STA | STRUCTURAL TIMBER ASSOCIATION

Structural timber market research: residential sector

October 2022

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Contents

Executive summary

This research is presented to provide clarity on the various moving factors that influence the structural timber industry. Section 2 discusses 'The need for change'; with other factors which affect demand being presented in Section 3 'Changing demand' and Section 4 'Economy and housing market'. Section 5 provides a detailed picture of the size of the residential market for structural timber.

The housing information contained within is based on housing starts, other reference points such as housing completions have not been included to avoid confusion.

Based on housing starts, the structural timber industry enjoys a 22% market share of the UK housing market, but England still lags badly when compared with the 90% in Scotland, albeit from a lower volume base point.

That said, the report does identify the increasing interest in timber frame with the national house builders, and increasing the share in England is where the opportunity lies.

Historical data is included for context in addition to forward forecasting which can be found in Section 5. These forecast numbers are taken at a point in time and rely heavily on the organisations such as the CPA for their views. At times of political uncertainty, the author would heed caution on accepting these numbers as absolute. The reader must make their own judgement on such forecast data.

Contained within are views on other markets such as student accommodation and care homes, highlighting the need for Government investment which can be found in Section 6 'Non-residential market sectors'.

The research and conclusions have been drawn from multiple sources, with all references at the base of each page. Where contradictory information was found, the STA has either taken reference from direct members and client interviews or taken an 'insiders' professional view.

It was not the brief of this research to provide strategy or direction. The STA feels that this remains in the gift of each individual member and their own aspirations.

Page 40 and 41 highlight the top key factors for growth with the top five listed below. These, with additional factors, can be found in Section 9:

- The need to modernize for a digital age
- A decline in the available and skilled workforce
- A growing percentage in single family housing
- Government support for increased use of timber in construction
- £12 billion Affordable Housing Programme with provision that housing associations must use 25% MMC.

Naturally, with any growth opportunity there are risks, and the five main risks are listed below. These, along with others, can also be found in Section 10:

- Building regulations - mission creep to restrict where timber can be used (18m>11m)
- Key stakeholder stance to risk (insurers and financiers)
- Availability and cost of labour: EU construction employment dropped by 49% between 2017 and 2021 (64% in London), however since 2021 it has been on an upward trajectory and may return to pre-Brexit/Covid-19 rates in the next two years
- Brexit: may cause problems with customs checks on EU imports
- The question of whether there is sufficient capacity in the timber frame sector to meet the potential demand and can the industry scale up?

The supply chain section of the report also address the up-stream demand on timber supply, providing much needed data on what volume of timber the structural timber industry will need to take advantage of the anticipated growth. The data strongly points to the UK residential market for structural timber represents approximately 600,000m^3 of the upstream supply chain current output.

Where information is presented as simple fact the author has tried to provide professional insight into the individual topic which are included in the highlighted text boxes.

Andrew Orriss
September 2022

1. Introduction

In our ever-changing world there is a continual need to respond and adapt to changes and advancements in culture, demographics, innovation and technology. The purpose of this report is to provide an insight into the current market, and explore opportunities for off-site manufacture (OSM) and modern methods of construction (MMC) in the UK with a particular focus on the housebuilding sector, principally in relation to timber frame (TF) construction, whilst also acknowledging other competing sectors.

Following discussion of the need for change in the construction industry, changing demand in the housing market, and the economic context, this report will use analysis of data for UK housing starts (actual and forecast) and insights and trend information from housebuilders, real estate organisations, and government and economic bodies, to map the likely volume development, identify key drivers and barriers to growth, and determine which of the UK's leading housebuilders are using OSM and MMC and where expansion in the use of these systems could take place.

2. The need for change

2.1 Modernisation

Interest in OSM and MMC has strengthened over the past decade, with reports such as Mark Farmer's, 2016 Modernise or Die Report [Farmer, 2016 [1]], picking up the baton from Sir John Egan's 1998 *Rethinking Construction Report [Egan, 1998 [2]]* that sought to accelerate the pace of the use of factory produced homes. Farmer believes that the UK construction industry may irreversibly decline if it does not undergo radical change and modernisation. Blaming an established 'survivalist business model', resistant to change and based on traditional building methods and dependent on onsite skills and labour, he identifies a misalignment between industry and client interests that has led to a general lack of confidence in the building industry, lack of profitability and underinvestment in training, development, innovation and productivity. He claims the building industry must change because:

- A decline of 20-25% in the available workforce is predicted within the next decade due to demographic changes
- Technological change and innovation seen in the wider society must be embraced
- The building industry must be made attractive to 'Generation Z', and subsequent generations, in terms of career pathways, prospects, diversity and inclusion
- The importance of the role of the construction industry in the quality of the overall Built Environment must be recognised and promoted.

Focussing in particular on volumetric housing, Farmer stresses the critical importance of government action in driving forward the use of pre-manufactured solutions through policy, investment, tax and planning, alongside organisations such as the Construction Leadership Council (CLC).

Following on from this report, and still relevant today, the UK Government issued a housing white paper in 2017 *"Fixing our broken housing market" [HM Government, Department for Communities and Local Government, February 2017 [3]]* and launched a working group, led by Mark Farmer, tasked with promoting greater understanding and use of MMC across residential development.

1 Farmer, M (2016) The Farmer Review of the UK Construction Labour Model: Modernise or Die - Time to Decide the Industry's Future [online] available **HERE**

2 Egan, J (1998) Rethinking Construction: The Egan Report [online] available **HERE**

3 HM Government, Department for Communities and Local Government (2017) Fixing Our Broken Housing Market, [online] available **HERE**

This resulted in a document: *Modern Methods of Construction, Introducing the MMC Framework [HM Government, Department for Communities and Local Government, 2019* [4]*]* which sets out seven definitions of MMC with a focus on delivering to the residential new build market through the use of a distinct list of material types, including timber frame, as shown in Figure 1 below:

BUILDING TYPOLOGY	MATERIAL GENRE
• Houses • Low rise apartments (<5 storeys) • Mid rise apartments (6-9 storeys) • High rise apartments (10 storeys and above)	• Mass engineered timber (MET) • Timber framed (TF) • Light gauge steel frame (LGS) • Hot rolled fabricated steel (HRS) Hot rolled/light gauge steel combination (SC) Concrete and cement derived (C) Timber framed/concrete combination (TFC)

Figure 1: Building typologies and material genres in modern methods of construction

[UK Government, Department for Communities and Local Government, 2019]

The seven definitions of MMC are as follows with, importantly, timber frame being represented in Category 2: Pre-manufacturing - 2D primary structural systems:

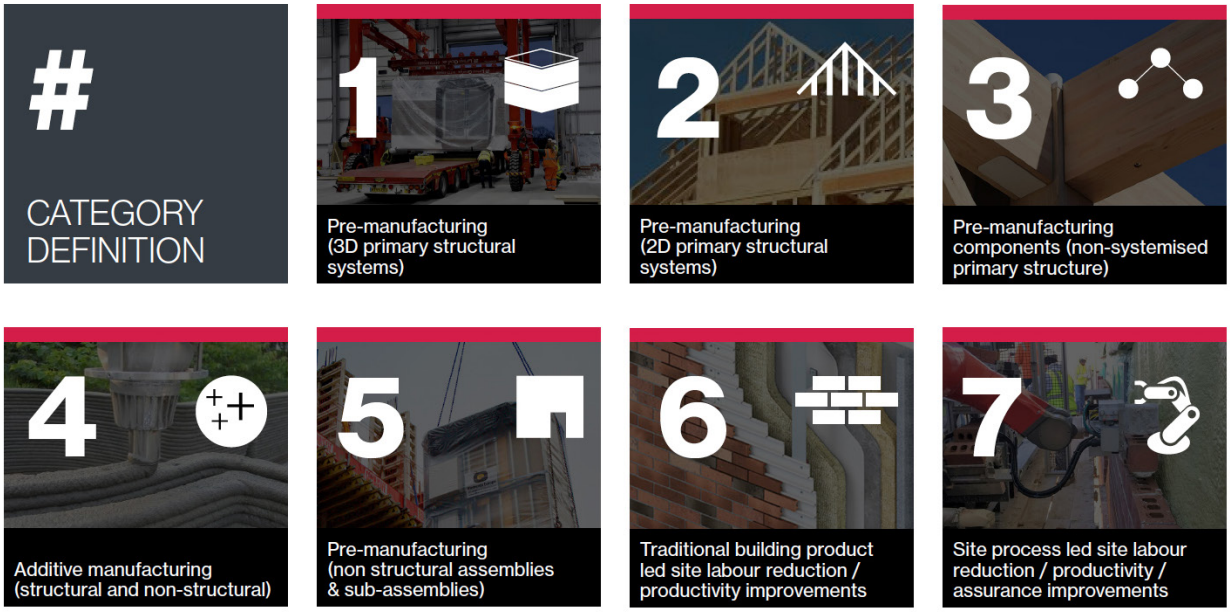

Figure 2: The seven category definitions of modern methods of construction

[UK Government, Department for Communities and Local Government, 2019]

It is within this context of the need to modernise and to embrace the use of MMC, therefore, that this market appraisal will look to establish the space that is currently occupied by STA members in OSM and MMC, the opportunities for growth, the competition from other OSM and MMC systems and the reality of the potential threat posed by the increasingly high-profile volumetric sector.

4 HM Government, Department for Communities and Local Government (2019) Modern Methods of Construction: Introducing the MMC Definition Framework [online] available **HERE**

That said the data shows a clear preference to masonry construction in the housing sector where custom and practice reigns, particularly in England where over 85% of homes are constructed using load bearing masonry in the form of concrete block.

2.2 The climate change and sustainability debate

Following on from the need to modernise, there is general consensus that the construction industry must address developments around the whole climate change and sustainability debate and have a different discussion about the role of construction, the materials used, and methods employed to deliver - indeed Architect Erin McDade states, in her contribution to the book *The New Carbon Architecture*, that: 'The building sector is a significant part of the climate change problem' *[McDade in King (ed], 2017* [5]*]*.

This should come as no surprise when, for example, Arup and the World Business Council for Sustainable Development (WBCSD) calculate that:

- Global construction accounts for 38% of total global emissions *[Arup and WBCSD, 2021 p8* [6]*]*
- More than 50% of emissions potentially being from the embodied carbon associated with construction
- 70% of this coming from just six materials *[Arup and WBCSD, 2021 p3]*
- Professor Paul Fennell at Imperial College London identifies that several aspects of cement production (the key component in concrete) release CO_2, with around 3.5 billion tonnes of cement being produced every year and each tonne emitting up to 622 kg of carbon dioxide (CO_2), equating to around 6.5% of global CO_2 emissions *[Imperial College London, 20 May 2021* [7]*]*
- Equally, every ton of steel produced in 2018 emitted on average 1.85 tons of carbon dioxide, equating to about 7% of global carbon dioxide emissions *[Imperial College London, 28 March 2028* [8]*]*

Timber, on the other hand, offers the possibility of 'net positive buildings where carbon sequestered in the timber exceeds emissions over a building's lifecycle' [Arup, 2020, p13 [9]] and further, at end-of-life, timber has the potential to be reused as a product, to be incinerated or to be used as biomass to create energy *[Arup and WBCSD, 2021, p42]*.

5 McDade E (2017) 'Beyond Zero: the Time Value of Carbon' in King, B (ed) The New Carbon Architecture: Building to Cool the Climate, Canada, New Society Publishers available **HERE**

6 Arup and the World Business Council for Sustainable Development (WBCSD) (2021) Net-Zero Buildings: Where Do We Stand? [online] available **HERE**

7 Imperial College London (May 2021) Best ways to cut carbon emissions from the cement industry explored, available **HERE**

8 Imperial College London (22 March 2022) 'Greening' cement and steel: 9 ways these industries can reach net zero, available **HERE**

9 Arup (2020) Net Zero Carbon Buildings: Three Steps to Take Now [online] available **HERE**

Whilst the STA has taken various approaches to promoting the use of timber frame in the past (such as fabric first), it must now be fully aligned with the MMC and climate change discussion and it is, therefore, important to emphasise the environmental benefits of building using timber, and express these clearly to key stakeholders in ways such as the following diagram from Stora Enso which demonstrates the path and circular life of wood in construction:

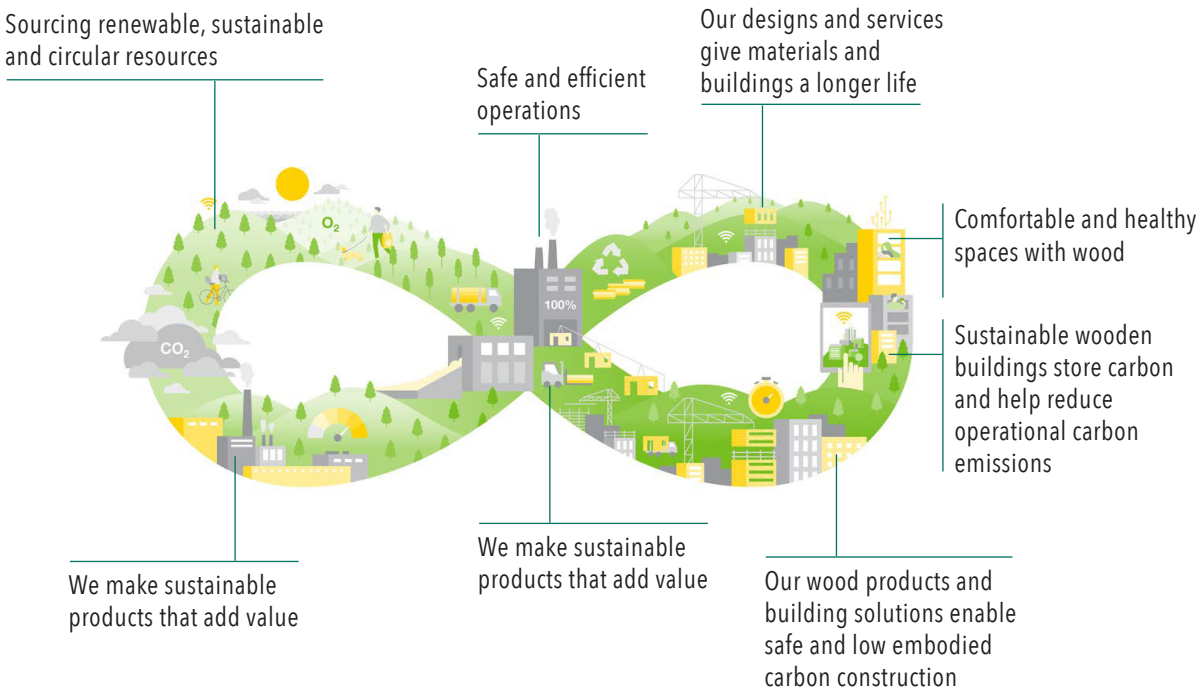

Figure 3: The circular life of wood

[Circular Life of Wood, Stora Enso, 2022 [10]*]*

Significantly, the UK Government has highlighted the importance of timber in its ambitious target to move to a net zero economy over the coming decades, with milestone commitments for 2030 and 2050. To this end the UK Government's *Net Zero: Build Back Greener strategy [HM Government, 2021* [11]*]*, recognises that 'timber has the lowest embodied carbon of any mainstream building material' [p178] and commits to promoting the use of timber in construction through initiatives such as:

- Financial support for development of innovative timber products
- Working in partnership with organisations such as the Home Builders Federation (HBF) to develop a policy roadmap for the use of timber
- Driving forward an increase in the use of modern methods of construction including the use of timber
- Working with Homes England to encourage the use of timber in the delivery of housing programmes
- Encouraging public demand for sustainably sourced timber
- Encouraging research into barriers to the increased use of timber, for example: strength and fire resistance of engineered timber structures.

10 Stora Enso (2022) Circular Life of Wood [online] available **HERE**

11 HM Government (2021) Net Zero Strategy: Build Back Greener [online] available **HERE**

In addition, the devolved governments and local authorities have their own targets: the Scottish Government aims for a net-zero circular economy by 2045 *[Scottish Government, 2018 [12]]* and Mayor of Greater Manchester, Andy Burnham, announced a five-year plan in 2019 for Greater Manchester to be carbon neutral by 2038 *[Greater Manchester Combined Authority (GMCA), 2019 [13]]*.

Several UK Government initiatives lend support to a positive outlook for the use of timber and OSM and MMC in construction:

- The £12billion *Affordable Housing Programme [Homes England, 2021-26 [14]]* commits Housing Associations receiving this funding to using some form of MMC for 25% of output
- The UK Government's National Design Guide (NDG) *[Ministry of Housing, Communities and Local Government, January 2021 [15]]* focuses on the importance of well-designed places in terms of climate, character and community and identifies ten key characteristics of a well-designed place, as shown in Figure 4 below. In terms of climate, it stresses the importance of the materials used and technologies adopted in minimising the environmental impact of places, following the principles of 'whole life carbon assessment and the circular economy (in) reducing embodied carbon' [p43]. To this end it acknowledges the importance of MMC and OSM in improving 'efficiency, quality and productivity' [p43] of new homes, thereby implicitly supporting the greater use of timber frame.

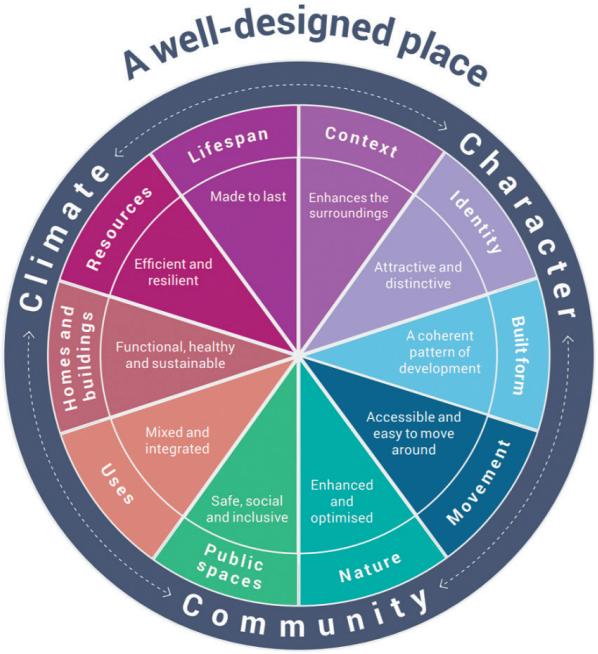

Figure 4: The ten characteristics of well-designed places

[HM Government, Ministry of Housing, Communities and Local Government, January 2021 [15]]

12 Scottish Government (2018) Update to the Climate Change Plan 2018 – 2032 Securing a Green Recovery on a Path to Net Zero [online] available at Update to the Climate Change Plan 2018 - 2032: Securing a Green Recovery on a Path to Net Zero **HERE**

13 Greater Manchester Combined Authority (2019) 5 Year Environment Plan for Greater Manchester 2019-2024 [online] available **HERE**

14 Homes England (2022) About the Affordable Homes Programme 2021 to 2026 [online] available **HERE**

15 HM Government, Ministry of Housing, Communities and Local Government (2021) National Design Guide: Planning practice guidance for beautiful, enduring and successful places [online] available **HERE**

- The Future Homes Hub (FHH) is supported by the UK Government and was set up to help in the implementation of the Future *Homes Delivery Plan* to meet climate and environmental targets as well as delivering high quality homes. All signatories to the FHH have committed to halving their embodied carbon by 2030 and to have net zero emissions by 2050. The UK's leading housebuilders are amongst the signatories, for example Barratt, Taylor Wimpey and Persimmon *[Future Homes Hub* [16]*]*.

The UK Government, devolved governments and local authorities, therefore, appear to be seeking to create an environment within which the structural timber industry can prosper, representing an enormous opportunity for the promotion of an increase in the use of timber in the delivery of construction projects and, most significantly for the STA and its members, in housebuilding in the UK. To reinforce the significance of the new housebuilding sector, not only to the STA but to the UK, we should here remind ourselves that housebuilding is seen as one of the engines of the economy, with the HBF estimating that £38bn of economic growth is generated by housebuilding in England and Wales alone *[Lichfields and House Builders Federation, 2018* [17]*]*.

The construction industry clearly has an important part to play in government targets. As architect Erin McDade** also contends 'the building sector is a significant part of the climate change solution' *[McDade, 2017]*; and there must be a wider acceptance of, and a mind-set to embrace, a change in the palette of materials and systems used by the construction industry. Timber is an important aspect of this change, and also OSM and MMC.

Consequently, it is vitally important to ensure that the STA stresses the credentials of timber frame as being both OSM and MMC, especially in light of environmental claims being made by competing systems: for example, a study, based on two modular housing schemes in London comprising nearly 900 homes, carried out by Tim Forman, a senior researcher at Cambridge University's Institute for Sustainability Leaderships and Francis Pomponi, Chair of Sustainability at Napier University, has found that factory-produced homes can produce up to 45% less carbon than traditional methods, representing a combined saving of 28,000 tonnes of carbon *[Housing Today, 6 June 2022* [18]*]*.

At present there is limited research for the STA to point to in order to demonstrate the environmental benefits of constructing using timber frame; however the research that is available clearly establishes how construction using timber frame significantly reduces the volume of embodied carbon in buildings. For example, a study carried out in Ireland by Jeremy Walsh Project Management used a life cycle assessment (LCA) tool to assess the whole life span environmental performance of two houses - one built using traditional masonry construction and the other built using timber frame construction - on the same street of the same housing estate with all other variables controlled as far as possible.

16 Future Homes Hub [online] available **HERE**

17 Lichfields and the Housebuilders Federation (2018) The Economic Footprint of Housebuilding in England and Wales: July 2018 [online] available **HERE**

18 Housing Today (6 June 2022) Modular Construction 'emits 45% less carbon than traditional methods' [online] available **HERE**

** Erin McDade, Assoc. AIA, is senior program director at Architecture 2030. Erin passionately believes in the power of the building sector to solve the climate crisis. She leads Architecture 2030's embodied carbon and public policy initiatives, is a founding member and current chair of the Embodied Carbon Network and is a member of the AIA 2030 Commitment Working Group.

The study found that the cradle to grave life-cycle of the timber frame house saved 38% carbon emissions compared to the masonry house, with the greater use of concrete in the masonry building being cited as the main reason for this difference. Even taking into account the potential reduction in embodied carbon by the use of timber joist intermediate floors in the masonry constructed house (the house in the study used concrete for intermediate floors), the study found that the reduction was 'still insignificant when compared to carbon savings by converting to timber frame construction' *[Jeremy Walsh Project Management, September 2020 [19]]*.

One of the findings from the above report is that building designers and developers need to be better informed with regard to the embodied carbon associated with certain building materials and their impact on the built environment in order that lower carbon homes can be delivered to market.

INSIGHT

- The STA must work to emphasise to key stakeholders that timber frame is a modern method of construction and that its members are delivering buildings using MMC, in order to take advantage of the growing interest in, and significance of, MMC.
- The STA must stress the environmental benefits of using timber and invest in research into, and calculation of, the carbon impact of timber frame manufacturing.

2.3 Demographics

Data from the latest UK censuses will provide more accurate up-to-date information but the Office for National Statistics *[ONS, February 2022 [20]]* estimates, based on 2020/21 figures, that:

- The UK population in 2022 is approximately 68.5 million and projected to increase to over 69.2 million by mid-2030 (a 3.2% increase) and to 70.5 million by mid-2041. Since the 1990s net migration has been the main source of population growth
- There were 28.1 million households in the UK in 2021 - an increase of 6.3% over the past ten years
- There has been an 8.3% increase in the proportion of people who live alone over the past ten years
- 3.6 million people aged 20-34 were living at home with their parents in 2021, representing 28% of this age group, compared with 24% a decade ago

19 Jeremy Walsh Project Management (September 2020) Study of the Embodied Carbon in Traditional Masonry Construction vs Timber Frame Construction in Housing available **HERE**

20 Office for National Statistics (February, 2022) Estimates of the population for the UK, England and Wales, Scotland and Northern Ireland [online] available **HERE**

- The old-age dependency ratio *(OADR) [OADR, ONS May 2018* [21]*]* shows the number of people of pensionable age relative to the number of working age (aged over 16) is expected to increase: 285.7/1000 in 2022 and projected to reach 366.4/1000 by 2041, due to declining fertility rates and longer life expectancy
- There were approximately 8.7 million over 70s in the UK in 2020 (15.21% of the total population) and over 9.1 million aged 50-60.

In addition, the Higher Education Statistics Agency (HESA) records that there were 2,751,865 students studying at Higher Education institutions in the UK in the academic year 2020/21 [Higher Education Statistics Agency 22 (HESA), 2022]. (A more detailed breakdown of this number can be found in Appendix 6).

Perhaps the most important points to take from these statistics are that we have an increasing and also ageing population, an increasing number of households, an increase in the proportion of people who choose to live alone, an increase in the proportion of those aged 20-34 still living with parents and a continuing large student population. These numbers have implications for the kind of accommodation we need in the UK including age appropriate 'later-living' accommodation, either for rental or to buy, care homes, accommodation aimed at single person households, possibly including co-housing, again for rental or to buy, affordable housing and student accommodation.

Furthermore, these statistics have serious implications for the size of the future workforce, with the construction industry being heavily reliant on "older workers" and challenged to recruit and retain new entrants going forward as demonstrated by:

- The Chartered Institute of Building's (CIOB) 2015 report "Exploring the impact of the Ageing Population on the workforce and built environment" which calculates that 19% of the construction workforce is set to retire between 2020-2025 *[CIOB, 2015* [23]*]*;
- A lack of skills in those entering the industry is amplifying this problem, with an estimated 50,000 vacancies in construction to be filled *[Construction Leadership Council Industry Skills Plan Update 2022-2023* [24]*]*.

INSIGHT

- The threat of a skills shortage in the construction sector is one that MMC/OSM looks to address: embracing digital technology, factory manufacture and reduced labour requirements on-site.
- The STA has the opportunity to attract a new generation into construction by for example:
  - Linking in with the CITB to deliver against the Department of Educations' Construction Skills Fund
  - Creating apprenticeships.

21 Office for National Statistics (May, 2018) Old Age Dependency Ratio, England, 1980 to 2041 [online] available **HERE**

22 Higher Education Statistics Agency (HESA) (2020/21) [online] available **HERE**

23 Chartered Institute of Building (CIOB) Exploring the impact of the ageing population on the workforce and built environment online] available **HERE**

24 Construction Leadership Council (CLC) (20220 Industry Skills Plan Update for the UK Construction Sector 2022-2023 [online] available **HERE**

3. Changing demand

In addition to issues around technology, climate and demographics, the past few years have seen further unprecedented challenges to the UK construction industry. Brexit and Covid-19 exacerbated skilled labour shortages with EU nationals returning to their home countries. Further, supply chain issues have arisen as the market reacted to Covid-19 and adjusted to new processes post-Brexit. The energy crisis and war in Ukraine have only served to add to these challenges.

3.1 The work from home/hybrid working trend

Covid-19 brought a shift in public attitudes towards the role of the home with working from home (WFH) and hybrid working concentrating attention on location and the amount and use of space:

- The estate agent Savills noted that 'change in working patterns underpins demand in suburban and rural areas' *[Savills, November 2021 [25]]*
- Zoopla sees this as a continuing trend with 46% of those moving or seeking to move house citing the need for more, or different, space and 18% citing changing working patterns and the need for more flexibility *[Zoopla, October 2021 [26]]*
- JLL identifies a 'desire for vibrant, social and attractive communities in which to live' suggesting that a village feel - green spaces, shops, cafes - including in an urban setting, improves the well-being of those who live there *[JLL, November 2021 p2 [27]]*
- The Government recognises this in its Levelling Up White Paper with its aim for 'sustainable, walkable, beautiful new neighbourhoods' *[HM Government, February 2022]*.

3.2 Bounce back to the cities

Notwithstanding the WFH trend, as Covid-19 recedes from the public consciousness a bounce back to the UK's cities rather than rural areas has become evident, in particular the cities outside London:

- JLL forecasts that Manchester is expected to have the highest rate of economic growth over the next 5 years (GVA growth of 16.4%) *[JLL, November 2021 p12/13 [27]]*
- Birmingham, benefitting from hosting the 2022 Commonwealth Games and the HS2 rail link, is expected to have the highest house price growth (average 4.9%) *[JLL, November 2021 p10/11 [27]]*
- Similarly, Edinburgh and Glasgow are expected to see high house price growth, Edinburgh 6% and Glasgow 5.5%, with both seeing growth in the Build to Rent sector *[JLL, November 2021 p14/15 [27]]*

25 Savills (2021) Residential Forecasts: 9 November 2021 [online] available **HERE**

26 Zoopla (2021) 'The Housing Market in 2021: the pandemic, current trends and what's next' at the Housing Market Intelligence Conference 2021, 7 October 2021 [online] available **HERE**

27 JLL (November 2021) UK Residential Forecasts 2022-26: Best of both worlds, November 2021 [online] available **HERE**

- Glenigan similarly forecasts strongest growth across the Midlands, the North, Scotland, Wales and Northern Ireland as the Government's 'levelling up' agenda takes hold *[Glenigan, November 2021, p7* [28]*]*. Indeed, in its update for the three months up to April 2022, Glenigan reports that the North-East, West Midlands and Northern Ireland saw notable increases in the value of project starts with the North-East being the strongest performer - value of project starts up 44% on the previous quarter and 3% higher than last year *[Glenigan, May 2022* [29]*]*

- Glenigan also notes a 'spectacular recovery' in the value of office project starts - up 50% on the previous quarter and 19% on the previous year with starts on large schemes rising almost 4-fold, perhaps in line with the bounce-back to the cities (Glenigan, May 2022 [28]).

3.3 Housing shortfall

This bounce back brings with it pressures at the bottom and top of the property ladder *[JLL, November 2021* [27]*]*. JLL estimates that there were 100,000 'lost starts' in the 18 months before November 2021, and whilst private housing starts will increase in the next 5 years, they will still fall well short of the Government's target of 300,000 per annum by 2025 - a 500,000 shortfall from the 1.5 million needed in the next 5 years. The situation for first-time buyers is therefore difficult and due to be further exacerbated by the end of Help to Buy in England in 2023 (the Help to Buy Scotland scheme ended at the end of March 2021, replaced by the reduced budget First Home Fund).

3.4 An ageing population

At the other end of the property ladder, as previously noted in section 2.3, approximately 20% of the UK population is over 65, with this age group predicted to be the fastest growing over the next two decades. There is, however, a distinct shortage of attractive, purpose-built, later life accommodation for this age group to buy or to rent, which, given that this group tends to under-occupy property, restricts supply in the middle rungs of the housing ladder *[JLL, November 2021* [27]*]*. Following on from this, of course, will be a greater demand for care homes.

28 Glenigan (November 2021) UK Construction Industry Forecast 2022-2023, November 2021 [online] available **HERE**

29 Glenigan (May 2022) Newsletter: Brighter spots for construction appear, 31 May 2022 [online] available **HERE**

3.5 Student population

Supply, especially rental, is further affected by the student market. With most universities only guaranteeing accommodation for first year students, and often disregarding availability of accommodation for other years, there is great pressure on off-street accommodation - an estimated 551,000 and growing number of students renting property which could otherwise be rented by, for example, young professionals *[2018/19 figures, HEPI August 2020 [30]]*.

(See Appendix 4 for further detail)

3.6 Levelling up

The UK Government's 2022 Levelling up the United Kingdom white paper *[HM Government, February 2022]* contains ambitious targets for improving the economy, transport, education, skills, culture and health of all regions of the UK through initiatives such as:

- Increased local devolution: mayors or governors for those regions that want them, trial of 'deeper devolution deals' with the West Midlands and Greater Manchester with further mayoral combined authorities to follow
- Relocation of more senior civil service roles outside London - moving 22,000 civil servants out of London by 2030 to, for example, Darlington, Wolverhampton, Glasgow, Belfast, Leeds and Bristol
- £100m of investment in three new 'Innovation Accelerators' - private-public-academic partnerships on the Stanford-Silicon Valley or MIT-Greater Boston model aiming to cluster together centres of research excellence with their associated industries - pilots will be centred on Greater Manchester, the West Midlands and Glasgow City Region.

It should be noted here that questions are currently being asked about the success of the levelling up agenda thus far, with questions about its ability to generate real change and the efficacy of its selection process leading to suggestions that 'some of the UK's wealthiest areas are being allocated 10 times more levelling up money per capita than the poorest *[Architects' Journal, 9 June 2022 [31]]* whilst some of the most deprived areas of the UK, for example Blackpool, have received no allocation at all *[The New Statesman, 15 June 2022 [32]]*.

30 Higher Education Policy Institute (HEPI) (August 2020) Student Accommodation: The Facts [online] available **HERE**

31 Architects' Journal (9 June 2022) MPs criticise ministers' picks for Levelling Up Fund cash [online] available **HERE**

32 The New Statesman (15 June 2022) How Tory seats hoovered up levelling-up funds [online] available **HERE**

3.7 Building Regulations

Building regulations constantly evolve creating both opportunities and threats for the timber frame sector.

In recent years the most challenging changes in building regulations for the UK timber frame industry have come in the aftermath of the high-rise fire at the 24-floor Grenfell Tower in June 2017, in which 72 people died. Following this tragedy, in July 2017, the UK Government commissioned an independent review of building regulations and fire safety, led by Dame Judith Hackitt, chair of EEF the Manufacturers' Organisation (now Make UK), which published a report *Building a Safer Future* with recommendations which included a new regulatory framework for buildings more than ten storeys high, greater accountability and more effective product testing, but which fell short of banning combustibles *[Hackitt, May 2018 [33]]*. However, the UK Government went further and brought in regulations (SI 2018/1230) on 21 December 2018 banning the use of combustible materials in and on the external walls of buildings for residential or institutional purposes over 18 metres above ground level *[HM Government, 29 November 2018 [34]]*.

A further review in 2020 faced calls for this height restriction to be reduced to 11 metres, however, to date, the 18-metre limit remains. Nevertheless, the Scottish Government announced a full ban on the use of combustible materials on buildings taller than 11 metres in April 2022 *[Scottish Government, April 2022 [35]]*; and on 31 August 2021 London Mayor, Sadiq Khan, announced a 'ban on combustible materials being used in external walls for all residential development, regardless of height' for the proposed 26,456 homes to be built under the £3.46bn Affordable Homes Programme *[Greater London Authority (GLA), August 2021 [36]]*, with this being condemned as 'irrational' by architects and timber bodies *[Architects' Journal, 7 September 2021 [37]]*.

Clearly these developments have serious implications for the timber frame industry, in effect locking it out of the affordable housing market in London and placing restrictions on the use of timber frame and structural timber in apartment blocks and purpose-built student accommodation (PBSA), and potentially hospitals and hotels across the UK. There is a risk of mission creep, pointing to the need for fire testing and scientific evidence demonstrating that timber is a safe building material. There is currently a good deal of activity taking place in stressing the disparity between government aims for net zero carbon emissions and the futility of 'planting millions of trees if they are left to rot and release the CO_2 they previously captured' (BBC News, 25 May 2020 [38]) and this will go some way to mitigating the risk of mission creep.

33 Hackitt, J (May 2018) Independent Review of Building Regulations and Fire Safety: Final Report [online] available **HERE**

34 HM Government (29 November 2018) Government bans combustible materials on high-rise homes [online] available **HERE**

35 Scottish Government announcement (April 2022) available **HERE**

36 Greater London Authority (August 2021) Building Safety in London [online] available **HERE**

37 Architects' Journal (7 September 2021) Architects slam Sadiq Khan's 'irrational' combustibles ban for new homes [online] available **HERE**

38 BBC News (25 May 2020) Grenfell fears prevent timber building boom [online] available **HERE**

Furthermore, Building Regulation Part L covers the conservation of fuel and power in the building of new homes in England, and establishes how energy-efficient new and existing homes should be *[HM Government, 15 June 2022 [39]]*. This very much plays to the strengths of timber frame manufacturers who, in the past, have approached the market with a "fabric first" strategy.

From 15 June 22 changes to Part L require that new homes must produce 31% less carbon emissions relative to the present regulations, this will be assessed under an update to the Standard Assessment Procedure (SAP) calculation methodology, SAP10. Part L also seeks to address concerns over thermal bridging leading to heat loss and condensation and the revision points to the use of products that can reduce thermal bridging.

Further revisions to Part L are set for 2025 which will bring this more in line with the 'Future Homes Standard' *[HM Government, 15 June 2022 [39]]* that ensures new homes will deliver a 75 - 80% reduction in carbon emissions.

INSIGHT

- Whilst the South-East is still, of course, an important market, the focus for STA members should perhaps be principally outside London, especially in light of the Greater London Authority's (GLA) ban on the use of combustible materials, including timber, in the external walls of all homes of any height to be built under its £3.46 billion Affordable Housing Programme.
- The success, or failure, of the 'levelling up' agenda has serious implications for the housebuilding industry and it is therefore important for the STA to lobby politicians, devolved governments and local leaders such as Greater Manchester's Mayor, Andy Burnham, to push for successful delivery of the policies promised in the levelling up white paper.

39 HM Government Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities and Local Government (15 June 2022) Conservation of fuel and power: Approved Document L [online] available **HERE**

4. The economy and the housing market

Following the instability around Brexit and Covid-19, in December 2021 it was widely reported in the UK media that the International Monetary Fund (IMF) gave a fairly positive forecast for UK Gross Domestic Product (GDP) being 6.8% in 2021, and falling back to 5% in 2022. However, the war in Ukraine and resultant energy crisis has led to a contraction of the UK economy and it has again been reported that the IMF has revised its forecast downwards to 3.6% for 2022 *[Proactive Investor, October 2022 [40]]*. Indeed, the UK economy did shrink in March and April with GDP falling by 0.3% in April 2022. However, unexpectedly the economy rebounded in May with GDP rising by 0.5% with all sectors expanding, especially construction, travel and manufacturing *[BBC News, 13 July 2022 [41]]*.

The Construction Products Association's (CPA) Summer 2022 forecast anticipated that the volume of construction output would rise by 2.5% in 2022 and 1.6% in 2023, this is a downward revision from its Spring 22 view of 2.8% and 2.2% in 2022/3 respectively. Whilst still demonstrating growth both 2022 forecasts are down from its previous Winter 2021 forecast with growth of 4.3% in 2022 and 2.5% in 2023. They cite rising energy costs, commodity prices and rising inflation following Russia's invasion of Ukraine, the resultant impact on economic growth and how this may affect construction industry output. *[CPA, Summer 2022 [42]]*.

The CPA also notes that construction activity in all three key sectors - commercial and social, residential and infrastructure - remains robust but that industrial and infrastructure output will see the greatest growth, whilst private housing output will increase by just 1% in 2022 and they see this being flat in 2023 (contrasting with a forecast of 3% at the beginning of 2022). Meanwhile, private housing repair, maintenance and improvement (RMI), which has seen spectacular growth over the last two years, is forecast to drop by 3% in 2022 and 4% in 2023, due to inflationary pressures resulting in a fall in real household disposable income, consumer confidence and spending. Indeed, at the beginning of the year inflation was forecast to be at an average of 6.8% over the year, possibly impacting all sectors including private housing, RMI and business investment and increasing pressure on the rental and social housing market. The CPA considers that demand is likely to remain strong to the end of Q3 2022, with contracts already in the pipeline, but with the latest data pointing to inflation running higher - at 9% for May 2022 and expected to reach 11% later in the year *[BBC News, 13 July 2022 [43]]*, this and subsequent demand may be put into question.

In its latest forecast for 2022-24 Glenigan *[Glenigan, June 2022 [44]]* also highlights that pressure on household budgets will dent homebuyers' confidence leading to moderate building starts this year, although Glenigan anticipates a recovery in 2023/24 as household finances and the UK economy adjusts and improves. In addition, interest rates will clearly have an impact on consumer confidence and behaviour; with the Bank of England having increased the base rate to 1.75% in the year to end August 2022 there is an expectation that this will be increased again before the end of the year (CPA forecasts 2% and reducing to 1.75% in 2023).

40 Proactive Investor (11 October 2022) IMF cuts growth forecasts for UK and global economy for 2023 available **HERE**

41 BBC News (13 July 2022) UK economy grows but fears remain over rising prices [online] available **HERE**

42 Construction Products Association (CPA) (Spring 2022) Construction Industry Forecasts 2022-2024: Spring 2022 edition and Summer 2022 edition [online] available **HERE**

43 BBC News (13 July 2022) UK economy grows but fears remain over rising prices link **HERE**

44 Glenigan (June 2022) The Glenigan Construction Review Extended Edition: reflecting activity to the end of May 2022 [online] available **HERE**

A growth in build to rent (BTR) projects over the next two years is also forecast, especially high-density apartments in urban settings and in social housing, in response to the easing of funding restrictions for housing associations and as the Levelling-up agenda starts to take effect. Furthermore, health and education are singled out as areas for growth with increased public sector investment.

The latest CPA forecast states that the recovery in construction activity since Summer 2020 has been heavily reliant on government funding, policy and stimulus *[CPA, Summer 2022 [45]]* Public construction is forecast as up 3.7% in 2022 and 4.5% in 2023, supported by the UK Government's £12bn Affordable Housing Fund 2021-26. Further evidence of the significance of the influence and impact of the social housing sector can be seen in the alliance of 29 housing associations brought together by the National Housing Federation that has a spending potential of £600m to deliver affordable homes using 2D/panelised MMC category 2 systems.

Overall therefore, whilst the outlook for private housing is cautiously optimistic, having remained resilient despite the end of the stamp duty holiday and more constrained Help to Buy, it may be inhibited by reduced consumer spending and confidence, affordability (especially deposit requirements), the Building Safety Pledge, and stronger building regulations. Similarly, private RMI, which was a key driver of recovery after the first Covid-19 lockdown, could also be sensitive to changes in consumer confidence and real household disposable income with inflationary pressure on the cost of building materials causing people to use their discretionary spending for holidays now that travel restrictions are easing, rather than RMI. The CPA identifies rising energy prices and commodity shortages as the greatest constraint on growth with Glenigan agreeing that availability and cost of materials is currently the greatest constraint on industry growth in general, although this is expected to improve over the next two years.

45 Construction Products Association (CPA) (Summer 2022) Construction Industry 2022-2024: Summer 2022 edition [online] available **HERE**

5. The new-build housing market: forecast to 2025

The UK housebuilding industry has a unique structure, dominated as it is by a relatively small number of companies: for example, in 2019 the Top 10 housebuilders accounted for approximately 46% of the new-build market. This has implications for delivery of the UK Government's target to address the supply-demand equilibrium and build 300,000 units per annum.

The estimated number of SME developers operating in the sector is 2,500 compared with 12,215 in 1988, with many not returning to the market following the last recession. Or to put it another way, forty years ago, SME house builders delivered 40% of homes in the UK. Today, this figure is just 12%. Hit hard by successive recessions, they struggle to access finance and land, and have difficulty navigating the complex planning system which successive Governments have failed to address.

In structural timber terms this market remains dominated by timber frame, much of which is open panel, but with the emergence of closed panels systems, SIPs and CLT as viable alternatives, there has never been greater choice in the use of timber systems.

That said it is expected that open panel timber frame will still be the solution of choice for some time due to commercial pressures when comparing structural timber with the traditional masonry products.

5.1 UK Government targets

UK Government action to stimulate the economy over recent years has had a positive impact on housebuilding and the financial performance of housebuilders, whether Help-to-Buy schemes or Stamp Duty holidays, with the latter certainly having had a positive impact from its launch on 8 July 2021 (it ended 30 September 2021). That said, the figure of 300,000 units per year has been the target for successive governments over the last two decades but has not yet been achieved, as shown in Figure 5. Indeed, in an interview with the BBC in May, the then Secretary of State for Levelling Up, Michael Gove, appeared to cast doubt on the viability of the 300,000 homes target *[Inside Housing, 11 May 2022* [46]*]*. In reaction to this, housebuilders including Barratt Developments have joined with umbrella groups such as the HBF in backing Housing Today's A Fair Deal for Housing campaign in calling for the reinstatement of the 300,000 target *[Housing Today, 30 June 2022* [47]*]*.

46 Inside Housing (11 May 2022) Gove: 'We don't want to be stuck to 300,000 homes a year target', arguing that he is bound by criteria beyond 'arithmetic' [online] available **HERE**

47 Housing Today (30 June 2022) Barratt backs a Fair Deal for Housing Campaign [online] available **HERE**

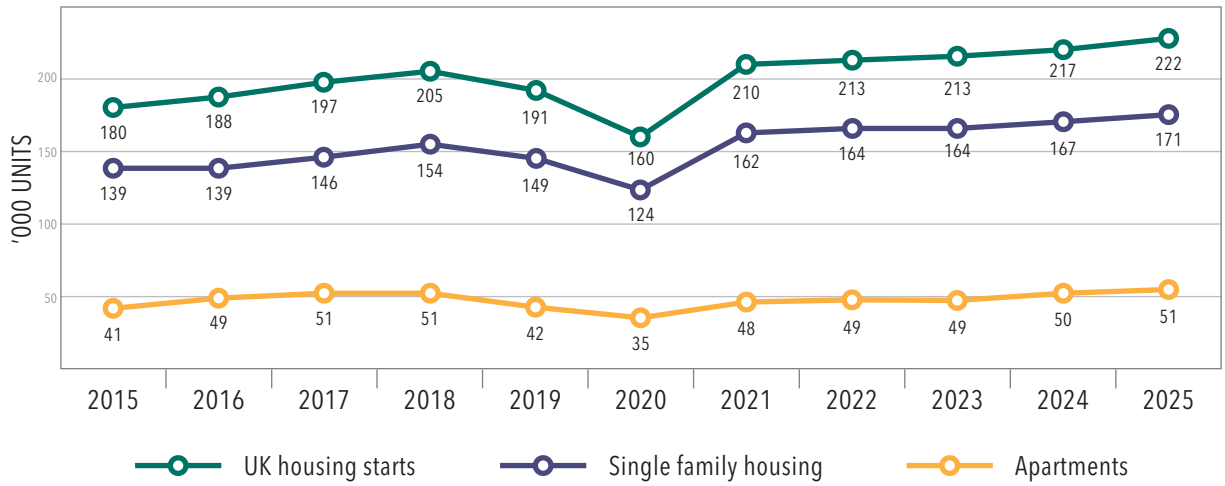

Figure 5: UK housing starts 2015-2025 [actual and forecast]

[2015-2020 figures from Government statistics [UK, Scotland, Wales, N Ireland], forecast balanced from numerous sources: JLL, HMI, Glenigan, CPA]

[Data for this table can be found at Appendix 1]

As previously referenced (in Section 2.2), the UK housebuilding industry is of great importance to the UK economy and its continued momentum is highlighted in the forecast data, clearly showing that the compound annual growth rate (CAGR) for housebuilding is likely to be in the region of 1.1% for 2021 to 2025 (from current forecasts) whilst for the timber frame industry it is forecast to be 5.5% (see table 2 in Appendix 1). With growth forecast to 2025 we could therefore conclude that the technologies represented by the STA are well established (timber frame), growing in influence (SIPS) and have captured the imagination of the architectural community (CLT).

The basis of this growth, somewhat bucking the trend, is in how the structural timber industry is able to respond to the various challenges and opportunities the market is presenting:

- Government promotion of OSM/MMC in social housing;
- OSM/MMC offsetting labour shortages;
- Government strategy to increase the use of timber in construction;
- Contribution to carbon reduction by construction;
- Response to changes in building regulations (Part L).

In addition to increasing its profile in the delivery of houses for developers and in social housing, SIPS is also a popular choice for the self-build market. The build number for self-build has averaged 10,000 units per annum over the past decade and will be influenced by the availability of land and planning considerations. There is also an emerging trend for custom build (as evidenced by the promotion of this at the Barking Reach Development initiative).

5.2 Timber frame market share

Housing starts, therefore, are forecast to exhibit modest growth to 2025, however timber frame is set to increase market share as seen in Figure 6 below:

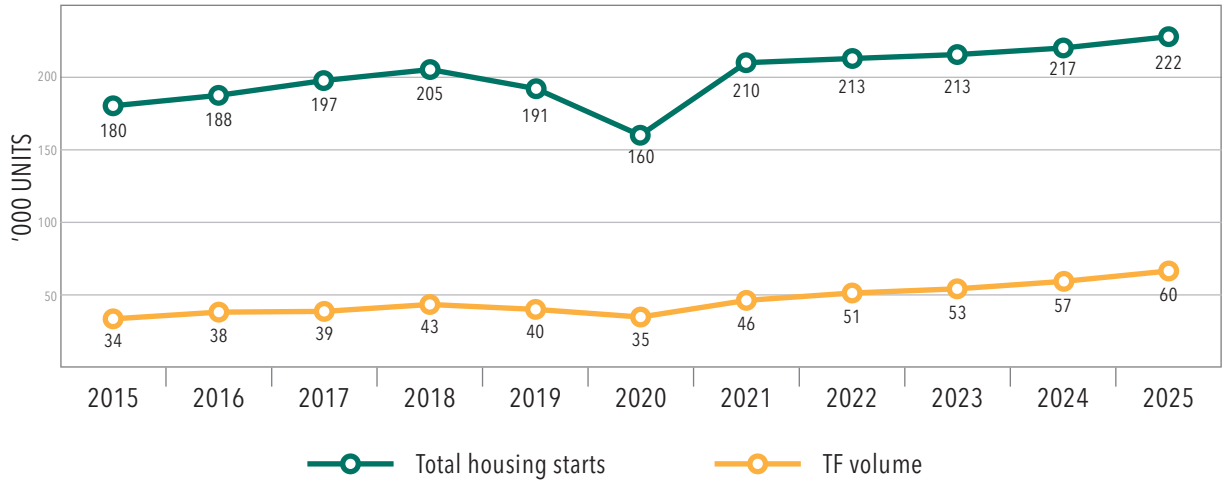

Figure 6: UK housing starts 2015-2025 and timber frame market share [actual and forecast]

[2015-2020 figures from Government statistics [UK, Scotland, Wales, N Ireland], forecast balanced from numerous sources: JLL, HMI, Glenigan, CPA]

[Data for this table can be found at Appendix 1]

Figures from the National House Building (NHBC) suggest that timber frame market share has developed from 19% in 2015 to 22% in 2021 and that market conditions, as described above, present the opportunity for this to develop to circa 27% by the end of the forecast period (2025).

INSIGHT

The forecast numbers take into account the positive signals coming from both Government, with its carbon reduction agenda, and from the client community with the increased commitment signalled to the use of timber frame. That said, we have taken a prudent standpoint given the Government's record in delivering against its ambitions.

MARKET	2019	MARKET SHARE %	TIMBER FRAME %	UNITS
England	152,340	80	9	13,711
N. Ireland	7,276	4	30	2,183
Wales	6,224	3	22	1,369
Scotland	24,772	13	92	22,790
TOTAL	**190,612**			**40,053**

Figure 7: UK housing starts and timber frame market share by market

[Source: NHBC HMI Report 2019]

It is clear to see that the Scottish market is the most developed and has a long tradition of using timber frame whilst the biggest potential for growth is in the English market. This is the area that will deliver the primary growth to the industry and is forecast to more than double in the period to 2025.

This is a bold statement but as we can see that over recent years the prominence and credibility of the timber frame sector has been enhanced by key housebuilders making volume commitment to TF and, in certain high-profile cases, moving into offsite manufacture through acquisition, some as a by-product of adding housebuilders to their business and some as a direct need to secure their supply-chain in OSM, for example:

2005 Persimmon acquired Westbury Homes and with it Space 4

2018 Countryside Properties acquired Westleigh Homes and with it Westframe Timber Frame

2019 Barratt Homes acquired Oregon Timber Frame

2019 Taylor Wimpey committed to 25% of homes delivered in timber frame

2021 Miller Homes acquired Walker Timber

2022 Avant Homes acquired Roof Profiles

Figure 8a illustrates the uptake of timber frame by the UK's top 20 housebuilders; this is derived from a series of assumptions that are based on interviews and interpretation of information from annual reports and wider market information. This can be found in Appendix 2.

COMPANY	DATE OF ACCOUNT	UNITS COMPLETED		AVERAGE SP (£'000)		APARTMENTS	TIMBER FRAME UNITS
		LATEST	PREVIOUS	LATEST	PREVIOUS		
Barratt	Jun-19	17,856	17,579	312	329	2,857	3,570
Persimmon	Dec-19	15,855	16,449	242	238	1,268	4,500
Taylor Whimpey	Dec-19	15,719	14,993	305	302	3,144	2,750
Bellway	Jul-19	10,933	10,349	334	323	1,968	1,500
Redrow	Jun-19	6,443	5,718	390	380	1,350	644
Countryside	Sep-19	5,733	4,295	367	402	917	1,750
Keepmoat Homes	Oct-19	4,035	3,988	161	150	605	485
Vistry	Dec-19	3,867	3,759	342	337	387	400
Bloor	Jun-19	3,760	3,257	296	298	376	564
Berkeley	Apr-19	3,698	3,678	748	725	3,143	-
Miller Homes	Dec-19	3,498	3,170	84	281	525	700
Crest Nicholson	Oct-19	2,912	3,048	388	396	437	435
Cala	Dec-19	2,449	2,033	464	450	490	367
L&Q	Mar-19	2,439	2,874	553	576	2,073	610
Lovell	Dec-19	2,400	2,500	235	233	360	300
McCarthy & Stone	Oct-19	2,144	2,134	308	300	2,144	-
Avant	May-19	1,953	1,846	271	257	391	300
Hill Group	Dec-19	1,812	1,550	545	594	362	270
Gleeson	Jun-19	1,529	1,225	129	125	-	229
Orbit Homes	Mar-19	1,212	2,019	250	247	121	180

Figure 8a: Top 20 UK housebuilders and timber frame usage

As stated above, the buy-in, and use of timber frame by the UK's leading housebuilders is a key factor in the market share which timber frame enjoys today and from where growth will be driven (the top 20 accounting for approximately 20,000 units alone across the UK from the research carried out in collating this report).

What is interesting is the agility of the housebuilder community as the industry responds to changes in market demand and demonstrates that it is able to adapt its offering accordingly, whilst always being conscious of the commercial implications of its actions. This requires that the strength of the relationship with this most important of sectors is critical in order to match their expectations and be solutions providers to the changes in markets and legislation; in doing so the timber frame industry maintains relevance and value.

From interviews with a sample of the UK's largest housebuilders we have seen, for example, the UK's largest housebuilders withdraw from the costliest areas of Central London, exiting high-rise apartment blocks due to the elongated cash-to-cash cycle and the tying up of capital, in favour of more single-family housing (with an element of mid/low-rise multi-occupancy units) in the outlying areas of London, suburbs and rural locations. This is reinforced by Persimmon's latest Annual Report that states that apartments were 8% of their output compared to NHBC assertion that the split is 20% in the UK (noting that NHBC does not cover all registrations); similarly, Barratt is at 16% and Taylor Wimpey 20% of their output being apartments.

HOUSEBUILDER	APARTMENTS AS % OF TOTAL
Barratt	16
Taylor Wimpey	20
Persimmion	8
Bellway	18
Redrow	21
NHBC	**20**

Figure 8b: Sample of apartment split by UK housebuilders versus NHBC

[Information from interviews and data available in the public domain]

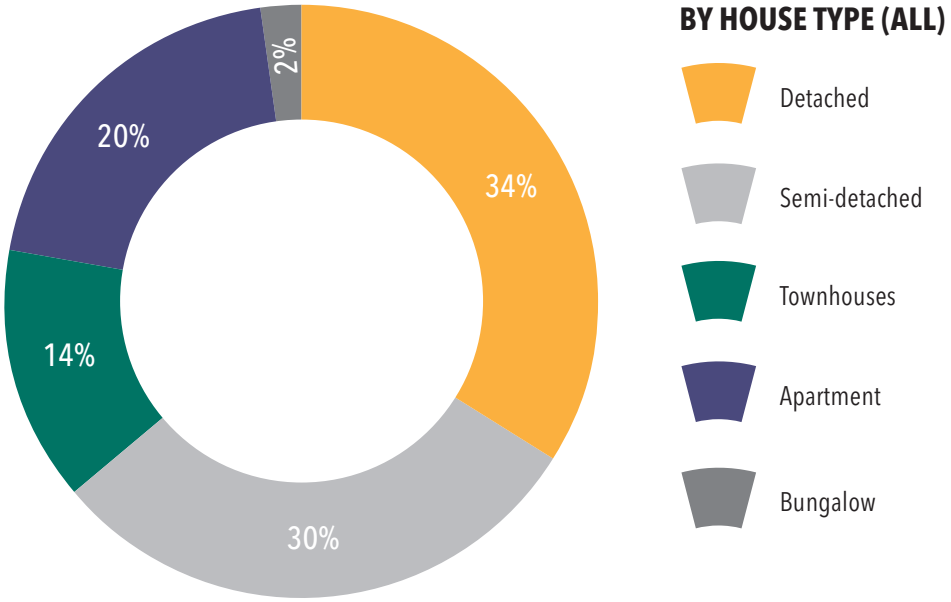

Figure 9a: NHBC registrations by type 2021 [48]

[NHBC data represents registrations in the period, NHBC Housing Report, January 2022]

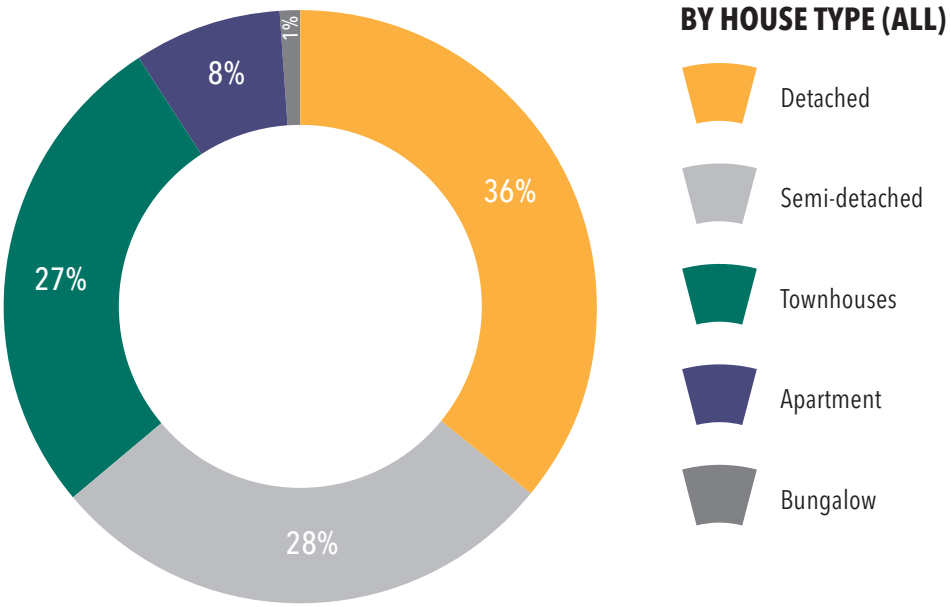

Figure 9b: Persimmon output 2021[48]

[Persimmon data represents completions in the period]

48 Persimmon Homes 2021 available **HERE**

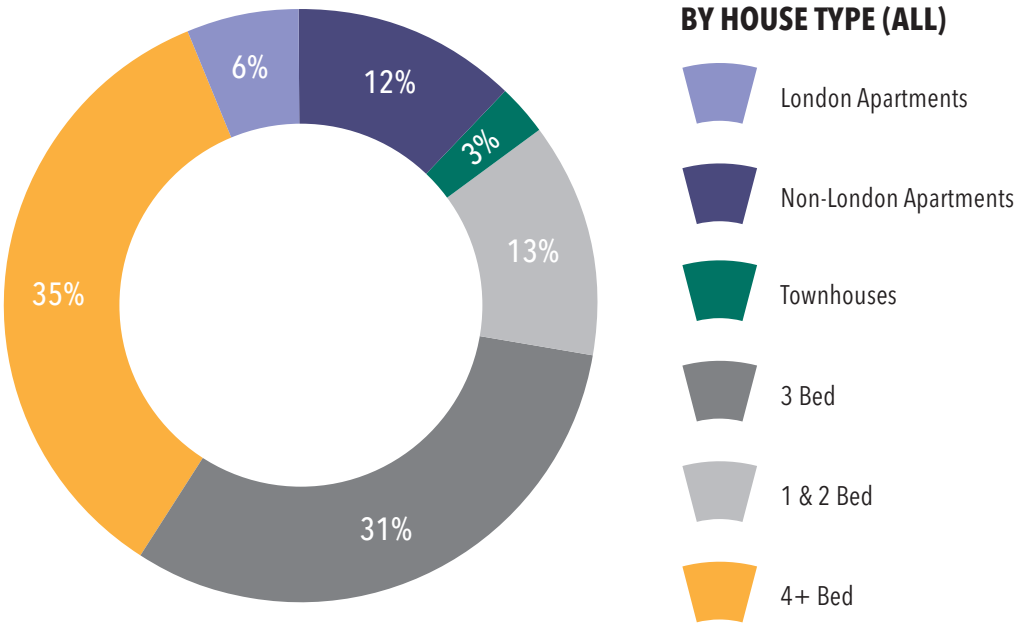

Figure 9c: Bellway Homes output 2021[49]

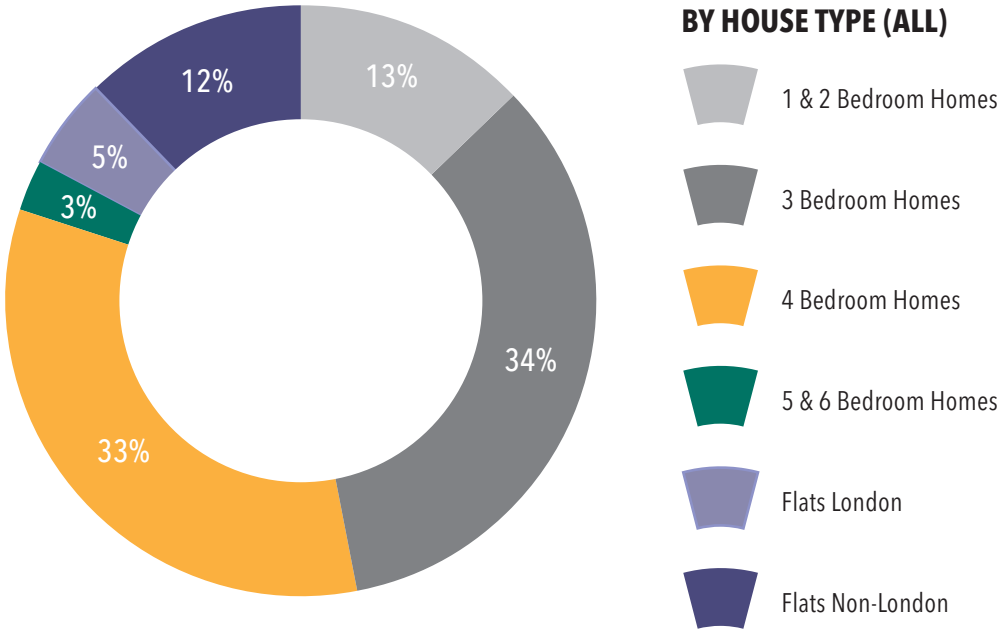

Figure 9d: Barratt Homes output 2021[50]

49 Bellway Home available **HERE**

50 Barratt Homes available **HERE**

5.3 Timber frame split: single family housing versus apartments

Timber frame has consistently been used to deliver both single and multi-family housing. However, the split between the two has changed over the course of the last two decades. During the mid-2000s timber frame was seen as a great solution to the need to deliver apartment blocks of up to 6 storeys quickly, in line with the density criteria set out in PPG3 (up to 50 units per hectare - depending on location). As a consequence, the share of apartments delivered as a percentage of overall timber frame housing was approximately 50%. Due to a number of factors this has reduced over time to the point where it is a less significant percentage of output and from confidential discussions with a sample of timber frame producers this is now estimated in the range of 5%-25%. Along with analysis of building typologies of a sample of leading housebuilders, this has informed the view taken (% apartments in 2021 at 20% reducing to 19% by the end of the forecast period).

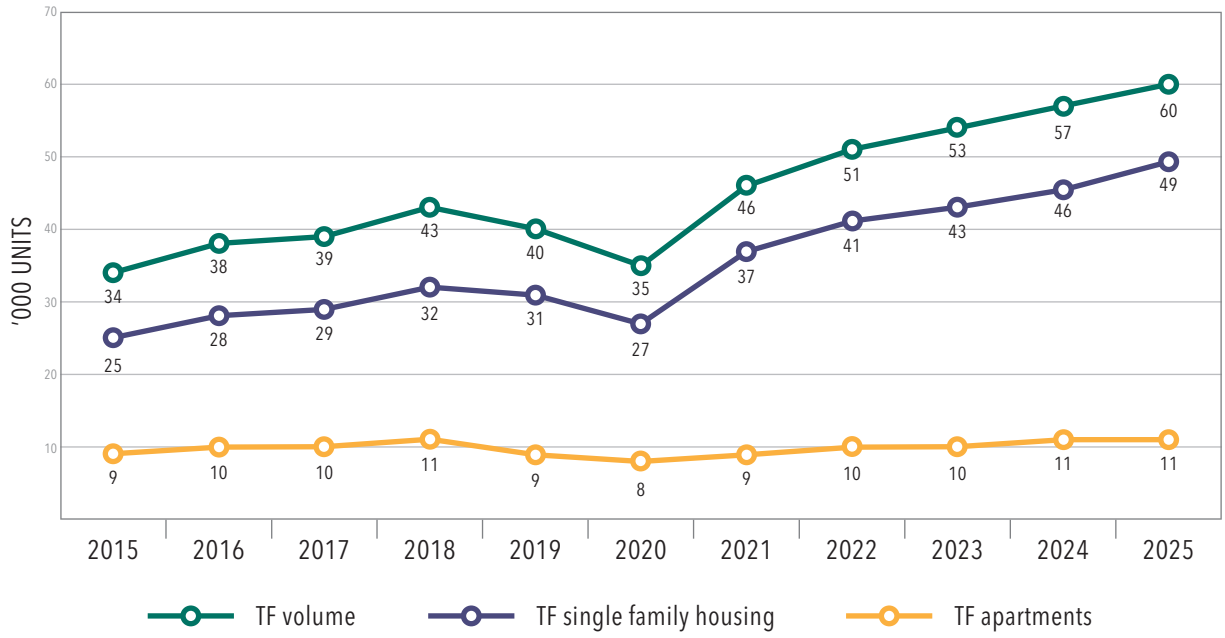

Figure 10: UK timber frame units by type 2015-2025 *[Data for this table can be found at Appendix 1]*

What is encouraging is that the sweet spot for timber frame is very much now in single family homes and low-rise dwellings, this being driven by regulation (in the wake of the Hackitt report) and mirroring key stakeholder sentiment in the insurance and financial sectors, whereby they report no issues with cover or lending in this sector compared with high rise and complex buildings. As such this is all positive news for the structural timber industry.

There have been further developments in the new-build market such as the recent growth in the build to rent sector (BTR), demonstrating that the market is developing in different areas such as the need for rental property for sectors including millennials who are finding it increasingly difficult to buy, and those in later life looking to downsize. John Lewis, for example, has just announced three locations where it proposes to build new rental homes as the first step of its plan to deliver 10,000 homes in the next ten years *[John Lewis, June 2022 [51]]*. The need to build communities is very much at the forefront of its vision with homes for different sized households and options for short and long-term tenure.

51 John Lewis Partnership (9 June 2022) John Lewis Partnership announces first proposed locations for rental homes [online] available **HERE**

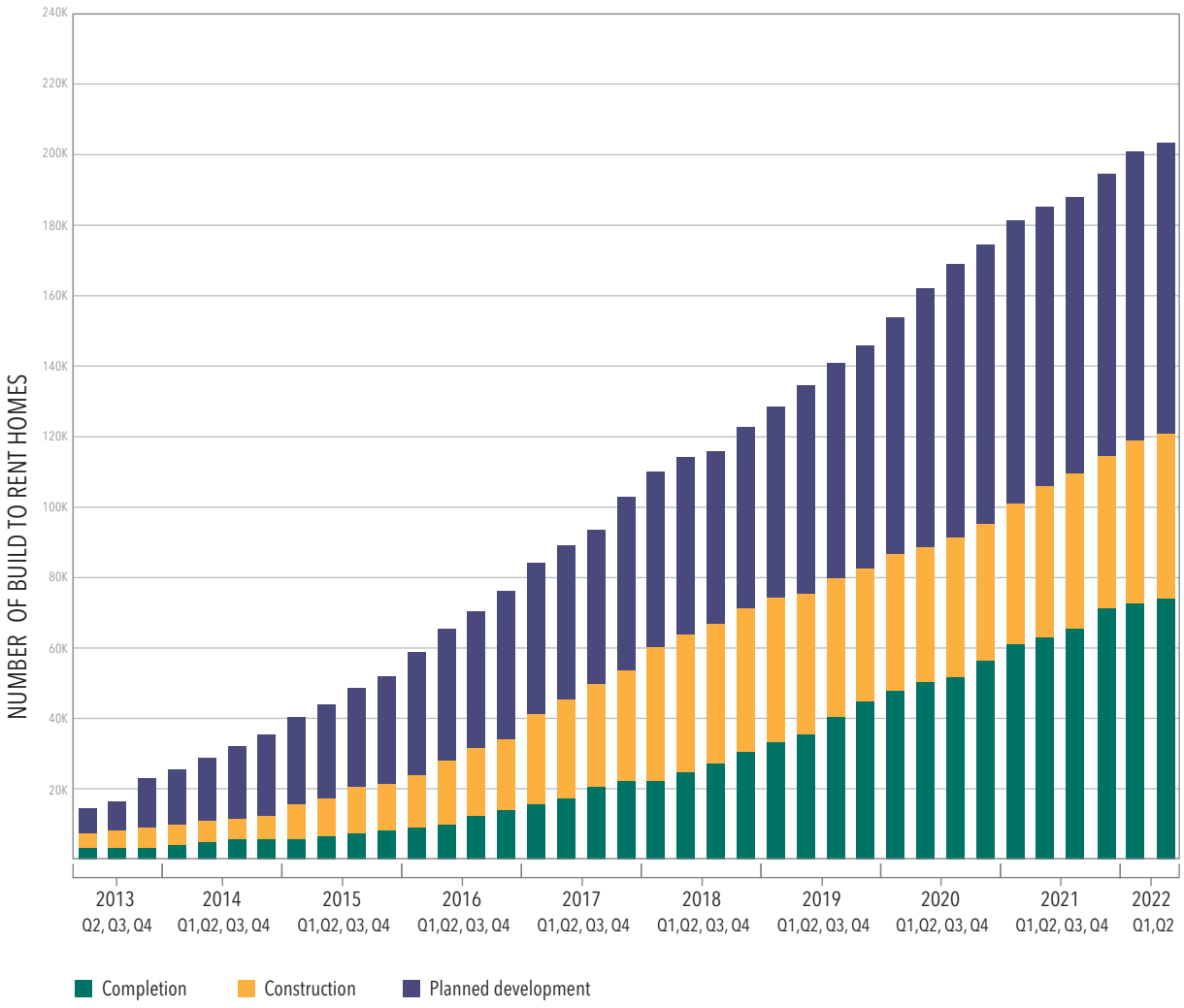

Figure 11: Build to Rent (BTR) market development

[Source: Savills, British Property Federation [52]]

Figure 11 above demonstrates that the investment in BTR continues to support expansion - the current stock is stated as 73,700 unit with a further 47,800 under construction. According to Savills' latest report *[UK Build to Rent market Update Q2 2022 [52]]* the future pipeline is 115,900 units suggesting that this sector is in the region of 237,400 units completed or in development. The strongest growth identified is in single family BTR, which given the planning pipeline will reach 21,000 units (+44% year on year growth).

52 UK Build to Rent Market Update available **HERE**

5.4 Social housing - impact and influence

With current concerns about the state of the economy and the potential for a recession to hit the UK, we can point to the significance of the social housing sector.

Figure 12 tracks the percentage of social housing built in the UK since 2007 and clearly shows that from the period 2008 (the onset of the global financial crisis) the percentage of social housing peaked at 25% in 2009. Bottoming out in 2016 at 17% of housing starts, it has increased again and, if we consider the role it has to play during periods of economic uncertainty, we can consider that it may increase to levels similar to the post-2008 recovery levels of 25%. The significance of the social housing sector has been referenced above with the £12bn affordable housing fund. Furthermore, MMC will have a greater role to play in the delivery of social housing.

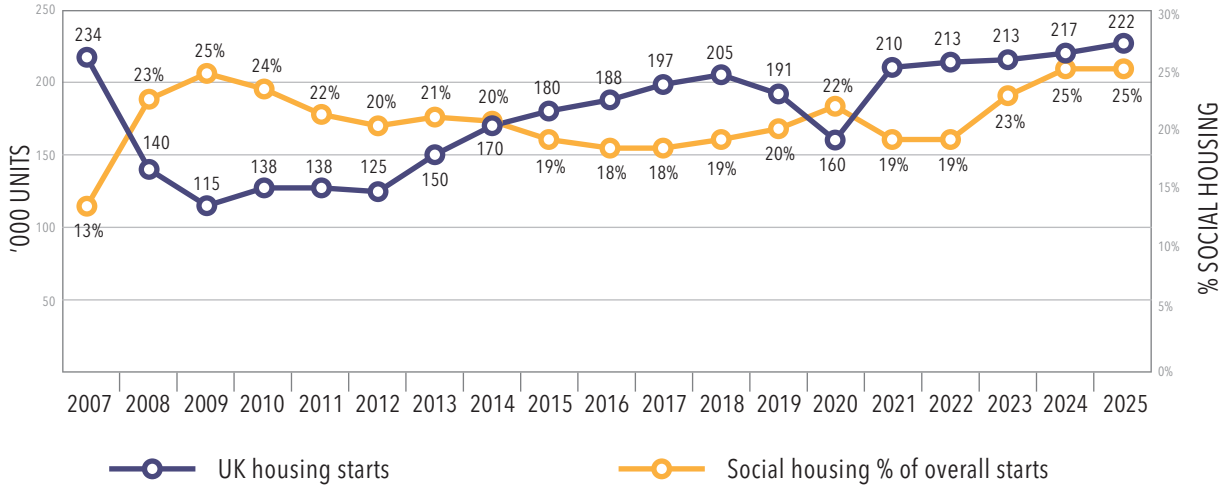

Figure 12: Social housing as a percentage of overall starts

[Source: UK, Welsh, N. Ireland and Scottish government stats]

Note: Welsh social housing numbers ceased to be separated from stats from 2011 therefore average for previous period used and applied

More information regarding volume of social housing is available in Appendix 3.

5.5 Size of the timber frame industry

With a market share of 22% of the UK house building sector, this would suggest that the value of the industry is £690m (based on an average of £15K per unit) and has the potential to more than double in size over the next 25 years - if the ambitions of the UK Government are realised.

Received wisdom would suggest that STA members represent approximately 85% of the UK's "timber frame" manufacturers although given that this is a STA report, it is not intended to provide a "who's who" of the industry listing the key players by turnover/volume.

What we can say is that until recently, with moves by UK housebuilders such as Barratt and Persimmon, the industry to date has not been populated with a large number of blue-chip organisations' and has had a spread of members ranging in size from £3m to more than £100m turnover. However, we can point to a credible, well-established industry that can demonstrate a record of delivering consistently over the past 5 decades, keeping pace with

changes in building regulations and customer needs, all underpinned by STA Assure - a unique and ground breaking quality assurance scheme that is recognised by the NHBC and is valued by key stakeholders from the insurance and finance industries. This scheme 'legitimises' an industry that has demonstrated that it is ahead of other sectors in pushing the quality agenda from factory to site.

Whilst the industry has long faced questions regarding capacity (noted at 52,000 units in 2021) there are clear examples of significant investment being made in adding to manufacturing capability by the sector - from information in the public domain we can point to Donaldson Timber Systems (DTS) which is increasing its output to meet the increasing demand for housing highlighted in the forecast scenario.

INSIGHT

All this points to an industry that is confidently committed to its future, aligning itself with the house building sector to deliver against increasingly exacting regulations and the need to increase the pace of build in the UK.

6. Non-residential market sectors

6.1 Education

Structural timber systems have long played a key role in the delivery of schools, universities and libraries to the extent that the Structural Timber Awards has an education category dedicated to exemplar projects delivered in timber frame, SIPs, CLT and hybrid structures. It is thought that around 23% of all CLT sold in the UK (2020 basis) has been for projects in the education sector, thus demonstrating the importance of this market for this growing system.

Education has for a long time been a significant part of UK construction output, estimated to account for approx. 17% of the industry *[UK Construction OnLine, 30/11/18 53* [53]]. As such it has been the subject to considerable Government investment funding over the past two decades.

In this time there has been the Building Schools for the Future initiative (£55bn plan launched by the Labour government, running from 2003-2010), the 2015 spending review pledged £23bn to deliver 500 Free Schools, in 2017 a further £320mn to help fund 140 Free Schools and latterly the outlook for education has been given a significant boost with the launch of the Government's 10-year school rebuilding programme - on 29 June 2020 the UK Government announced a fund of more than £1 billion to fund the first 50 projects.

So far there are 71 projects that are planned: 50 school rebuilding schemes plus 21 new free schools, comprising a mix of primary, secondary and specials as well as a sixth college in West Yorkshire, with more than 70% of the schools in the North and Midlands.

One of the aims of this fund is to promote greener projects to help meet the Government's net zero target with a focus on MMC that reflects the November 2021 Build Back Greener strategy document *[HM Government, 2021* [54]*]*.

Alongside the environmental benefits of building with timber, as set out in section 2.2, there are a number of studies that have demonstrated the benefits of using timber in educational contexts in order to foster a sense of wellbeing and engender a calm and positive environment for learning in line with the concept of 'Biophilic Design' which aims to improve health and wellbeing in the Built Environment through reconnecting with nature including the use of natural products such as timber *[Terrapin Bright Green, 2014* [55]*]*. The most renowned study is the Schule Ohne Stress, 2010 (School without Stress) which points to timber structures providing a more "stress-free" environment which leads to less aggression from pupils and higher teaching quality *[The Wood Window Alliance, RIBA Better Spaces for Learning Report, May 2016* [56]*]*.

6.2 Care homes and health care

Following the changes proposed in the Building Safety Policy and the height restriction of 11m to buildings that have escape risk issues, structural timber, being defined as combustible, will be required to demonstrate through significant evidence, that the design and application of buildings such as care homes are safe in timber.

53 UK Construction Online article Building into education available **HERE**

54 HM Government (2021) Net Zero Strategy: Build Back Greener [online] available **HERE**

55 Terrapin Bright Green (2014) 14 Patterns of Biophilic Design: improving health and well-being in the built environment, New York NY/Washington DC [online] available **HERE**

56 Wood Window Alliance [online] available **HERE**

6.3 Student accommodation

Timber frame has previously enjoyed great success in the delivery of purpose-built student accommodation (PBSA), which have typically mixed timber frame with volumetric bathroom pods as the preferred method. However, this has changed since the Hackett report and the attitude of key stakeholders, from insurers to clients, who are typically risk averse and lacking in the knowledge of what is involved in the delivery of timber buildings, from design though to manufacture, installation and in-use.

There is a disconnect between the increasing interest from investors who are looking at the future of construction with carbon reduction and government policy, and those institutions that fund and insure such projects and buildings.

As mentioned in section 3.5 above, student numbers continue to rise with 2,751,865 students studying at Higher Education Institutions in the UK in the academic year 2020/21 *[HESA, 2022 [57]]*. This may have implications for the type of accommodation being sought, and more demand for purpose-built student accommodation (PBSA).

Furthermore, to-date PBSA has predominantly focused on first-year undergraduates and to some extent post-graduates, whilst disregarding other academic years, thereby placing pressure on the on-street rental market. However, there is an increasing trend for local authorities to zone areas for student housing in order to prevent areas being 'overrun' with students, and in order to free up accommodation for other renters. For example, Edinburgh Council's City Plan 2030 states that in relation to planning permission: *'The proposal will not result in an excessive concentration of student accommodation … to an extent that would be detrimental to the maintenance of balanced communities or to the established character and residential amenity of the locality'; and 'It is preferable in principle that student needs are met as far as possible in purpose-built and managed schemes rather than the widespread conversion of family…housing. Increasing the amount of purpose-built student accommodation assists the growth of the universities and the attractiveness of the city as a centre for Higher Education' [City of Edinburgh Council, September 2021 [58]].*

With other councils instituting similar policies it seems clear that the demand for PBSA will continue to rise.

INSIGHT

Whilst it may be felt that this is a sector that structural timber is effectively excluded from today, we should not discount that markets and thinking can and do evolve. This is demonstrated by the case of modular builder and developer Tide Construction. They have received full approval for a 48-storey (159m high) student accommodation project in Canary Wharf, London [Housing Today, 05/08/22] the Time for Timber campaign has made a positive start in delivering "facts" to key stake holders in the insurance and finance sectors. This process of education should be accelerated and lobbying with key stakeholders in these sectors and government is a must.

57 Higher Education Statistics Agency (HESA) (2020/21) [online] available **HERE**

58 City of Edinburgh Council (September 2021) Edinburgh City Plan 2030 [online] available **HERE**

7. SWOT analysis

It can be seen therefore, that whilst there are a good number of positives, STA members should also be aware of their position in the market, as highlighted in the following SWOT analysis focusing on timber frame:

STRENGTH	OPPORTUNITY
Credibility: proven technology and volume delivery Technical capability Value-added operations – more done in factory Strong knowledge base within industry/STA Understanding/affinity with market Volume housebuilder have bought into OSM/MMC: • Acquisitions made to secure supply chain • Recognise speed of build • Addresses skills shortage STA Assure programme Green credentials Fabric First	Government strategy and initiatives: • Build Back Greener Strategy paper • Net Carbon Zero agenda • Future Homes Standards • Affordable Homes Programme Changing Building Regulations (Part L 2022/25) Timber in Construction initiative EAC activities: aging with organisation with shared agenda Lobbying: key political stakeholders (e.g. Mayor of Manchester) Fully align with and be seen as a forerunner of MMC in the UK Own the MMC/timber space: be the go-to organisation Widen market sectors scope (education for example) Widen supply chain: unlock supply from Canada, Central Europe, UK Increase M&A activity involving MMC
WEAKNESS	**THREATS**
Low barrier to entry Lack of scale/financial strength Lack profile with key stakeholders (Government) Credibility/profile of organisation/leadership? Viewed as mature (trad) system - not seen as MMC Limited resource to fight PR machine of "trad" rivals Supply chain volatility/vulnerability Capacity - investment in Technical: durability/combustibility Lack of resource to collate/present: environmental/carbon sequestration arguments	Government: lack of follow through, plus lack of joined up thinking/policy Overreliance on housebuilding Competitor PR machine - exploit fire agenda Insurer and lenders perceive risk Market perception impacted Competing systems advancing: • Quality • Market awareness and penetration Lack of investment in capacity Exclusion from key market sectors: care homes/PBSA Mission creep: 18m-11m

Figure 13: SWOT analysis of offsite production and Modern Methods of Construction (MMC)

8. The supply chain - timber

The SWOT analysis of the timber frame sector, above, highlights that the supply chain for timber frame should be given specific consideration with Figure 14 showing contributions to the supply chain from timber frame for 2015-2025.

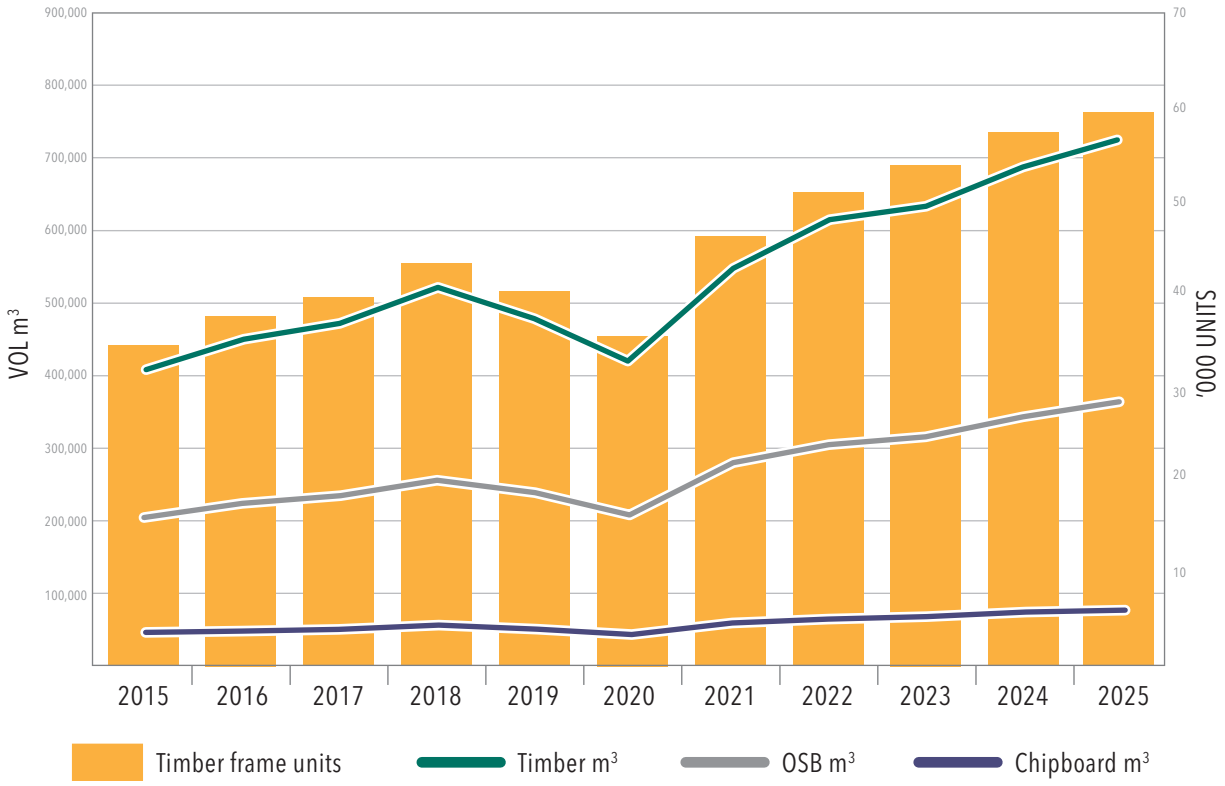

Figure 14: Contributions to supply chain from timber frame 2015-2025

[Data for this table can be found at Appendix 1]

From Figure 14 above it is estimated that the timber frame sector alone will use in the region of 600,000m^3 of softwood and more than 350,000 m^3 of panel products, based on 2022 forecasts. If timber frame is to take, say, 40% market share by 2050 then it would require more than 1million m^3 of softwood and 600,000m^3 of panel products. This raises a number of questions regarding the supply chain as discussed below:

Whilst the UK is virtually self-sufficient in the supply of panel products used in timber frame construction (OSB and particleboard) it is not the same for the structural framing used. The Timber Development UK (TDUK) reports that the UK imported approximately 7.3 million m3 of sawn timber in 2021 *[TDUK timber demand [59]]*; the timber components used by the timber frame sector are included in this volume with material coming principally from Sweden (42%), Finland (14%) and the Baltic states, for example Latvia (16%) [all stats based on 2017 values from Forest Research].

59 TDUK Timber demand and supply in the UK, July 2022 [online] available **HERE**

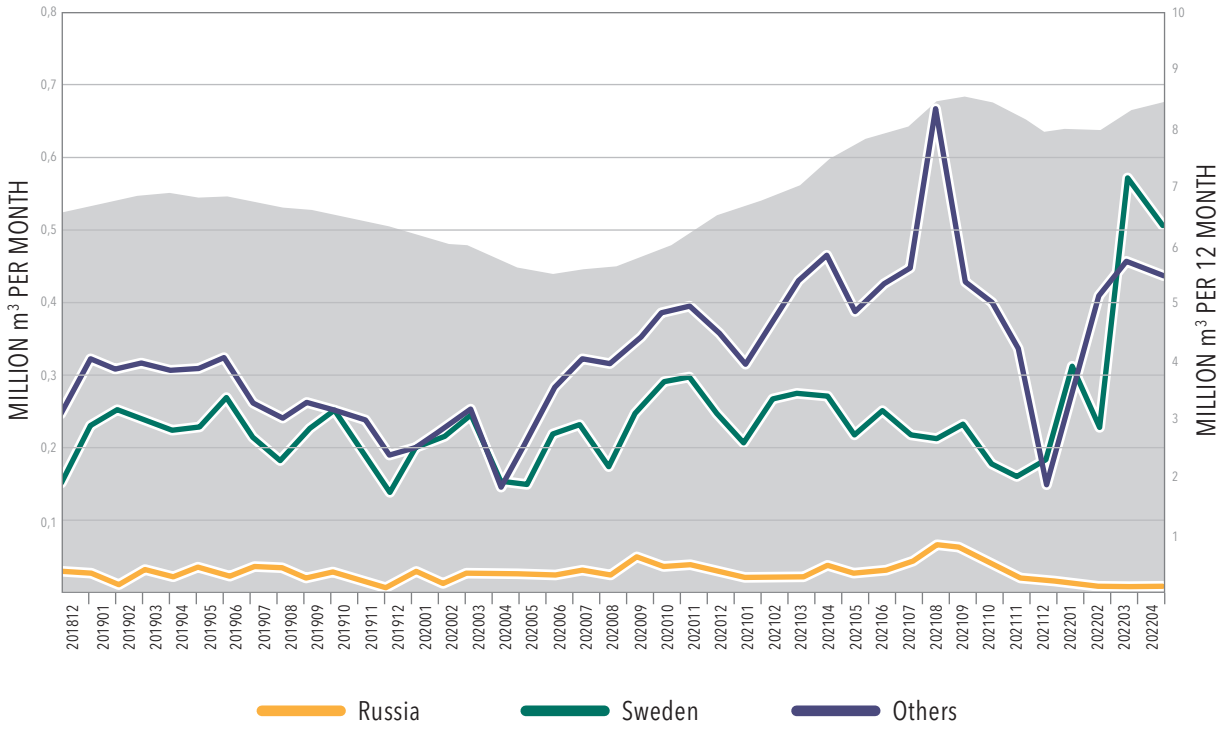

Figure 15: UK softwood imports

[From Swedish Wood, 23 June 2022 [60]]

There has been a global move to embrace the drive towards net zero carbon and there has been an associated re-evaluation of the role that timber has to play in construction. As a consequence, demand has increased and this in turn has put pressure on the global supply of what was once viewed as a low value commodity - we should remember that whilst timber is a renewable material there is not an infinite supply and it is subject to the forces of supply and demand on the world stage.

Without commitment from the supply chain there is the potential for the flow of material to the UK to be threatened, as competition with other markets will be price driven and, at points in the global cycle, others will be prepared to pay a higher rate to secure supply.

In order to present a robust supply proposition to the market in the face of those that may seek to question the integrity of, and ability to deliver, the industry needs to seek assurances from its main supply-chain sources or find alternatives to the norm.

Whilst there is a need to explore alternative European and global supply there is also a case for exploring the ability to use home-grown timber in construction - as highlighted by the COP26 house. This house, constructed in Central Glasgow for the UN Climate Change Conference in November 2021, was specifically designed to use home-grown C16 spruce on a 1.2m grid to enable easy panelisation and prefabrication alongside ease of dismantling at end of life for re-use or recycling *[Beyond Zero Homes, 2021 [61]]*. The COP26 house was also part of a larger discussion about the need for the UK, as one of the largest importers of wood products in the world, to produce/use more home-grown timber, especially in light of the vast amounts of land available and suitable for managed woodlands. This is important if we consider the environmental impact of importing material in relation to the UK Government's strategic drive to increase the use of timber in construction. Accelerated tree planting programmes across the four nations will support the further development of the UK timber and associated industries.

60 Swedish Wood available **HERE**

61 Beyond Zero Homes (2021) COP26 House [online] available **HERE**

Indeed, the Scottish government has a policy to plant 30 million trees per annum for 10 years from 2019; 65% of this is likely to be commercially harvestable species such as Sitka Spruce *[Scottish Government, 5 February 2019 [62]]*. Forestry and Land Scotland *[Forestry and Land Scotland 2022 [63]]* states that the timber industry is vital to the Scottish economy with forestry and timber processing accounting for £285 million of gross value added (GVA) every year; in addition, it provides more than 30,000 jobs across the wood production, forest management, haulage and processing sectors.

"The Sitka Spruced Project" [64] was initiated in 2017 to make advances in the development of native Sitka Spruce to increase quality and its economic value, using new "breeding techniques" (genomic prediction for example) and selecting outstanding rare individuals combining high growth rate with good timber qualities (diameter, straightness and no loss of density). Sitka spruced is a collaboration between the University of Oxford, the University of Edinburgh (Roslin Institute) and Forest Research (an Agency of the Forestry Commission). It is funded by BBSRC and a group of forest and wood processing industries.

At the same there have been advances in kilning and grading technologies used in the UK. Although native timber will not perhaps satisfy all the structural demands of a timber frame structure it may go some way to reducing the reliance on imported material, the significance of the size of which is flagged by the Environmental Audit Committee (EAC).

In its paper, "Building to Net Zero: costing carbon in construction" *[EAC, 11 May 2022 [65]]* the EAC, chaired by Rt Hon Philip Dunn, MP, posed a number of questions to government related to the lack of joined up thinking with regard to achieving its carbon reduction targets; pointing to a lack of "leadership by government and stating that "we must make sure the domestic timber industry is fit for the future and supports our net zero ambitions", and must consider the implications for planting, construction and the environment.

INSIGHT

The increased use of UK produced timber would allow for government policy to become joined up: linking the re-forestation policy to the greater use of timber in construction and supporting the development of jobs in "green industries". STA members are important potential volume users of native structural Sitka spruce and should become more involved in these initiatives: own the space and be in the vanguard of change.

62 Scottish Government (5 February 2019) Scottish Forestry Strategy 2019-2029 [online] available **HERE**

63 Forest Research (2022) Statistics [online] available **HERE**

64 Sitka Spruced Genonics for next generation tree breeding [online] available **HERE**

65 Committees.parliament available **HERE**

9. Summary of key drivers for growth

- Need to modernize for a digital age
- Decline in available and skilled workforce
- Sustainability agenda
- UK Government target of 300,000 new homes per year
- Growing percentage in single family housing
- Government support for increased use of timber in construction
- UK Government ambition to increase market share in MMC (40%- 80% by 2050)
- £12 billion Affordable Housing Programme with provision housing associations must use 25% MMC
- Funded plan to re-build schools
- Bounce back to cities - levelling up/outside London
- Need for age-appropriate housing for an ageing population
- Continued high number of students and lack of dedicated housing for second and third year students
- Speed of construction - practical (make weather-tight) and commercial (enhanced cash/cash cycle)

10. Summary of key risks to growth

- Building regulations - mission creep to restrict where timber can be used (18m>11m)
- Key stakeholder stance to risk (insurers and financiers)
- Housing starts fail to hit UK Government targets (300,000)
- Inflation: how high it goes and how long it lasts
- Availability and cost of materials: the highest materials inflation in the year to February 2022 was in timber-related products and steel related products
- Supply chain
- Availability and cost of labour: EU construction employment dropped by 49% between 2017 and 2021 (64% in London), however since 2021 it has been on an upward trajectory and may return to pre-Brexit/Covid-19 rates in the next two years
- Margins: affected by fixed-price contracts signed over a year ago, insurance, and increased costs being pushed down the supply chain and exacerbated by energy price increases and Ukraine
- Brexit: may cause problems with customs checks on EU imports
- UK Government policy: aided recovery after first Covid-19 lockdown and benefitted housing, new build, RM&I and infrastructure.
- Must be aware that 85% of housebuilding, and therefore of the UK Government's 300,000 homes per annum target, is reliant on housebuilders who are increasingly burdened by costs for example: fire safety issues, issues with legacy buildings, stronger building standards and Future Homes Standard, net zero and decarbonisation - the UK Government's Green Homes Grant was cancelled in 2021 and new schemes - Heat and Buildings Strategy and Future Homes and Building Standards not yet proven effective.
- Is there sufficient capacity in the timber frame sector to meet the potential demand - can the industry scale up?
- Investment in alternative systems (volumetric), approach taken/argumentation presented takes market share aggressively in adjacent sectors

Appendix 1: Data for figures 5, 6, 10 and 14

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
UK housing starts	180	188	197	205	191	160	210	213	213	217	222
% Change		4	5	4	-7	-16	32	1	0	2	2
% Houses	77	74	74	75	78	78	77	77	77	77	77
Units ('000s)	139	139	146	154	149	124	162	164	164	167	171
% Apartments	23	26	26	25	22	22	23	23	23	23	23
Units ('000s)	41	49	51	51	42	35	48	49	49	50	51

Data for Figure 5: UK housing starts 2015-2025 (actual and forecast)

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
UK housing starts	180	188	197	205	191	160	210	213	213	217	222
% Change		4	5	4	-7	-16	32	1	0	2	2
% Houses	77	74	74	75	78	78	77	77	77	77	77
Units ('000s)	139	139	146	154	149	124	162	164	164	167	171
% Apartments	23	26	26	25	22	22	23	23	23	23	23
Units ('000s)	41	49	51	51	42	35	48	49	49	50	51
Trad (masonry, steel, concrete)	146	150	158	162	151	124	164	162	160	152	155
TF house unit ('000s)	25	28	29	32	31	27	37	41	43	46	49
TF apartment units ('000s)	9	10	10	11	9	8	9	10	10	11	11
Total timber frame volume ('000s)	34	38	39	43	40	35	46	51	53	57	60
TF market share %	19	20	20	21	21	2	22	24	25	26	27
TF capacity ('000s units)	Based on assessment of STA members at 80% of market +non-members volume						52	→			??
CAGR UK housing starts 2021-2025 (%)											1.1
CAGR TF developments 2021-2025 (%)											5.5

Data for Figure 6: UK housing starts 2015-2025 and timber frame market share

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Total timber frame volume ('000s)	34	38	39	43	40	35	46	51	53	57	60
Timber frame house units ('000s)	25	28	29	32	31	27	37	41	43	46	49
Timber frame apartment units ('000s)	9	10	10	11	9	8	9	10	10	11	11
Total timber frame market share %	19	20	20	21	21	22	22	24	25	26	27

Data for Figure 10: UK timber frame units by type 2015-2025

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
UK housing starts	180	188	197	205	191	160	210	213	213	217	222
Total timber frame volume	34	38	39	43	40	35	46	51	53	57	60
Timber frame market share %	19	20	20	21	21	22	22	24	25	26	27
Timber total ($12m^3$/unit av.)	411,059	450,185	473,710	517,734	480,342	421,278	555,523	612,085	636,000	683,118	723,579
OSB total ($6m^3$/unit av.)	205,529	225,092	236,855	258,867	240,171	210,639	277,761	306,043	318,000	341,559	361,790
Chipboard total ($1.3m^3$/unit av.)	44,531	48,770	51,319	56,088	52,037	45,638	60,182	66,309	68,900	74,004	78,388

Data for Figure 14: Contributions to supply chain from timber frame 2015-2025

Appendix 2: UK top 20 housebuilders supporting information

The table on P25 of the report has been put together using information from company's annual reports, wider market information, plus discussions with key personnel, to arrive at certain well-considered assumptions, as detailed below:

Barratt

Based on interview with BDW: apartments represent c. 16%) of build; timber frame c. 20% with the purchase of OTF and existing supply-chain relationships this will increase.

Persimmon

8% apartments; assume Space 4 and Scottish suppliers delivering approx 30% of output in timber frame (from information in annual report and wider discussions with supply chain).

Taylor Wimpey

Information from interview with TW re 2019 build: 20% apartments, 25% timber frame (Scotland dominates).

Bellway

Assume 18% apartments; all townhouses (14%) and 15% timber frame.

Redrow

"backing" trad build methods and its Heritage range, assumed max 10% timber frame; 21% apartment build (will change with withdrawal from London market).

Countryside

Three timber frame factories target to deliver 6000 units per annum; 50% of homes with MMC by 2025; apartments 15% - assumption 35% timber frame per reporting year.

Keepmoat Homes

Annual report states 12% timber frame. Assume 15% apartments.

Vistry

Increasing use of MMC/timber frame as part of its sustainability strategy, assumption that currently is 10%; Partnership aspect contributes towards this and number of apartments built.

Bloor

Assume 10% apartments; 15% timber frame.

Berkeley

85% apartments (focus being brownfield, South East/London); annual report states has used MMC (bathroom pods) has its own modular factory will change this.

Miller Homes

Assume 15% apartments; timber frame to increase with acquisition of Walker Timber (assume 20%).

Crest Nicholson

Assume 15% apartments; 15% timber frame.

Cala

Assume 20% apartments; 15% timber frame.

L&Q

Assume 85% apartments (focus on brownfield and SE/London); 25% timber frame.

Lovell

Assume 20% apartments; 13% timber frame.

McCarthy & Stone

Retirement provider, no timber frame.

Avant

Assume 20% apartments; 15 % timber frame - this will grow with recent acquisition of Roof Profiles.

Hill Group

Assume 20% apartments; 15% timber frame.

Gleeson

Assume no apartments, 15% timber frame.

Orbit Homes

Assume 10% apartments; 15% timber frame.

Appendix 3: Social housing

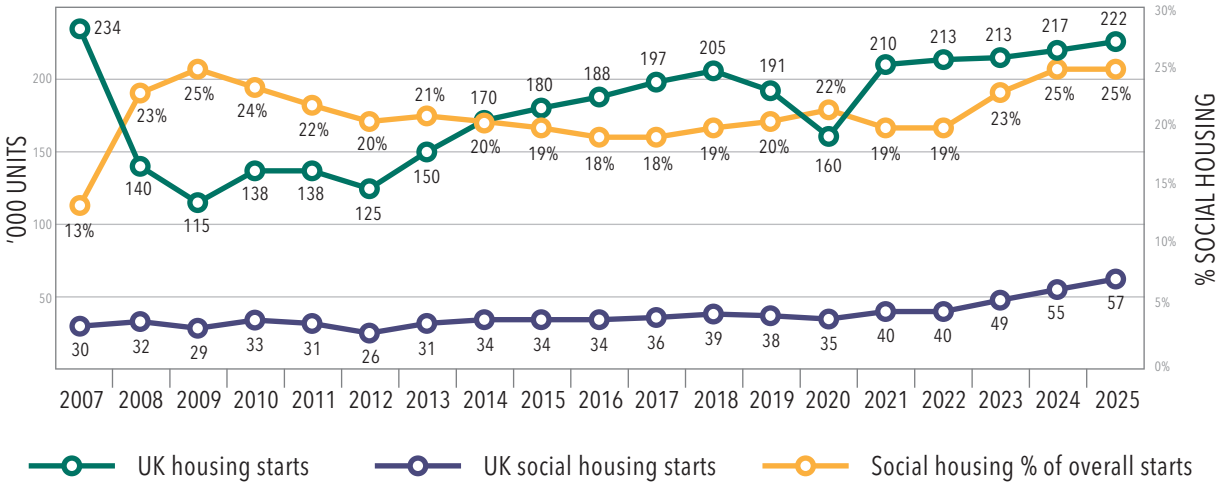

Figure 15: UK overall housing starts vs. social housing volume / % share

Appendix 4: Student accommodation

Timber frame has previously enjoyed great success in the delivery of purpose-built student accommodation (PBSA), typically mixing timber frame with volumetric bathroom pods as the preferred method. However, this has changed since the Hackett report and the attitude of key stakeholders from insurers to clients who are typically risk averse and lacking in the knowledge as to what is involved in the delivery of timber buildings, from design though to manufacture, installation and in-use.

There is a disconnect in the increasing interest from investors who are looking at the future of construction with carbon reduction and government policy to those institutions that fund and insure such projects and buildings.

Student numbers continue to rise with 2,751,865 students studying at Higher Education Institutions in the UK in the academic year 2020/21 *[HESA, 2022 [66]]*. This number can be broken down as follows:

2,008,525 undergraduates

743, 340 postgraduates

1,257,350 in first year of study (774,455 undergraduate, 483,895 postgraduate)

2,146,475 from the UK

152,905 from the EU

452,225 from outside the EU

The number enrolled on first degrees has dropped slightly by 2%-75% in 2019/20 to 73% in 2020/21.

The number enrolled on masters degrees has increased 2% from 25% in 2019/20 to 27% in 2020 mostly due to an increase in non-EU students

If we include students in Further Education institutions the total number of students rises to 2,912,380.

As can be seen, the number of students studying for master's degrees has increased slightly, mostly due to an increase in numbers of non-EU students, and there are now nearly three times as many non-EU students as EU students studying at UK institutions. This may have implications for the type of accommodation being sought, with more demand for purpose-built student accommodation (PBSA).

Furthermore, to-date PBSA has predominantly focused on first-year undergraduates and to some extent post-graduates, whilst disregarding other academic years, thereby placing pressure on the on-street rental market. However, there is an increasing trend for local authorities to zone areas for student housing in order to prevent areas being 'overrun' with students, and in order to free up accommodation for other renters. For example, Edinburgh Council's City Plan 2030 states that in relation to planning permission: *'The proposal will not result in an excessive concentration of student accommodation … to an extent that would be detrimental to the maintenance of balanced communities or to the established character and residential amenity of the locality'*; and 'It is preferable in principle that student needs are met as far as possible in purpose-built and managed schemes rather than the widespread conversion of family … housing. Increasing the amount of purpose-built student accommodation assists the growth of the universities and the attractiveness of the city as a centre for Higher Education' *[City of Edinburgh Council, September 2021 [67]]*.

66 Higher Education Statistics Agency (HESA) (2020/21) [online] available **HERE**

67 City of Edinburgh Council (September 2021) Edinburgh City Plan 2030 [online] available **HERE**

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