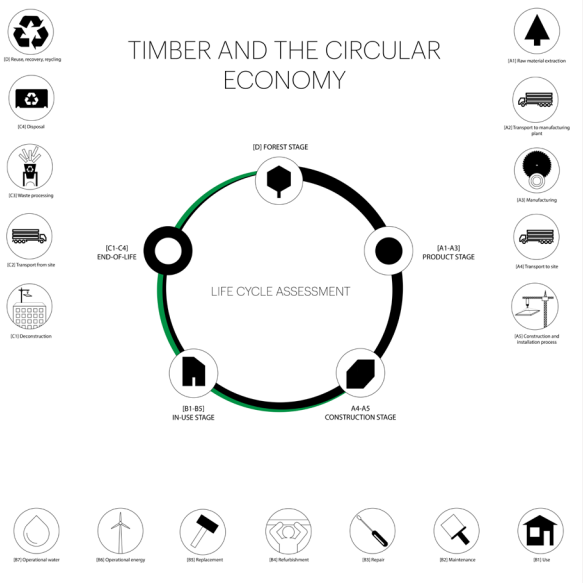


Figure 4: Worldwide carbon emissions.
Source: Graphic based on data from UKGBC/McAuley

Source: *Architects Climate Action Network, The Carbon Footprint of Construction, (2021). Graphics: Finbar Charleson / ACAN (Data: LETI), Finbar Charleson / ACAN (Data: Scott McAuley / UKGBC)*



steel is one of the most effective ways to use limited biomass resources to mitigate climate change." [26]

The CCC estimates that if timber frame were used to build 270,000 new houses we could increase the amount of carbon sequestered in UK homes to 3 Mt, while reducing embodied emissions by around 20% per building. When cross laminated timber is chosen in place of concrete structures this effect is even greater, with carbon embodied emissions reduced by around 60%.[27]

Wood absorbs and stores carbon

Timber is the worlds only large-scale, renewable, construction material, and wood in construction remains the only commercially viable Carbon Capture and Storage (CCS) system.[28] By using more wood in construction, the UK can turn our built environment into a weapon against climate change.

Research shows for every cubic metre of timber used in construction, 0.9 tonnes of CO_2 is absorbed and stored, in a process known as sequestration.[29] This carbon is then stored for the lifetime of the building product - with more timber grown in its place. This is because timber in the UK is responsibly sourced, and helps support sustainable forest management (SFM) where several trees are planted for every on planted.

As a result of SFM, a practice which is supported through the use of sustainable wood in construction, forests in Europe have grown by about 5% in the past 25 years.[30] This stands in stark contrast to other forest systems in the world, which remain under severe threat, largely due to conversion to agriculture. These commercial forests are absorbing CO_2 providing a sustainable livelihood to millions of people, as well as supporting greater biodiversity.

Construction industry action and commitments to reducing carbon emissions

The vast majority of the building industry have made some form of commitment to reaching net zero, including making major reductions to embodied carbon. These include:

Engineers - via industry pledges such as the Structural Engineering Institute 'SE2050' commitments, the Institute of Structural Engineers with proposals such as 'Approved Document Z' and 'Part Z' amendment, or through other leading bodies such as the Chartered Institute of Building Service Engineers, the profession is driven to minimise embodied carbon emissions.

Major House Builders - via the Future Homes Hub, and Future Homes Delivery Plan | Signatories are signed on to halve their embodied carbon by 2030, and achieve net zero emissions by 2050, while industry bodies such as the House Builders Federation and National Federation of Builders are actively publishing advice to members on how to meet these commitments.

Architectural Practices - via the RIBA 2030 Climate Challenge | Signatories are signed on to reduce embodied carbon by at least 40% by 2030, from current baseline figures, before offsetting. Other practices have made commitments through alignment with the Architects Climate Action Network.

What can government do

The most important actions the government can do to reduce carbon emissions from construction are;

- **Support the use of wood in construction** in government policy and procurement.
- **Introduce legislation to regulate embodied carbon,** starting with mandatory, standardised measurement on all government projects.
- **Accelerate the introduction of the Future Homes Standard** and prevent expensive retrofits.

On a local government level, some of these policies have already proven viable. This includes in both;

- **Regional authorities:** The London Plan includes the requirement for a Life Cycle Assessment on planning applications referred to the Mayor.
- **Councils:** Both the London Borough of Hackney and Powys County Council in Wales have a 'timber first' approach to their planning policies.

Devolved governments are taking these policies further, with the Welsh Government committing to 'maximise the efficient use of timber in construction' in their £250m affordable housing programme,[31] investing in timber frame manufacturing through their £35m Innovative Housing Programme,[32] and developing a timber industrial strategy.

Meanwhile across the Channel, France is set to place thresholds on embodied carbon emissions.[33]

Broad industry support for these policies

Industry leaders recently put forward a 'Part Z' for Building Regulations[34] that could be used to mandate the reporting and limiting of carbon emissions. They are joining a number of architectural bodies who have been making this call, including the Architects Climate Action Network, whose report *Regulate Embodied Carbon* was signed by more than 1,000 architectural practices.[35]

With COP26 in November 2021, and taking place in the UK, the government should take leadership on the issue and support a policy framework which places construction on a path to reach net zero emissions.

RECOMMENDATIONS

1 BRING WHOLE LIFE CARBON EMISSIONS INTO BUILDING REGULATIONS AND INTRODUCE THRESHOLDS ON EMBODIED CARBON IN CONSTRUCTION.

Despite making up a large portion of the construction industries carbon footprint, embodied carbon emissions remain entirely unregulated. However, as the recent 'Part Z' for Building Regulations from IStructE reflects, there is already broad industry agreement on a proposed framework for regulating these emissions. This proposal should be taken forward by MHCLG.

2 TAKE A SCIENTIFICALLY CONSISTENT APPROACH TO BUILDING SAFETY BY RECOGNISING THAT CLADDING IS NOT STRUCTURE.

Since the Grenfell Tower fire, the Government has rightly made building safety a top priority. However, the regulations around combustible materials have not always reflected the realities of safe construction using timber, and instead of making a safer building system, have created uncertainty in the market. Regulations for the construction industry must be based on science.

3 GIVE PREFERENCE TOWARDS LOW-CARBON MATERIALS AND BUILDING SOLUTIONS FOR ALL GOVERNMENT PROJECTS

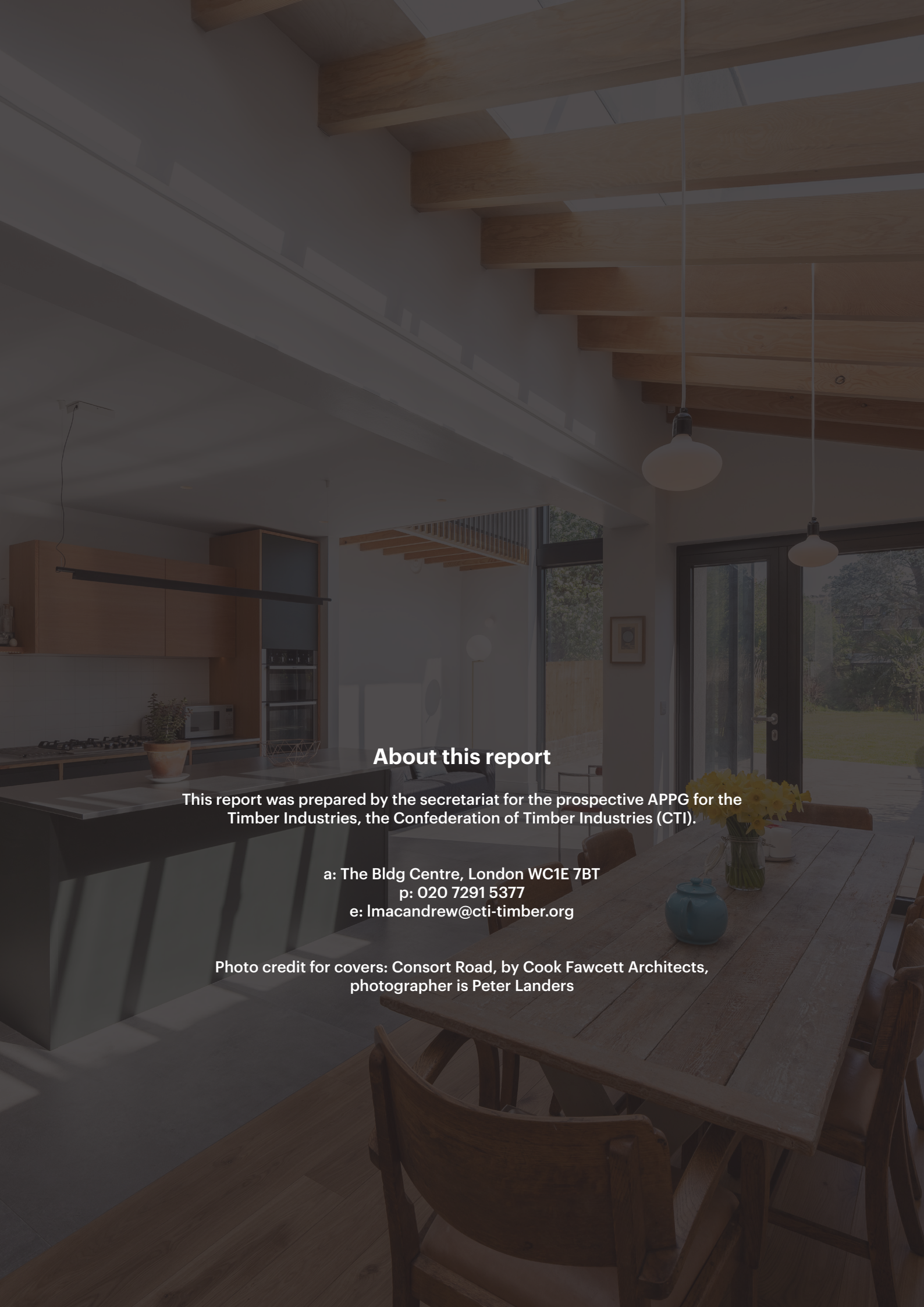
One of the most powerful levers the Government possesses to affect change is finance, yet it currently remains entirely untouched when it comes to reducing the emissions from construction. Using the weight of such preference, the Government could support the rapid development and scaling up of the timber and forestry industries along with other low-carbon solutions to construction.

4 WORK WITH THE TIMBER INDUSTRY TO DEVELOP AN INDUSTRIAL STRATEGY WHICH CAN BE USED TO ALIGN GOVERNMENT POLICY

A major issue encountered by the timber industry when working with government departments is the lack of consistency. This is particularly problematic between building and climate regulations, where wood in construction is being simultaneously discouraged and encouraged. An industrial strategy specific to the timber and forestry industries would help level up this important sector.

References

1. Wendy Wilson and Cassie Barton, House of Commons Library Briefing Paper: Tackling the under-supply of housing in England, (14 January 2021).
2. HM Government, Industrial Strategy Construction Sector Deal, (5 July 2018)
3. Ministry of Housing, Communities and Local Government, Fixing our broken housing market (February 2017).
4. Shelter, The Human Cost, (April 2010).
5. RIBA, 'Deregulation won't solve the housing crisis' – RIBA criticises Jenrick's planning reforms, press release, (6 August 2020).
6. National House Building Council, 'New homes statistics 2020', (29 January 2021)
7. Construction Products Association, 'Construction Industry Forecasts, (26 April 2021)
8. Construction Leadership Council, 'Roadmap to Recovery', (1 June 2020)
9. Home Builders Federation, 'The Economic Footprint of House Building in England and Wales' (July 2018).
10. Arcadis, 'Building Homes, Making Places', (15 June 2017).
11. Confederation of Timber Industries, 'Mapping UK Timber Industries', (October 2016).
12. Confederation of Timber Industries and Swedish Wood, 'Timber supply and demand in the UK', (21 July 2020)
13. Royal Institute for Chartered Surveyors, Modern Methods of Construction: A forward-thinking solution to the housing crisis? (September 2018).
14. Waste & Resources Action Program (WRAP), Waste Reduction Potential of Offsite Volumetric Construction (accessed 3 July 2019).
15. Royal Institute for Chartered Surveyors, Modern Methods of Construction: A forward-thinking solution to the housing crisis? (September 2018).
16. Structural Timber Association, Annual survey of UK structural timber markets (2016).
17. Ministry of Housing, Communities and Local Government, Fixing our broken housing market (February 2017, (accessed 16 August 2019).
18. Giovanna Dunmall, 'Tall in Timber' in The Economist (5 February 2018) (accessed 7 September 2019).
19. Waugh Thistleton, '100 Projects UK CLT', (13 September 2018).
20. ARUP, 'Rethinking Timber Buildings', (March 2019)
21. MHCLG, 'Independent review into scaling up self-build and custom housebuilding: report', (21 August 2021)
22. LETI, Climate Emergency Design Guide, (2020).
23. RICS, Whole life carbon assessment for the built environment, (2017)
24. Akbarnezhad, A. & Xiao, J,., Estimation and Minizatio, (2017)
25. Architects Climate Action Network, The Carbon Footprint of Construction, (2021).
26. Climate Change Committee, UK housing: Fit for the future?, (2019).
27. Spear, S., Hill, C., Norton, A., Price, C., 'Wood in Construction in the UK: An Analysis of Carbon Abatement Potential'. Commissioned by the UK Committee on Climate Change, (2019).
28. Royal Society and Royal Academy of Engineering, 'Greenhouse gas removal', (12 September 2018)
29. CEI-Bois., Wood – Building the Bio-economy, (2019).
30. Forest Europe, State of Europe's Forests. (2015).
31. Welsh Government, 'Welsh Development Quality Requirements 2021', (July 2021)
32. Welsh Government, press release: '£35 million investment in Welsh homes for the future', (27 November 2020)
33. Frederic Bourgeon and Joe Giddings, ACAN, 'How the emerging environmental regulations will apply to new buildings in France', (2 July 2021).
34. Will Arnold, Tim den Dekker, et al, 'A proposed amendment to The Building Regulations 2010', (August 2021).
35. Architects Climate Action Network, The Carbon Footprint of Construction, (2021).



About this report

This report was prepared by the secretariat for the prospective APPG for the Timber Industries, the Confederation of Timber Industries (CTI).

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