Building from England's Woodlands

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Research Funded by: Forestry Commission - Woods into Management (WiM) Forestry Innovation Funds

ISBN: 9781908225160

Funder:

Forestry Commission

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Project Partners:

BE—ST

dRMM

ECOSYSTEMS TECHNOLOGIES

Edinburgh Napier UNIVERSITY

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Foreword

Building from England's Woodlands

England's woodlands are a national asset. They store carbon, support wildlife, and offer recreation and leisure opportunities to millions of people. When managed correctly, they can provide materials for housing and other construction projects that can help tackle the climate emergency. In 2022, the Forestry Commission's Woods into Management Forestry Innovation Fund invested in a project called "Building from England's Woodlands" (BFEW). BFEW brought together knowledge and expertise from Britain's foresters and wood researchers, its manufacturing sector and the construction industry. The project aimed to facilitate the increased adoption of English-grown timber in construction by strengthening the evidence base and confidence in its use.

A collaborative effort spanning Great Britain – the New Model Institute for Technology and Engineering (NMITE) in Hereford, Edinburgh Napier University (ENU), Built Environment-Smarter Transformation (BE-ST) in Glasgow, Ecosystems Technologies in Alness, and dRMM Architects in London – BFEW demonstrated how to unlock the potential of England's forests for greener construction.

The project showed that timber grown in England – including hardwoods such as ash, oak, birch, and beech – can, where appropriately designed and specified, be used safely and efficiently in modern buildings. This evidence will help inform future forestry strategies and support a more sustainable approach to the built environment.

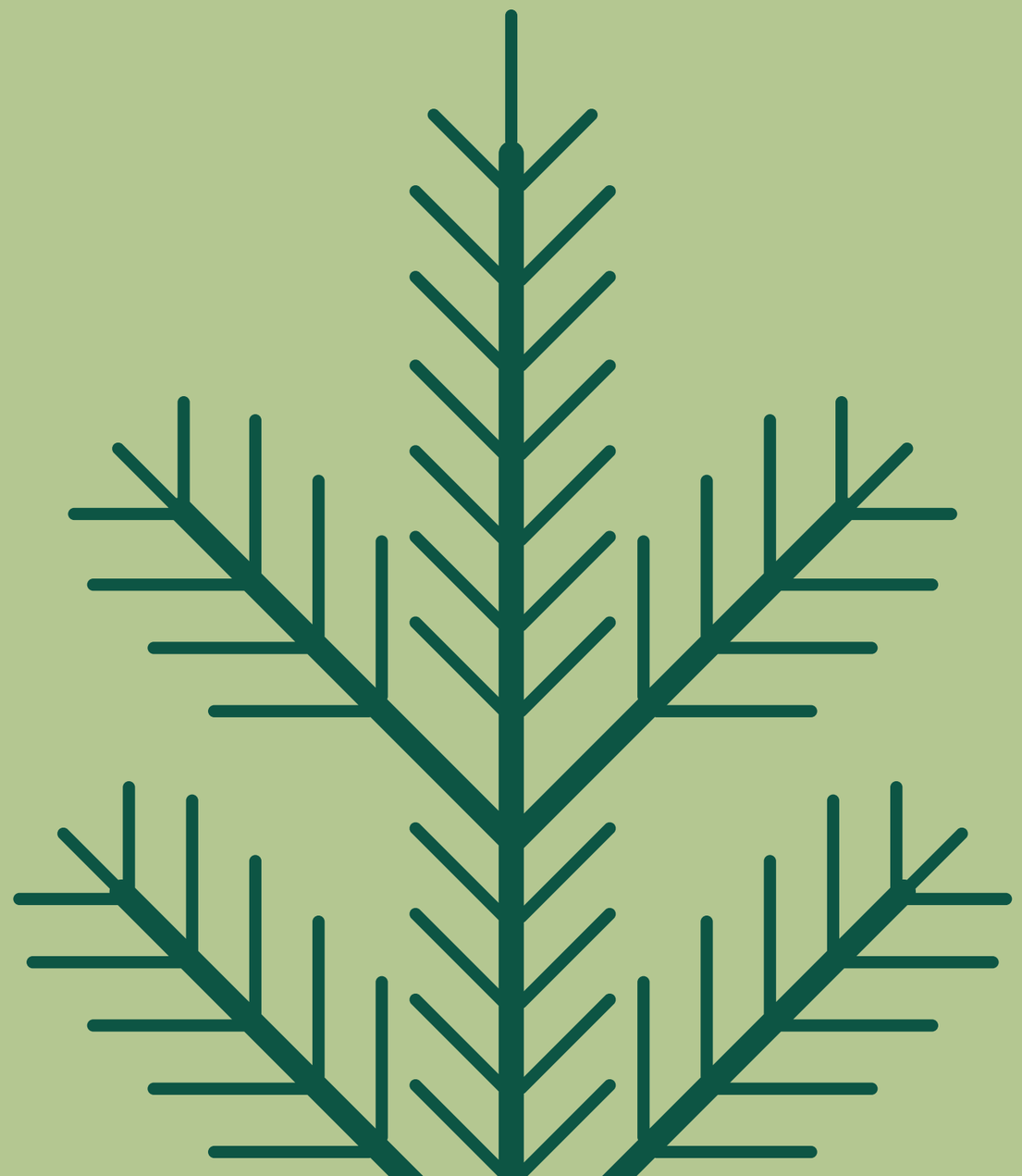
We now understand more about the suitability and viability of engineered and mass timber building components manufactured from English timber, and how they can enable innovative and novel wood-rich products that have the potential for UK construction market commercial viability.

The project culminated in the display "dRMM: Building from Forests" at the Victoria and Albert Museum in South Kensington, which brought the innovations and insights of the research to public attention and showcased the possibilities for design and construction of buildings to be shaped by local, climate resilient, mixed-species forests.

This report summarises the context, research, and implications of the project: pioneering new timber products have the potential to transform local production, reduce reliance on imported materials and carbon-intensive products such as concrete and steel, all while supporting healthier forests. More technical details are available via reports on the "Transforming UK Timber" website.

I encourage readers to explore how evidence from this project can inform the future use of timber from England's woodlands.

David Bole FICFor
Head of Green Economy & Skills
Forestry Commission



Building from Woodlands

Broadleaf trees are vitally important for the ecological and cultural benefits of England's forests, yet they have long been underutilised as a potential source of construction timber[1]. With the combined challenges of climate change, biodiversity collapse, and raw materials shortages, it is increasingly important to consider their potential for the benefit of both people and the forests.

Today, 55% of the world's population lives in urban areas; a proportion that is predicted to increase to 68% by 2050[2]. This will exacerbate current housing crises like the one we are experiencing in the UK and put increased pressure on the broader built environment and local infrastructure such as schools, hospitals, and other facilities. Meanwhile, we also need rapid and sustained reductions in global greenhouse gas emissions if we are to reach agreed targets.

Buildings are responsible for a large share of the UK's carbon emissions. Much of this comes from:

- Building with carbon-intensive products like concrete and steel (the built environment sector in the UK uses more raw material and produces more waste than any other—it's responsible for around 25% of the country's carbon emissions)[3].
- Emissions resulting from importing construction products (the UK is the second largest importer of timber products behind China)[4].
- Using materials inefficiently or wastefully.

Fortunately, timber offers an alternative to carbon intensive materials:

- It can be sourced from sustainably managed and economically vital forests (UK forestry supports 21,000 jobs and adds £0.68 billion gross value to the economy)[5].
- It is a renewable resource and stores carbon (1kg of oven-dried wood contains approximately 0.5kg of carbon, which represents approximately 1.8kg of absorbed carbon dioxide for each kg of construction timber used)[6].
- It can be manufactured and constructed in less wasteful, and more energy-efficient ways (timber modern methods of construction for housing reduces upfront embodied carbon by more than 20% when compared to traditional brick)[7].

So, one major way in which the UK can address the dual challenges of reducing greenhouse gas emissions while constructing or upgrading the built environment is by innovatively using timber. For example, while Scotland already uses timber in around 92% of its new build housing, in England this is closer to 15%[8], so there is room for improvement.

The UK Government has recognised this opportunity, confirming the Timber in Construction Roadmap[9] in 2025. This policy document states:

> "Our vision for timber in construction is clear: a sustainable, integrated industry that meets the needs of the future. Government, industry, and stakeholders must work together, aligning efforts to decarbonise and build efficiently. Hybrid designs, using the best materials, will support sustainability."

The Building from England's Woodlands (BFEW) project directly responds to this vision with innovative ideas backed by research and demonstrated in practice. It represents a strategic convergence of England's sustainable natural capital (woods and forests) with the UK manufacturing sector and construction industry, paving the way for engineered hybrid building components made from English wood to be used in the UK construction market.

Let's trace the story of BFEW, from seed to building.

Figure 1. Westonbirt, The National Arboretum. Photo: Finbar Charleson

Forest Floor to Built Environment

The Innovative Idea

Forest Floor to Built Environment

"We started our thinking with the tree."

Jonas Lencer, dRMM

A sustainable forest is a community of trees that, over time and with responsible management, regrows what is removed from it. For the last several hundred years, forests in the UK have not been managed as sustainably as they could have been, and in many areas, there has been an over-reliance on a small number of plantation-grown conifer species[10].

To address the effects of climate change on the forests, a wider variety of tree species will be needed. This will also support biodiversity threatened by ecological collapse. In turn, these changes will affect the timber we use to build with. Currently, we mostly use timber from a handful of species, but the wood of other species is mostly burned for energy, including 85% of the hardwood harvest[11]. We can't afford to continue doing this[12].

The UK has an active forest industry, covering everything from tree breeding to manufacturing with timber. But we still struggle to meet demand for wood materials. We already import large volumes of timber and timber products. If we increase the amount of timber used in construction, how are we going to have enough wood? And, can we guarantee that the timber we use to build with is grown in sustainable forests?

In the BFEW project, we worked with foresters, manufacturers, and wood specialists, going on a full journey:

1. From forest – understanding what different English broadleaf tree species can do,
2. Through manufacture – turning timber into products suitable for large-scale building,
3. To buildings – testing real components and systems,
4. And beyond – sharing knowledge through education and digital tools.

Our research sought to discover if local timber resources could be put to better use. Can homegrown hardwood products create inspiring buildings for living and working? And in doing so, can this encourage the growth of the biodiverse, resilient multi-species forests that we need? Our hypothesis was that all this was possible, and can benefit our society, the economy, and the environment.

Key Insight

We are not alone in our thinking: At COP28, the global policy framework to 'Push for More Timber in Construction and More Sustainable Forestry' was agreed by the 17-country International Sustainable Forestry Coalition which includes the UK.

Domestically, this aligns with the UK Government commitment to promote timber use in construction as part of the 'Net Zero Strategy', 'England Trees Action Plan', and 'National Wood Strategy for England.' Specific recommendations were issued by the Climate Change Committee and Environmental Audit Committee and are set out in the 'Timber in Construction Roadmap 2025'.

Figure 2. 'Treeptych' by dRMM

Building with timber

What timber products do we need to build with?

When we think about building with timber, the first thing that comes to mind might be the black and white "half-timber" framed structures that were built across the UK beginning nearly a thousand years ago[13]. Today, we need higher performing buildings which can meet modern living requirements and standards for safety and durability, and for these we need more than just planks of wood sawn from trees.

In recent decades, researchers have developed what are known as Engineered Wood Products (EWPs), which are often made by bonding or mechanically fixing timber configurations together to improve strength and reliability. For example, timber can be layered up and formed together as a glued laminated beam with the stronger and stiffer material at the top and bottom to optimise performance. These building materials are strong enough to replace carbon-intensive alternatives such as steel and concrete, and crucially, they are renewable.

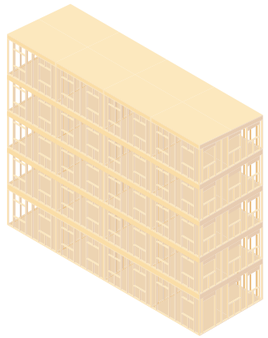
For instance, glued-laminated timber, or glulam, can replace steel and concrete in columns and beams, while crosslaminated timber, or CLT, can replace concrete in floors and walls. These products are already used in the UK.

To create the EWPs used to build structures like these, the wood going into the product needs to be reliable. This means it must have relatively consistent and quantified characteristics from board to board so that designers, architects, and engineers can be confident that what they are building is safe.

Most structural timber used in UK buildings is imported; in fact, the UK imports 68% of the sawn timber it uses[14]. The wood used in construction is usually from softwood tree species such as spruce, fir, and pine due to their propensity to grow fast, tall, and straight[15].

However, 77% of the woodland area in England is made up of hardwood tree species like birch, oak, ash and beech[16]. The BFEW project wanted to investigate if English-grown hardwood timber could be used in the same way as softwoods or in combination with them, for constructing homes and other built environment assets.

To do this, we needed to understand the existing market for hardwood species, the challenges they present for use, and the most promising routes to their adoption.



A1-3 Biogenic Carbon Content

737 $kgCO_2e/m^3$

(UK average)

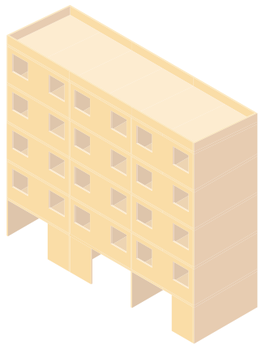
Sawn Timber

A1-3 Biogenic Carbon Content

761 $kgCO_2e/m^3$

(UK/ Imported weighted average)

Glued Laminated Timber



A1-3 Biogenic Carbon Content

762 $kgCO_2e/m^3$

(UK/ Imported weighted average)

Cross Laminated Timber

Figure 3. TDUK 2026 Embodied Carbon Data for Timber Products

A Market Review was undertaken comprising interviews, surveys, and focus groups with three main participant types: forestry professionals, wood product manufacturers, and experts in wood products. The resultant data was analysed to establish key themes and directly inform later product development. Challenges to the adoption of locally grown species in wood products were identified alongside proposed actions to address them:

Challenges	Actions
Disconnected supply chain	Supporting and advocating vertically integrated businesses
Raw material volume / availability	Product diversification
Manufacturing costs	Ongoing research and collaboration between academia and industry
Skills and knowledge gaps	Supporting industry-oriented education
Quality of and access to woodlands	Long-term plan for the use of woodlands

Furthermore, the surveys revealed the following attributes of English hardwoods as positive drivers for adoption:

- Potential for diversion from fuel to long lived products,
- Current underutilisation of species such as alder, ash, beech, birch, sweet chestnut and poplar,
- Structural capability (of certain hardwood timbers),
- Lower embodied carbon,
- Good moisture behaviour (of certain hardwood timbers),
- Fire performance (supported by evidence that certain hardwoods char at a slower rate than softwoods).

When consulted on the suitable applications of English hardwoods, more than half of the research participants expressed their highest level of confidence in mass timber engineered wood products: greater than for any other product or application.

These insights were combined with the existing knowledge and expertise at Edinburgh Napier University to determine key species for further investigation and to identify suitable products for manufacture.

Figure 4. GenZero classroom. Manufactured at BE-ST from homegrown CLT and Glulam. Photo: BE-ST

Figure 5. Maggies Oldham. The world's first hardwood CLT building designed by dRMM. Photo: Alex de Rijke

Key Insights

- English hardwoods are a compelling resource for more efficient building structures.
- Improved management and access are needed to meet short to medium term supply.
- Better supply chain integration and skills development is needed for sustained use in construction.

England's Forest Resource

England's Forest Resource

Forests have long served the political and economic ambitions of nations, and for England this is no different: think of the timber that was once used to build the Navy's ships. In the 20th century, the Forestry Commission was founded to restore woodlands that had been depleted over time: forest cover was only 5% after World War I[17]. Early on, this restoration was done by creating large plantations of fast-growing softwoods. Unfortunately, monoculture can be more vulnerable to climate change, pests, and disease and this approach to forest management is now considered less ideal.

We now know that there is value in biodiversity, and that mixed, well-managed forests provide increased forest resilience and environmental benefits[18]. UK forests remove approximately 18 million tonnes of carbon annually[19], and there is evidence that mixed forest stands could increase carbon sequestration by boosting biological productivity[20].

How much wood is available from England's forests for construction? Today, our harvest consists mostly of softwood[21], although half of the UK's forest area consists of broadleaved trees, with England alone hosting 61% of the nation's broadleaf forest cover[22]. With growing timber demand and decreasing softwood availability from changes in planting, we might harvest and use more hardwood in the future. The UK's Forest Research organisation has forecasted available hardwood volumes across the nation, but its data is based on woodland area in 2012 and only woodlands with recent management activity are considered in their forecast. This means that we may be potentially underestimating the actual volume of wood that is available.

Focusing on availability and considering stocked areas and a forecast projecting hardwood availability over the next fifty years[23], the BFEW project identified the top hardwood species in England and Great Britain. But it's not enough to know what timber is available. We also have to learn much more about what the wood from these trees is like, so we can understand how it can be best used.

Key Insight

Oak dominates in England, followed by ash, birch, sycamore, and beech. However, in Great Britain overall, birch takes precedence over oak, especially in Scotland. Notably, birch, sycamore, and ash are expected to see significant increases in availability, and while ash dieback has had a significant impact in recent years, supply for other species like oak, beech, and sweet chestnut remains relatively stable.

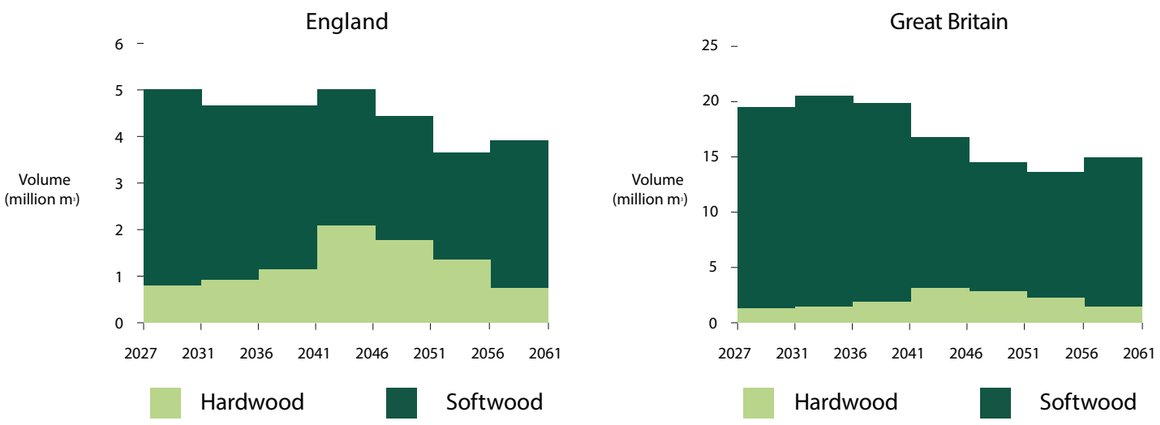


Figure 6. Forecast of timber availability in England vs. Great Britain

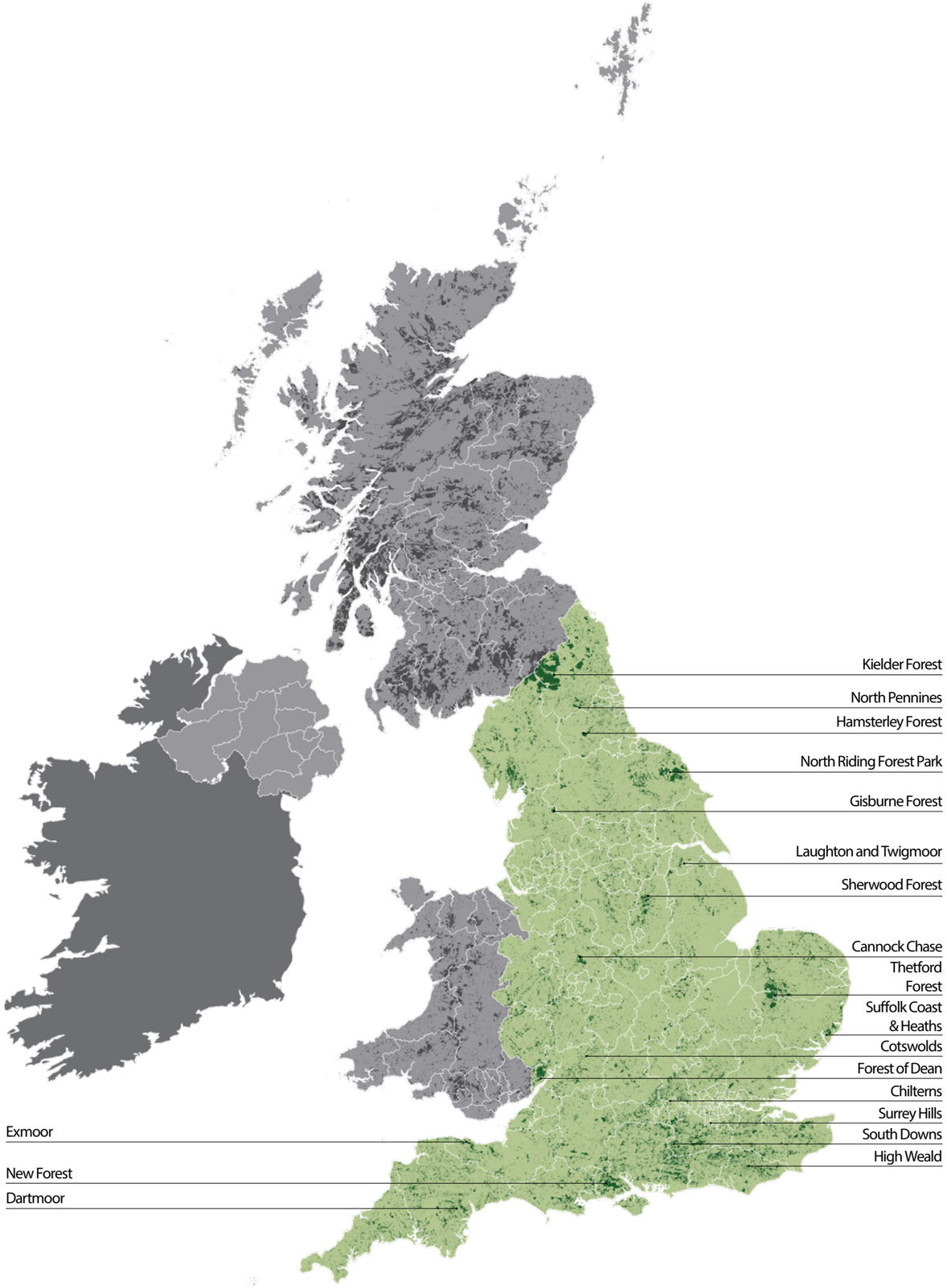


Figure 7. England's Woodlands. National Forest Inventory 2020, Forestry Commission.

Properties of English Timber

The Properties of English Timber

Wood properties are incredibly variable. While there are differences between species, there are also significant variations between trees of the same species. Trees are growing wood for their own purposes and according to their own situation: a young tree grows different wood than an older tree, and a tree growing close to other trees grows different wood from a tree without competitors. A major influencing factor on wood properties is growing conditions, which are ever changing due to changes in forest management and the impact of climate change. For this reason, we need ongoing testing and data to understand how different species could be used for structural purposes. The more information we have, the better. However, information about the properties of many hardwood species growing in our woodlands is currently limited, so we can't have confidence in the potential timber products. Without confidence, the resource is considered of low value and underused. Perhaps for this reason, there is a common (and unfair) stereotype about the strength, suitability, and quality of our homegrown timber: that it is unsuitable for construction.

To counter this lack of information and potential misinformation, BFEW project researchers at Edinburgh Napier University set out to contribute to the growing knowledge of the structural properties of hardwoods. They studied the characteristics of different UK-grown hardwood species sourced from sawmills around the country: oak, ash, beech, sycamore, birch, sweet chestnut, alder, and poplar.

These tests include:

- Bending strength
- Stiffness
- Density
- Compression strength
- Hardness
- Moisture behaviour

Testing was mostly done on "small clear" specimens – a type of testing used for comparing species and giving an initial idea about properties. For developing strength grading assignments which are needed to ensure compliance with structural standards, "full size" testing needs to be done, requiring a lot more time and timber.

During the project, more than 2,000 tests were carried out to build a clearer picture of how these woods perform. While this was a relatively small sample range (representing only between 1 to 10% of what would be required for full characterisation), it did contribute to a better understanding of how they might be used for construction and have value added in the form of engineered and hybrid timber products useful for building.

Besides just testing the hardwood species individually, data sets were compared with softwood species commercially available for construction. This initially suggested that certain hardwood species exhibit properties akin to softwoods and could potentially be used in similar ways. For instance, poplar properties align with UK Sitka spruce, while sweet chestnut, alder, and lime seem to be similar to UK larch. The comparison can give an initial idea about the species' properties and what their wood might be used for, but many full-size tests would be needed to confirm this.

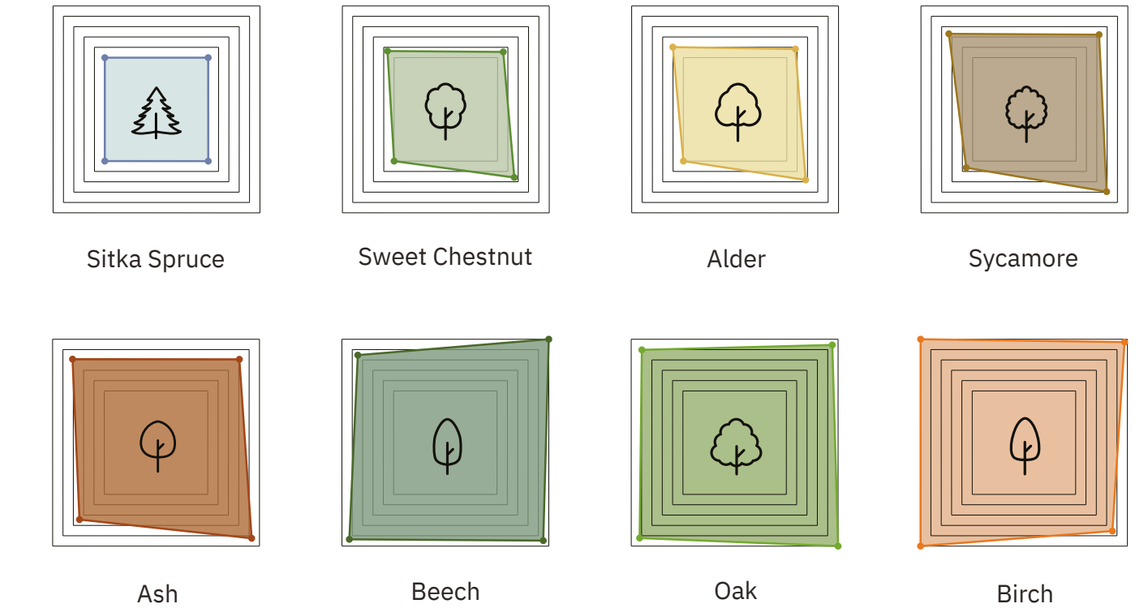
The infographic opposite shows a comparison between the softwood spruce and the seven most prevalent UK hardwood species suitable for construction. For example, on average birch is the strongest, sweet chestnut is the weakest, but all are stronger than spruce.

Key Insights

Overall, the testing showed for the sample range available that:

- Many English hardwoods are stronger and stiffer than the usually used softwood species.
- Their performance is suitable for at least some kinds of structural use.
- Research, even on a relatively small scale, can support engineering design to translate results into real-life examples.

This confirms that English hardwoods are not just suitable for furniture and flooring, but could also be used for scaled up structural roles in buildings, and that with appropriate selection and specification this can complement existing specifications and optimise performance overall.



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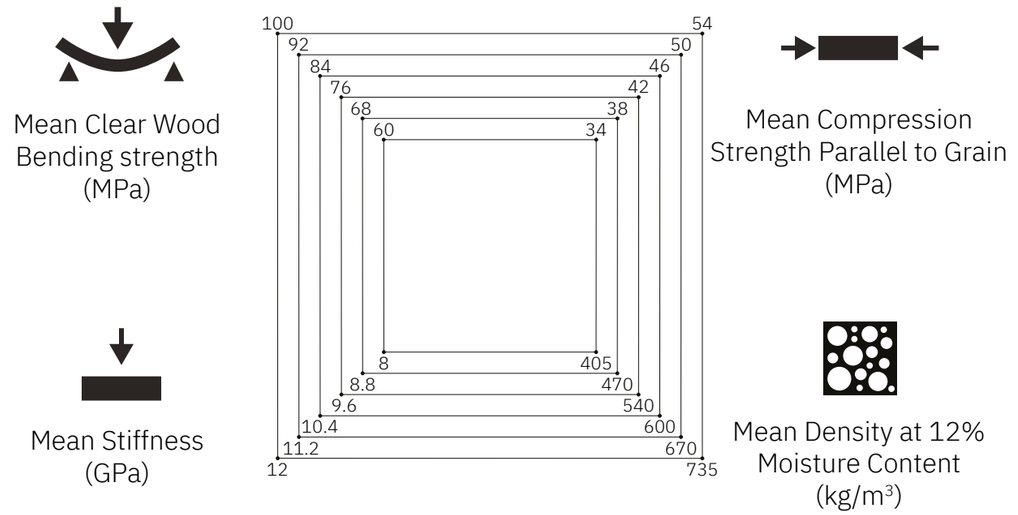

Figure 8. Hardwood mechanical properties

The Possibilities of Hybrid Timber Products

Possibilities of Hybrid Timber Products

Rather than seeking to replace imported softwood with English hardwood, the BFEW project explored how hybrid engineered timber systems can make more effective use of England's diverse woodland resource. The core proposition was simple: by combining species with different structural properties, it is possible to design timber elements that are more material efficient, better matched to available resources, and capable of meeting modern construction demands.

Hybrid engineered wood products (EWPs) deliberately combine softwood with hardwood, placed strategically where stresses are highest. This mirrors the structural logic of placing the right wood in the right place with the ecological benefits of species diversity in the forest, and the project demonstrated how this principle can translate directly into construction systems.

Hybrid EWPs developed through the project purposefully combine:

- UK grown softwood for the core and low stress zones,
- English hardwoods (including ash, beech, birch and sycamore) placed at structural "hot spots" such as the edges (outer lamellas) of a glulam beam in bending or at the corners of a portal frame resisting later loads such as wind i.e. the high moment locations.

This enables designers and engineers to use a diverse range of species which can also offer different aesthetic appearances.

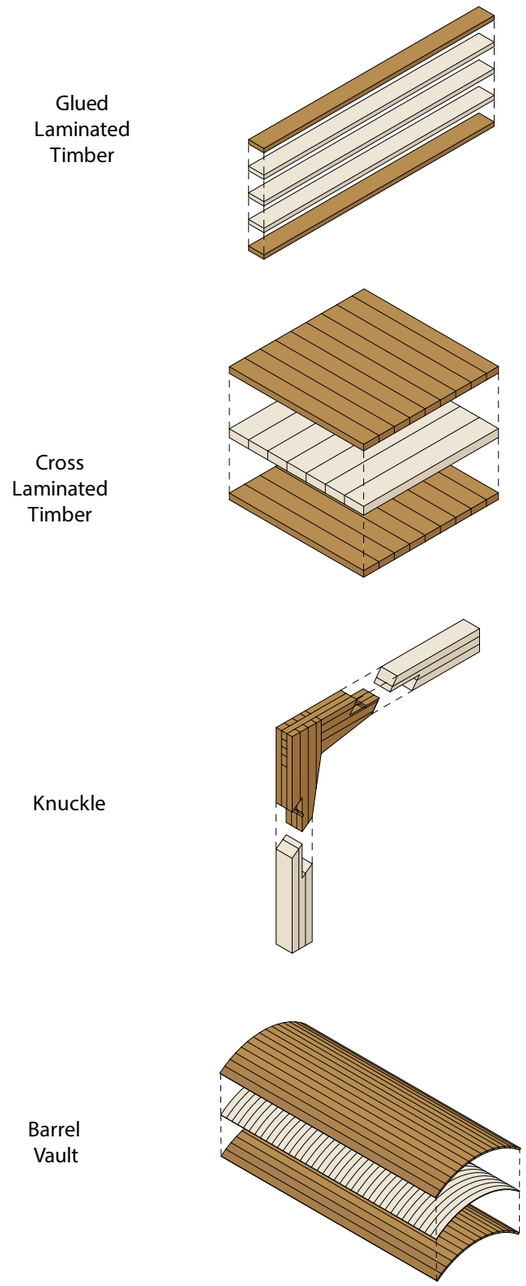

Figure 9. Hybrid products

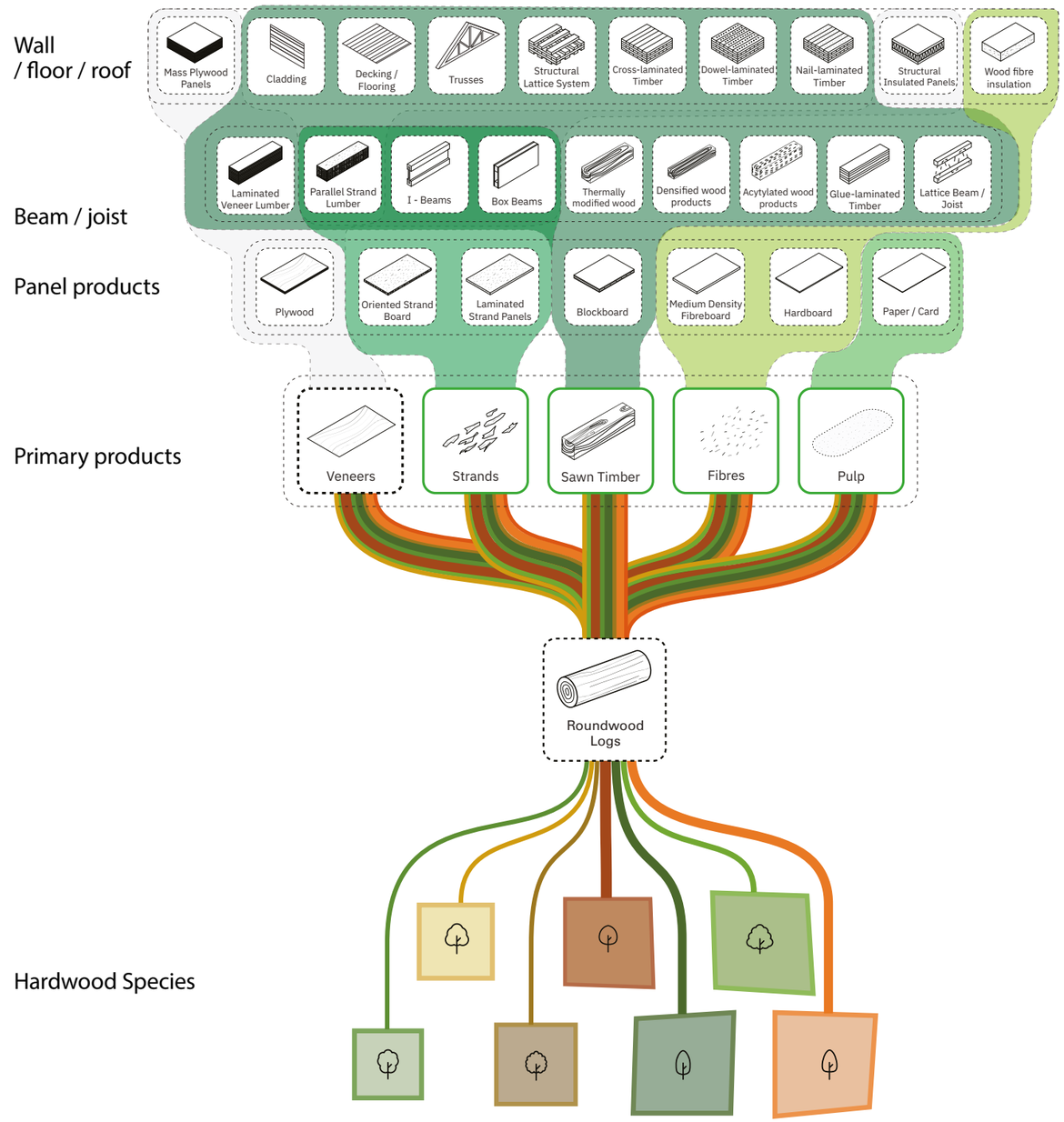

Figure 10. Wood products review

A series of full scale hybrid glulam beams and combined hardwood–softwood CLT panels, as well as prototypes of construction products, were made and tested at BEST's Mass Timber Centre of Excellence and Edinburgh Napier University laboratories. Manufacture followed the requirements of relevant European product standards, with particular attention paid to moisture control, surface preparation, adhesive selection, and pressing regimes tailored to mixed species assemblies.

Across all configurations tested, hybrid glulam beams exceeded requirements for both strength and stiffness, with spruce–ash and spruce–birch combinations performing particularly well. Critically, delamination and bond strength tests met or exceeded the requirements set out in relevant product standards. While significantly more testing would be required for commercial production, this robustly demonstrates that the current manufacturing standards and processes reliably support the production of hybrid EWPs made from English-grown hardwood and softwood.

This testing also showed that introducing hardwood as the outer layers of CLT can reduce the panel's thickness by around 10-15%, while maintaining the required stiffness. Similarly, combining hardwood and softwood in the same way for glulam enabled slimmer beams. The result is a suite of more resource efficient engineered timber products, which also offer potential benefits relating to cost, transport, and architectural designs.

Critically, these technical findings did not remain at the level of samples and tests. They informed the development of new structural components and systems, including:

- GLT Portal frame with hybrid knuckle joint: A hybrid node designed to improve force transfer and connection efficiency, allowing smaller members and longer spans without increasing material use.
- Barrel Vault System: A curved hybrid timber floor and roof concept that optimises bending behaviour and load distribution, offering an alternative to conventional flat slabs.
- Hybrid glulam beam installed in an NMITE building extension: A full scale application of the research, demonstrating how English hardwood can be integrated into a real building project to replace an imported glulam element.

Together, these outcomes show how thinking differently about hybridised timber can take us beyond individual products and towards adaptable systems that respond directly to available forest resources, manufacturing capability, and structural demand.

Key Insights

- Hybrid CLT and glulam combining English hardwood and softwood met all required bond strength and bond-durability criteria.
- Reliable bonding between the species was demonstrated using industry standard adhesives and processes.
- Strategic use of hardwood enables material savings of approximately 10–15% while maintaining structural performance.
- The research directly enabled the development of new timber components and systems, bridging materials science and design innovation.

Figure 11. Hybrid CLT manufacturing. Photo: Wojciech Plowas

Figure 12. Hybrid CLT samples. Photo: Wojciech Plowas

Figure 13. Hybrid glulam samples. Photo: Wojciech Plowas

Figure 14. 'Knuckle' sample. Photo: Wojciech Plowas

Research to Reality

Research to Reality

Building from Forests Demonstrator

The BFEW project did not stop at laboratory testing. It moved into real world manufacturing. To find the best solutions for using new engineered timber systems, we first needed to understand the specific challenges faced in the market for each type of timber construction: lightweight timber frame, post and beam, and panelised mass timber.

After identifying the current problems with engineered timber structures, we could establish an understanding of the market for hardwood-augmented EWPs, design "product families" responding to this likely demand, and design a demonstrator display structure that showcased the use of the hybrid EWPs. This process highlighted the feasibility of the products and piloted the design for manufacture and assembly processes.

The demonstrator concept was not to be a house, but an educational structure that could showcase the attributes of the resource and the varying way it could be used. The display allows people to:

- See different timber products side by side,
- Compare hardwood and softwood solutions,
- Understand how modern timber buildings are assembled.

Think of it as a full-scale sample book for future buildings. The parts are shown in the figure opposite.

The demonstrator was assembled and went on display in November 2025 at the V&A South Kensington in an exhibit called "dRMM: Building from Forests." The display presented the pioneering products that emerged from the three years of BFEW research, showcasing the potential of this underused hardwood resource.

Ultimately, the BFEW project's demonstrator introduced the idea of a "Mixed Forest Frame" – a building system designed to:

- Reflect the diversity of English forests
- Use each species where it performs best
- Support engineered timber and offsite manufacturing

This systems approach is essential for modern construction where speed, quality, and sustainability drive the agenda. Moreover, this approach is essential for climate resilience by ensuring we maximise the use potential of the resources available and have the capability to evolve the system if needed.

Demonstrator Components

1. Oak Knuckles
2. Hybrid oak and Douglas fir glulam beams
3. Cross laminated barrel vault
4. Mixed hardwood hybrid CLT wall
5. Douglas fir columns
6. Species sample display
7. EWP sample display
8. Mixed hardwood hybrid CLT floor
9. Softwood joists
10. Information boards
11. Existing museum plinth

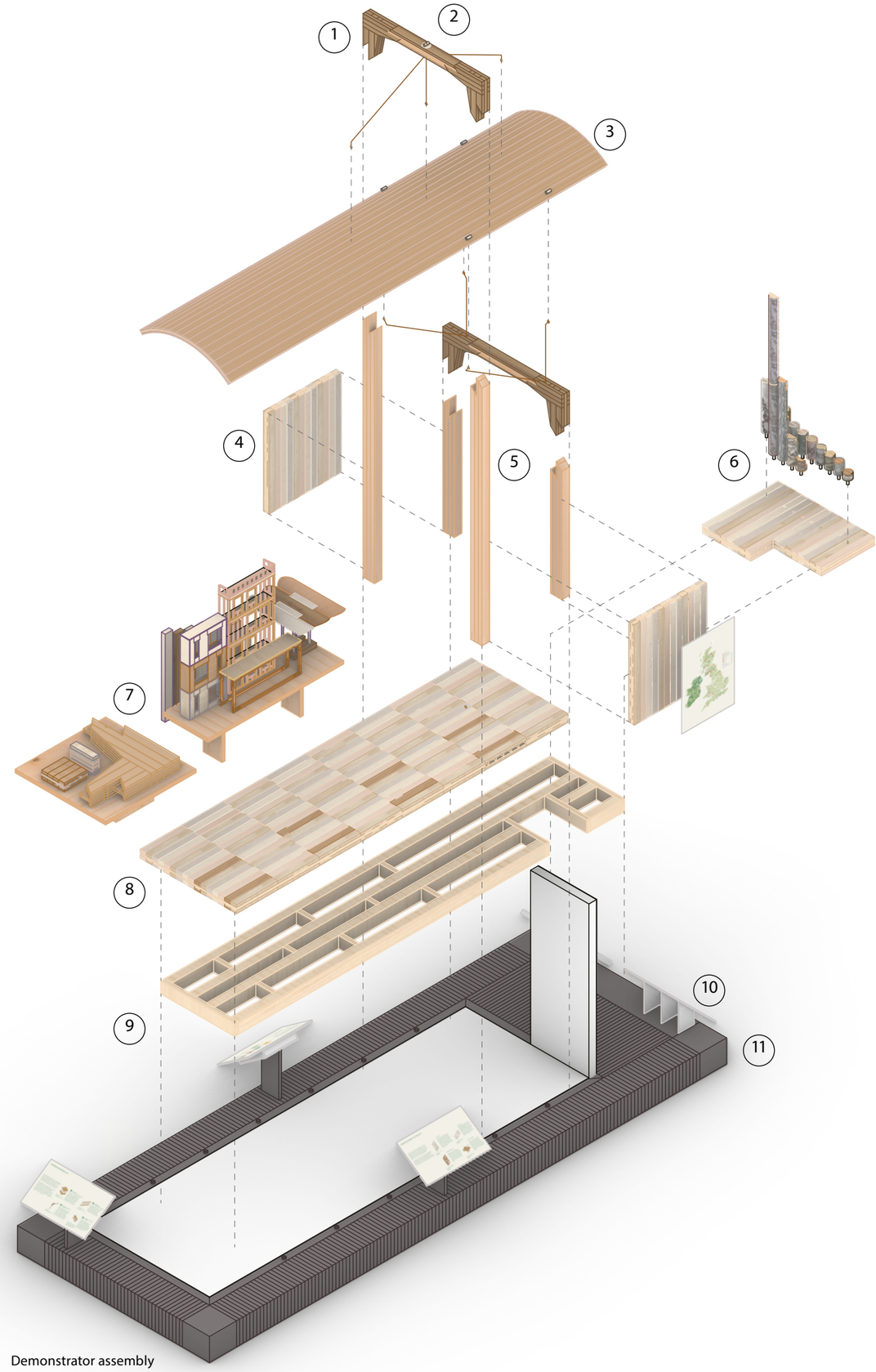

Figure 15. Demonstrator assembly

Figure 16. Building from Forests display. Photo: Alex de Rijke

NMITE Skills Hub

There is a long story behind a single structural element in the newly built Skills Hub at the New Model Institute for Technology & Engineering (NMITE) in Hereford. The onsite build was an opportunity to showcase that structural timber can be homegrown.

NMITE's Centre for Advanced Timber Technology (CATT) is active in developing the supply chain and skills for a stronger structural timber sector in the UK. Together with architects Arbor and contractors Giraffe Engineering, we replaced a planned imported timber beam with our UK hybrid glulam beam combining softwood and hardwood. The spruce and ash used was harvested, processed and installed - all within the UK. This small step reflects our values and our teaching mission. It is also an excellent way to surface the barriers against installing structural timber in the UK, so we can start to make the system work better.

What happened when we swapped imported timber for homegrown: Bespoke Testing

Full-scale bending and glue-line shear tests were required to demonstrate adequate performance. Structural timber still needs proper engineering design and verification, even in the smallest applications, so deviating from the specified glulam beam required additional documentation.

Why this matters beyond NMITE

Our challenges were not unique, and they show that there is more to be done to make homegrown structural timber a realistic option.

To get such innovative products used requires an effort throughout the supply chain. Often the methods of manufacture are geographically fragmented and thus more resource intensive. To demonstrate the correct levels of quality assurance, more rigour and on occasion bespoke testing is needed. All of this can make innovation cost prohibitive. However, showcasing examples of use is critical to overcoming the barriers to uptake, allowing products to be commercialised and ideally scaled up to a point where they can be competitive.

The Skills Hub beam is evidence that innovation in construction is rarely a leap forward. More often, it is incremental, negotiated, and contested, with the intricacies figured out one beam at a time.

Key Insights

- The BFEW project moved beyond research into real-world manufacture, demonstration, and public engagement, validating hybrid hardwood systems in practice.
- The V&A installation overcame resourcing, coordination and logistical challenges to demonstrate how English hardwood can be integrated into modern engineered timber systems.
- The NMITE Skills Hub pilot demonstrated that imported timber can be replaced with a UK-grown hybrid glulam beam, proving that this approach is technically feasible and deliverable within a live construction project.
- Each demonstrator evidenced a route through the fundamental challenges with construction product innovation. These include aligning the supply chain, securing the resources, working across fragmented infrastructure (manufacturing, post-processing, testing etc.), demonstrating technical compatibility and securing client buy-in of a non-standard and non-technically approved product.
- By addressing these challenges, the project demonstrated routes to viable markets on the wider journey to commercialisation.
- Wider adoption of English hardwoods in construction will require joined-up efforts across design, manufacture, assembly and regulation to move from pilot to scalable solutions.

Figure 17. NMITE Skills Hub under construction - incorporating hybrid glulam beam combining softwood and hardwood. Photo: Michelle Gartside at Arbor Architects.

Sharing the Benefits

Sharing the Benefits

As the real-life examples show, a priority of the BFEW project was to share knowledge, not keep it behind academic walls. This is because there is a need to educate the entire timber construction supply chain, from foresters to sawmillers to designers and architects, and more broadly the construction professions, including the tradespeople who are critical to construction delivery. Of course, the built environment is pointless without considering the people who will eventually use the buildings, so it is imperative that society as a whole gains an understanding of the amazing potential for not only greener construction using homegrown timber, but also the wider social and economic benefits through jobs and wealth creation that can be derived from forests and woodlands.

During the project we:

- Delivered Continual Professional Development (CPD) courses.
- Gave public talks and held events around the research undertaken.
- Developed technical specification content and materials for professionals to reference.

These resources can help designers, engineers, and clients understand what English-grown timber can offer and therefore provide the confidence for them to specify their use. This is important because we want to ensure our products solve real user needs before scaling. Exhibiting our work publicly was even more important because we wanted to engage with communities who may not be aware of the potential of England's woodlands.

All the work to date emphasises what we've learned about the benefits of building from England's woodlands, which is that it supports people, planet, and shared prosperity.

Benefits for Forestry

The findings from the project are not just about buildings. They also matter for forestry and land management. Bringing woods into management is important because it benefits biodiversity, forest health, and timber production. By identifying valuable construction uses for a wider range of species, we can:

- Support more diverse woodland planting,
- Increase long term value of forests,
- Reduce risk from pests and disease,
- Be more resilient in the face of climate change.

In short: better buildings can support better forests.

Benefits for the Environment

Using more English timber can:

- Reduce carbon emissions,
- Store carbon in buildings for decades,
- Cut transport distances,
- Reduce reliance on imports and enhance UK timber security.

This aligns directly with the UK's Net Zero goals and wider climate commitments. In fact, if we can accelerate the use of English biogenic construction products over the next five years, it would result in much more CO_2 being stored per year in the built environment, rather than being emitted into the atmosphere.

Benefits for the Economy

With rising demand for timber expected globally, the UK needs a sustainable, species-diverse supply of its own to ride out the increasing volatility of international wood markets and reduce our current over-reliance. This reveals the potential to transform the construction industry in England and use more local resource for the delivery of construction and the built environment.

The project highlights market opportunities for:

- UK timber processors,
- Manufacturers of engineered wood products,
- Offsite manufacturing businesses,
- Rural and regional economies.

By promoting localised manufacturing facilities and improving engagement and collaboration across supply chains, we can strengthen the UK economy. By keeping more of the value chain within the UK, timber construction can support jobs and skills.

Benefits for People and Communities

The UK needs to build more housing, schools, hospitals, community spaces, commercial facilities, and must also upgrade and refurbish its existing built environment. Ideally, this should be done through regenerative approaches such as with local timber products. We can't succeed in this without collaboration, and we need input from people across all sectors including industry, academia, government, and civic organisations. This can engage local people, resources, and companies to create a sense of ownership, belonging, and pride in our places.

Key Insights

The Building from England's Woodlands project was about more than timber. It was about:

- Rethinking how we build
- Valuing and maximising local resources
- Driving circularity and sustainability
- Connecting forests, industry and people

Our material testing covered species like sycamore, alder, birch, sweet chestnut, beech, ash, poplar, and oak, creating valuable data that can contribute to future grading and product development.

We manufactured a suite of engineered products that was developed to optimise the use of diverse hardwood resources. The research demonstrated that hybrid systems offer significant advantages by combining species for specific performance attributes.

The demonstration projects helped engage the supply chain and proved the practical viability of these solutions, while outreach efforts targeted diverse audiences to share knowledge, build understanding, and ensure lasting impact.

Overall, we found that English timber has the potential to play a bigger role in construction. Hardwoods are a valuable, under used resource. Mixing species leads to smarter, more efficient buildings. Education and confidence are just as important as testing.

With the right knowledge, investment, and ambition, England's woodlands can help shape a lower carbon, more resilient built environment for generations to come. We've found that this is an achievable goal: research and innovation point the way forward. Education and dissemination ensure change is actionable and understood by those that are impacted the most in the context of people, place, and planet.

This project shows that change is not only possible – it is already happening. It represents a significant step towards a more sustainable future for England's built environment and forests.

What's Next?

Timber properties change if the forest changes, meaning wood properties 100 years ago are not the same as they are now. They will not be the same even 50 years from now and the pace of change is accelerating with forest diversification and climate change. We need continuous investment in research, whether that comes from private finance or more public sector grants, to scale these initial projects up and explore new ones. Fundamentally, for the betterment of nature and society, we must make things mainstream and standard practice. We must also take this information and share knowledge with the right audiences, be that policy makers, investors, or future generations that we want to engage with who are seeking this field as a career.

The project has laid strong foundations, but more work is needed:

- Understanding the impact of forestry practices on timber properties and yields,
- Conducting on-going measurements and testing to maximise utilisation and enhance formal standards,
- Planning responsible commercialisation that can manufacture on a scale to meet demand,
- Bringing products to market that have buildability, longevity and durability,
- Continuing education, training and awareness across all communities of people and practice,
- Ensure we understand the forest resource, the impact of climate and how to maximise its value return,
- Work collaboratively to pool and share our knowledge and infrastructure to demonstrate the art of the possible,
- Showcase this to the public at large to change perceptions and integrate new knowledge into educational curriculum at all levels.

If you would like to help us in this important work, you can:

- Engage with us on our collaborative work to date; we would like to build momentum towards a timber innovation cluster in the UK.
- Support and enable future research and outreach by contributing resource that can make this valuable work continue to happen at the scale required.
- Learn more and be a part of changing how we deliver and upgrade the built environment in way that supports our natural environment.
- Visit the 'Transforming UK Timber' website to learn more.

Figure 18. Building from Forests display. Photo: Thomas Adank

List of Figures

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