



Research initiatives around low carbon mass timber

Construct Innovate

Ireland's National Research Centre for Construction Technology and Innovation

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Why do we care about Mass Engineered Timber (MET)?

Mass timber is chosen over concrete or steel for several key reasons:

1. **Lower Embodied Carbon**
2. **Project Delivery: Off-Site Manufacturing benefits (DfMA) and fast on-site delivery of lightweight structure**
3. **Aesthetic & Biophilic Benefits**
4. **Sustainability & Local Supply Chains (Homegrown Timber)**



Credit: D/RES. Newtown Mount Kennedy Community Centre

Why do we care about Mass Eng Timber (MET)?

.....its ability to serve as a sustainable, low carbon, strong, and fast-to-assemble alternative to concrete and steel.

Primary Driver for change:

National and European targets, plans and legislation
NDP, CAP, EPBD, RIAI 2030, NZEB (ZEB)

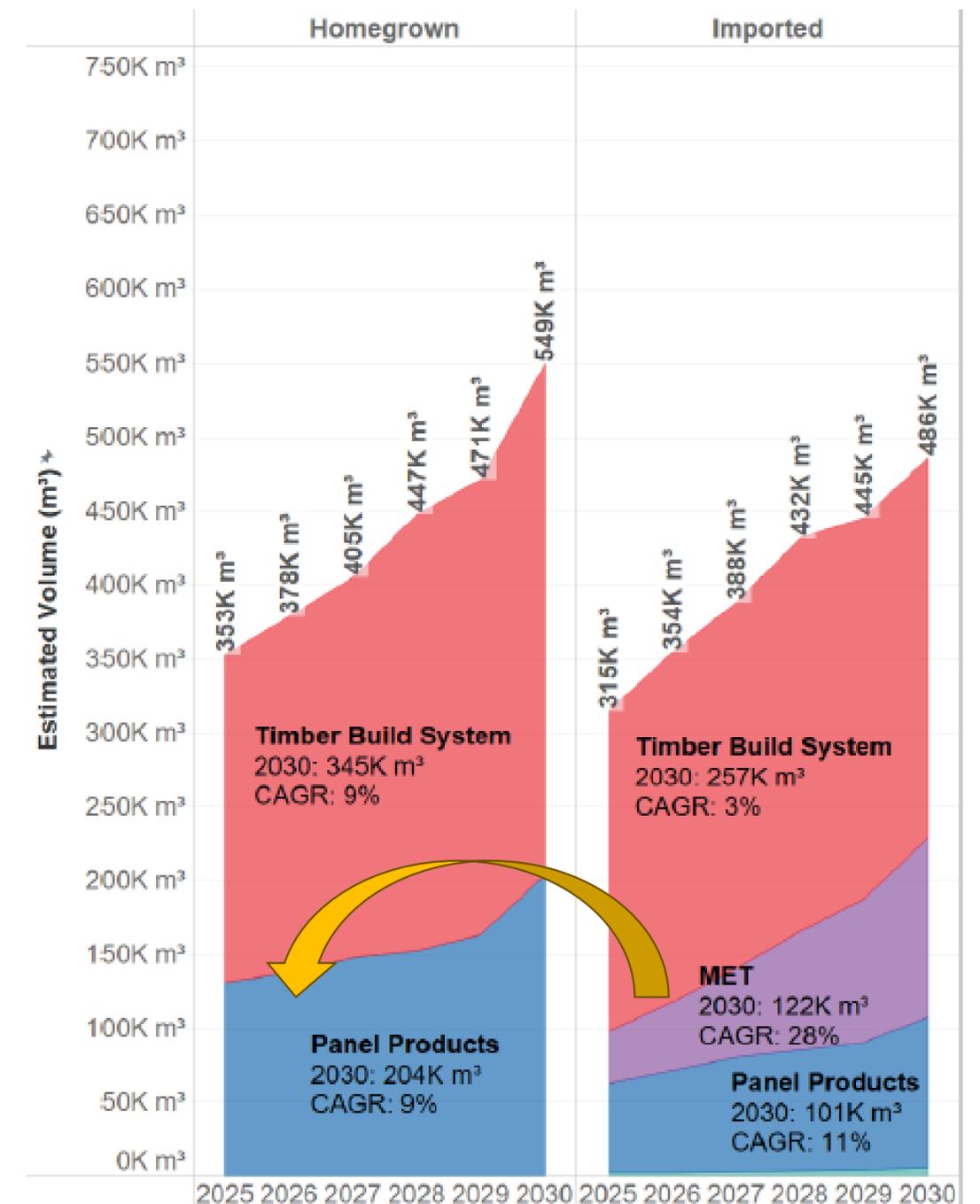
MET Emerging Market and Commercial Opportunities:

Significant opportunities to increase the use of MET and maximise the use of home grown timber in construction:

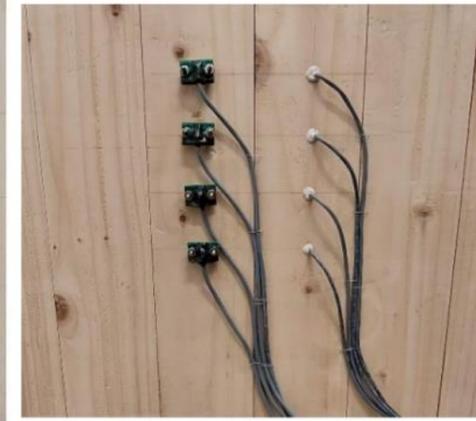
- Increase the market size
- Develop the commercial viability for domestic manufacturing



Estimated volume (new build and RMI) of timber used for construction by origin (homegrown and imported), based on scenario 1.



**Supporting MET
projects:
“in an Irish context”**



MET Collaboration Partners

Partners: D/RES Properties & University of Galway:

- Mass Timber Demonstrator
- Mass Timber Living Lab



Partners: SISK, Coillte, Glenfort & University of Galway

- CLT demonstrator structure using Irish homegrown timber



OLLSCOIL NA
GAILLIMHE
UNIVERSITY
OF GALWAY

TERG
Timber Engineering Research Group

Partners: G-Frame Structure & ATU

- Structural health monitoring of mass timber for the Irish Climate



Partners: G-frame Structures & UCD

- Timberflow: Design workflow efficiency for mass timber



Ollscoil
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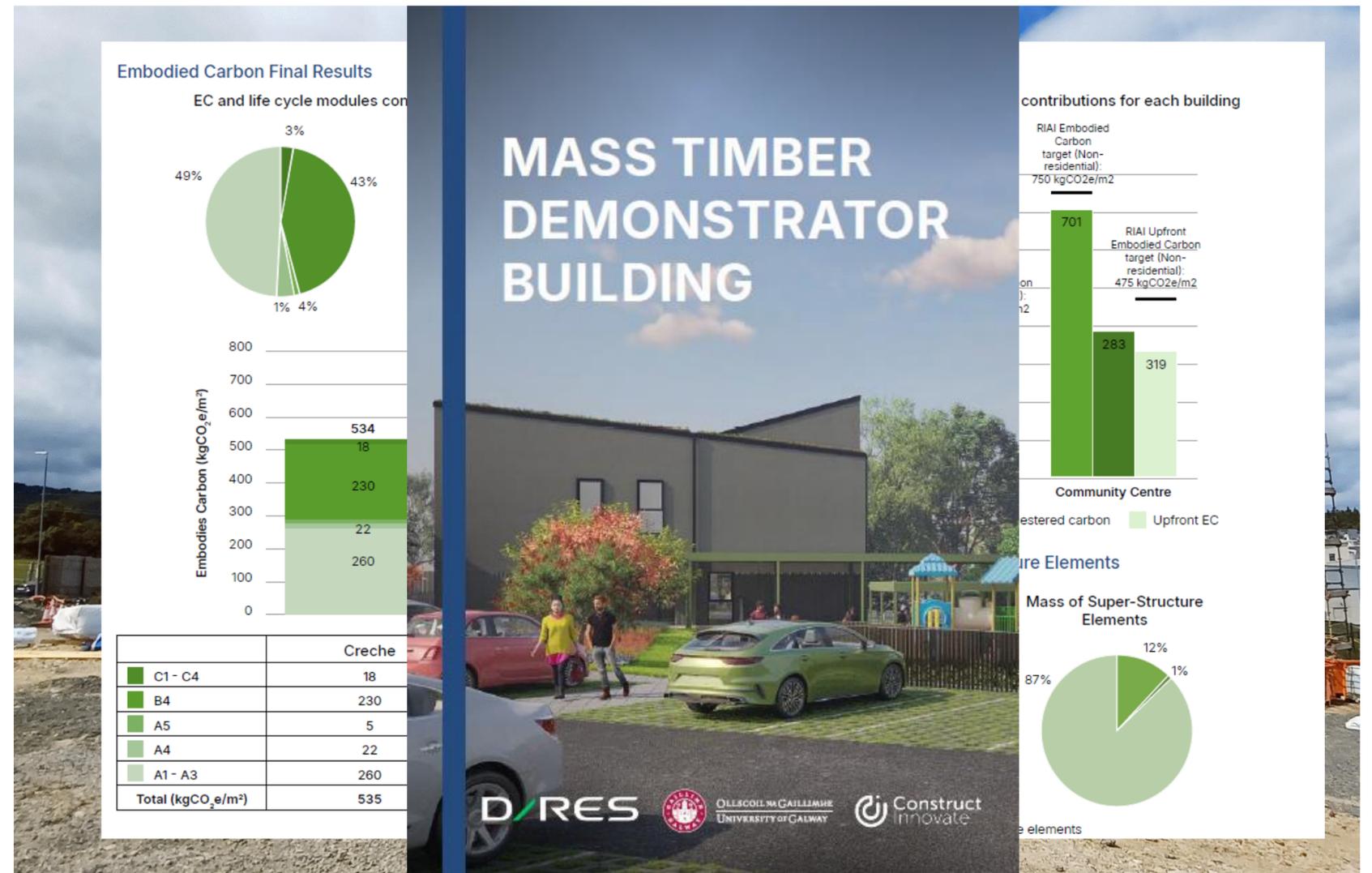
Partners: Coillte & University of Galway:

- Woodspec
- Homegrown timber pilot



MET Demonstrator and Living Lab

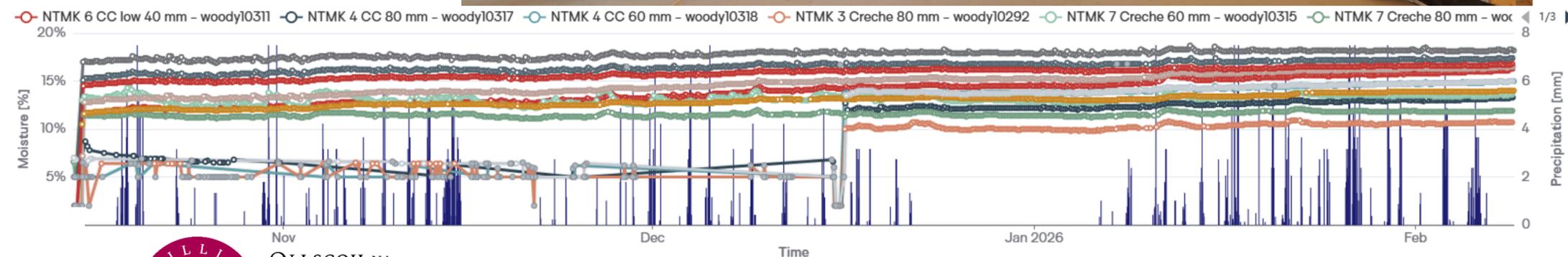
- Crèche (600 m²) & Community Centre (400 m²), Newtown Mount Kennedy, Co. Wicklow by D/RES.
- Buildings demonstrate MET in an Irish context, using CLT, glulam as well as wood fibre insulation and incorporating a green roof.
- Off-site Design for Manufacturing and Assembly (DfMA) construction methodology (+ JIT principles) and standardised design detailing for fixings and connections compliant with B.Regis
- Embodied carbon assessment carried out – meets RIAI 2030 targets



MET Demonstrator and Living Lab

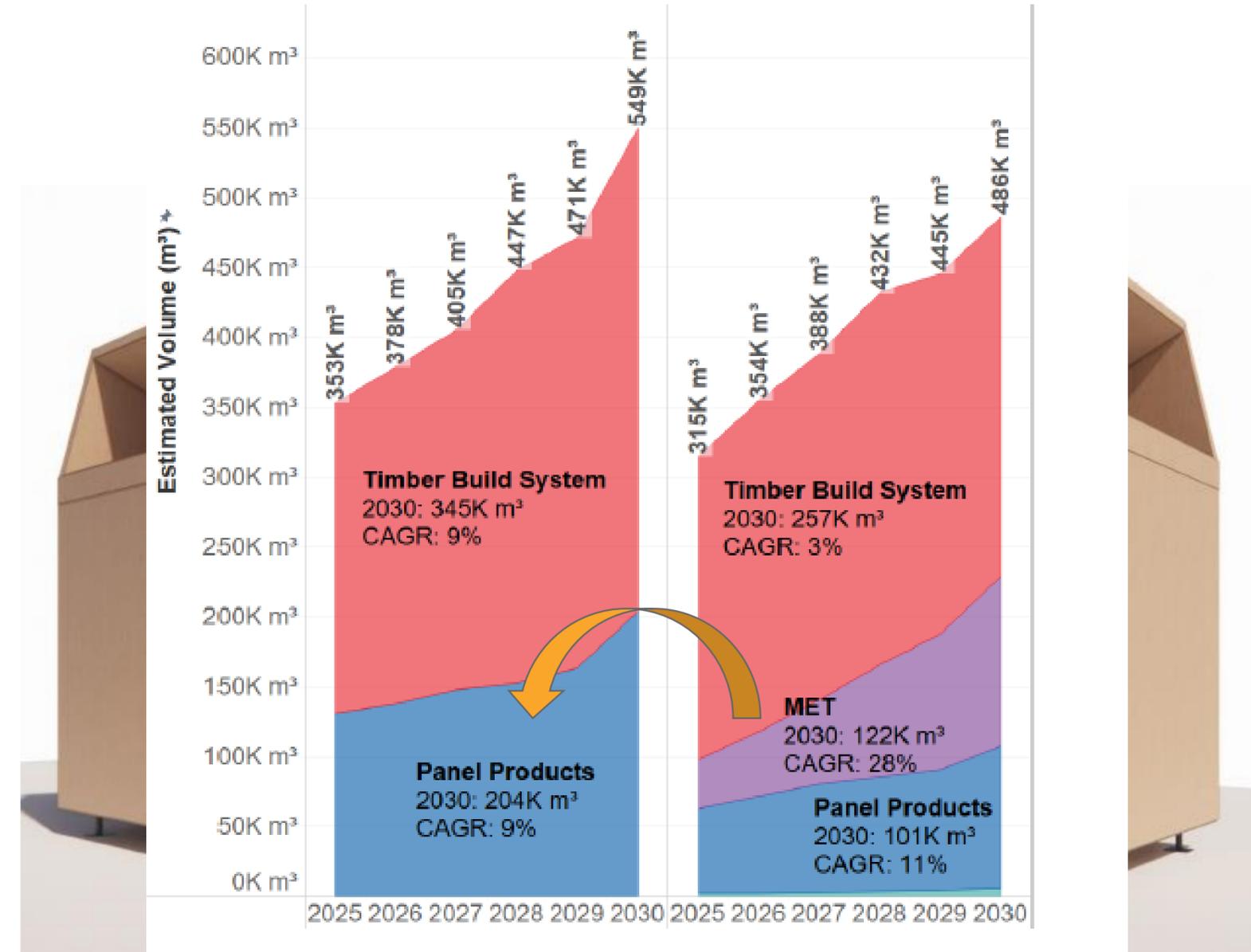
Need for research into long term performance of mass timber buildings through measurement and monitoring.

- **IEQ:** CO2 levels, temperature, humidity, thermal comfort, and user satisfaction.
- **Operational effectiveness:** energy demand and consumption
- **Structural material performance:** Monitoring parameters such as timber moisture content, strains and/or deformations using sensors embedded in the structure.



Irish CLT Demonstrator

- Designing and manufacturing Ireland's first full-scale Cross-Laminated Timber (CLT) demonstrator structure using Irish-grown C16 Sitka spruce
- Demonstrate a scalable, low-carbon timber alternative to traditional construction methods, using local resources from Irish forests in place of imported timber.
- Addressing design, fabrication and supply chain challenges to support wider industry adoption and considers carbon footprint associated with using local material

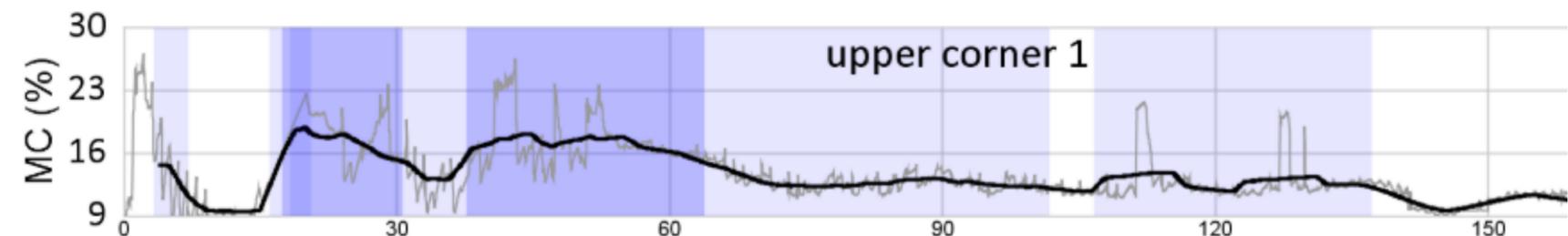
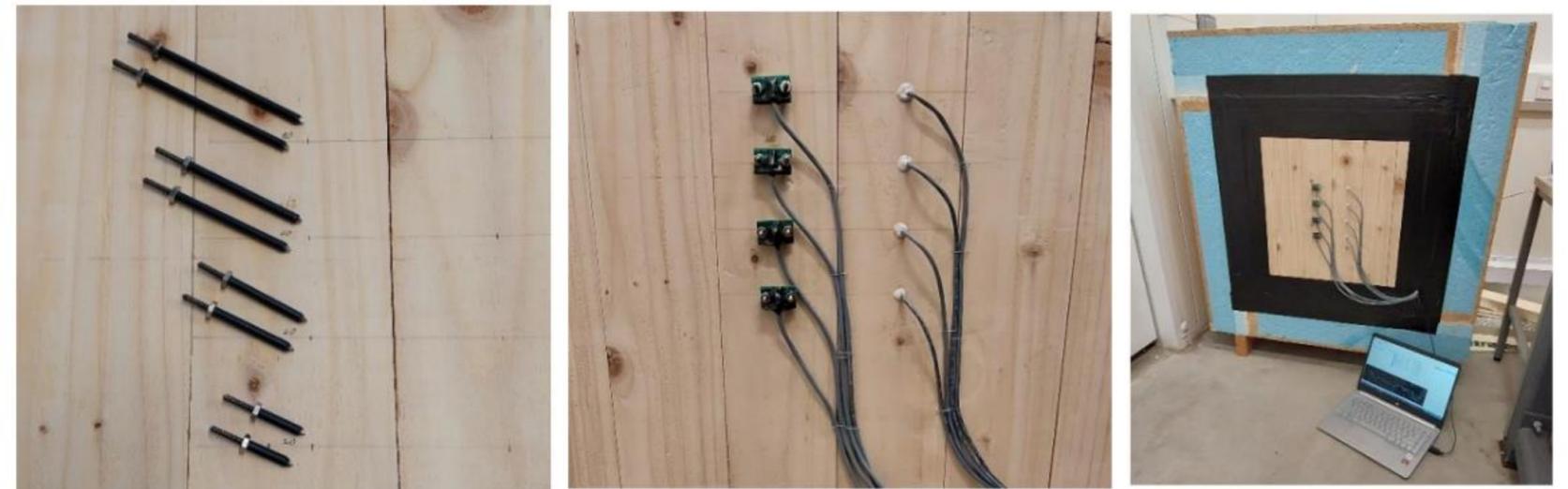
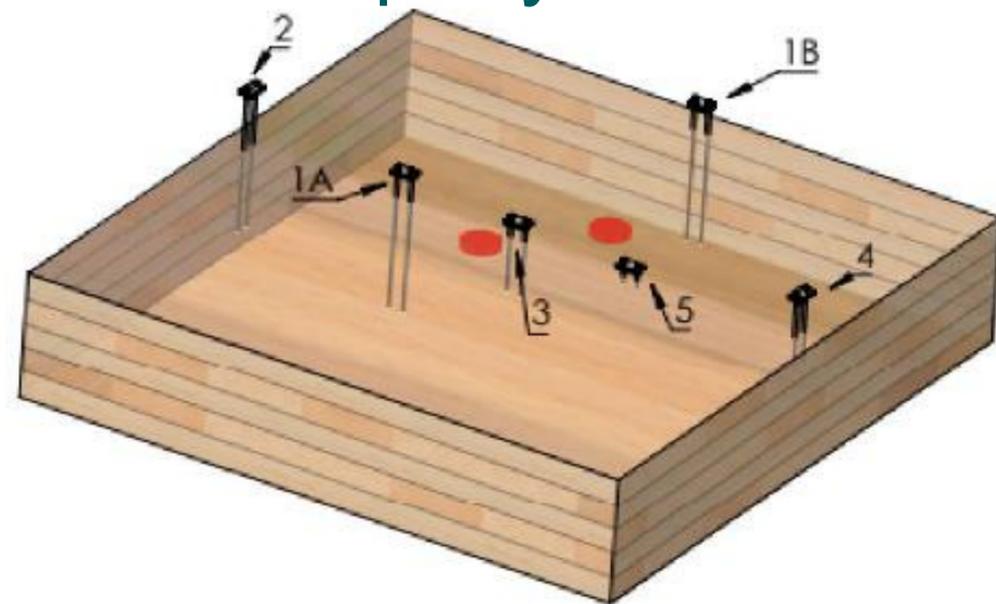


Prelim design



Structural Health Monitoring

- Monitoring **Mass Timber** construction in an Irish Climate
- CLT and Glulam elements instrumented
 - Moisture content (MC) probes at various depths
 - MC profile will be examined over time
 - Construction & Commissioning Phase
- Results - Inform policy and stakeholders



Schmidt, E., Riggio, M. (2019) **Monitoring Moisture Performance of Cross-Laminated Timber Building Elements during Construction**, Buildings.

Homegrown timber pilot

- Ireland's first **all homegrown timber** residential housing development – now under construction
- Launched by Minister for Housing and Minister for Forestry in June 2025
- Whole life carbon assessment
- Instrumentation and monitoring of buildings – open access timber frame performance data for global timber community



Thank you.

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