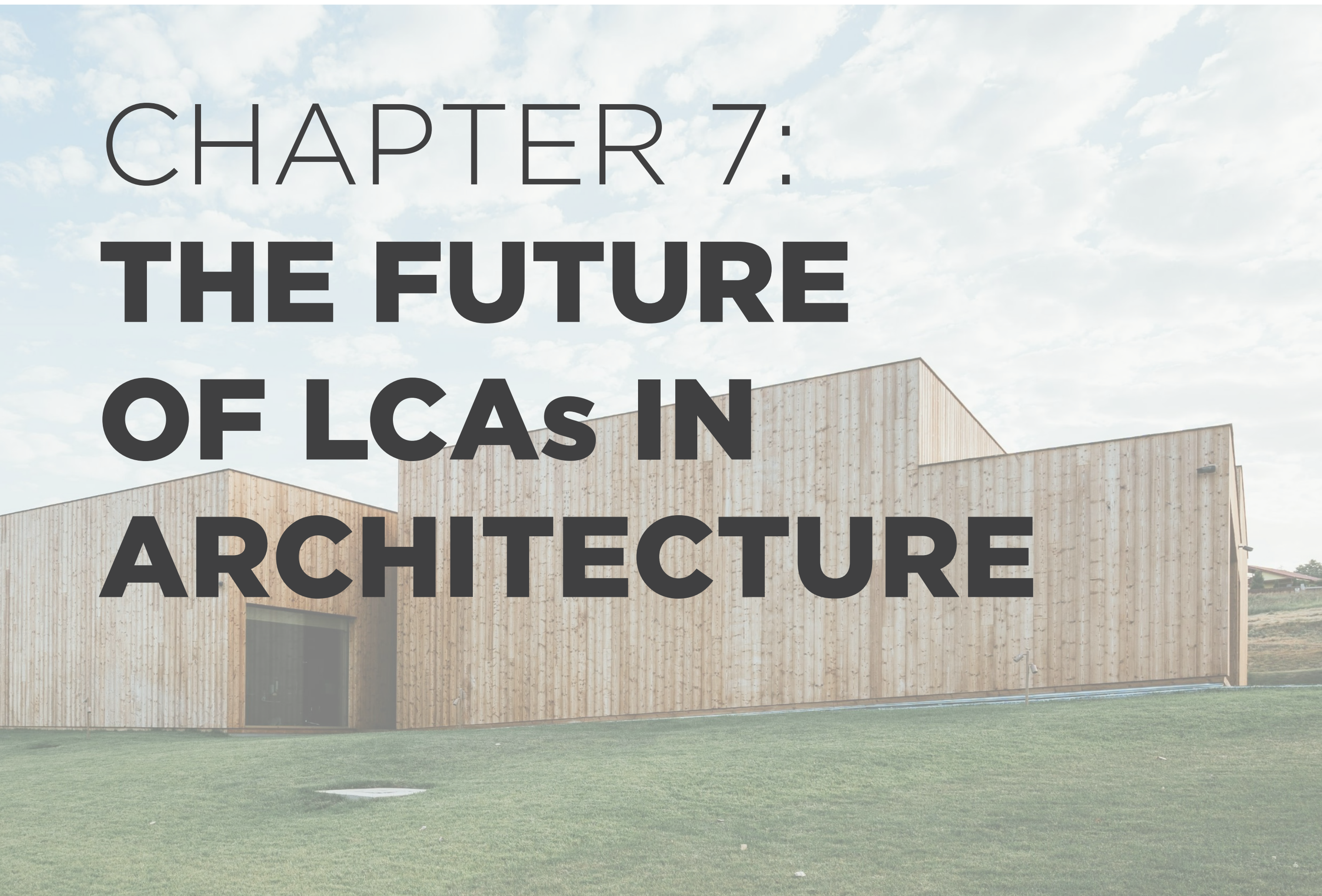


UNPACKING LOW-CARBON DESIGN SERIES

CHAPTER 7: **THE FUTURE OF LCAs IN ARCHITECTURE**



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As the architectural industry responds to the challenges of climate change, **Life Cycle Assessment's** (LCA) are set to become a core part of how we design buildings. No longer limited to regulatory compliance or material comparisons, LCA is evolving into a practical tool that can support early design decisions, encourage circular economy thinking, and help reduce environmental impact across a building's life cycle.

This chapter looks ahead to the technologies, trends, and frameworks that are shaping the future of LCA in architecture. From real-time design feedback and AI-assisted modelling to stronger links with ESG reporting and procurement, we explore how LCA can move from a specialist task to a standard part of project delivery.

As tools improve and policy expectations grow, the key question is not whether LCA will become essential, but how quickly and effectively it can be integrated across the industry.



Emerging Trends Shaping the Future of LCA in Architecture

1. Early-Stage Integration: From Compliance to Concept Design

Traditionally, LCAs were done late in the design process, often post-planning or even post-construction, to meet regulatory or funding requirements.

By the time LCA results are available, many high-impact decisions (like structure, orientation, or material palette) have already been made.

What's changing:

- Tools and workflows are emerging that allow LCAs to be done during concept and schematic design, enabling teams to explore carbon impacts of design options early.
- Practices are embedding “carbon checkpoints” into RIBA or GLA work stages, reviewing and updating LCA outputs at each milestone.

Implication:

- Early integration helps architects make proactive, rather than reactive, design choices—driving better outcomes without necessarily increasing cost or delay.



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Emerging Trends Shaping the Future of LCA in Architecture

2. Real-Time Feedback and Integration with Design Tools

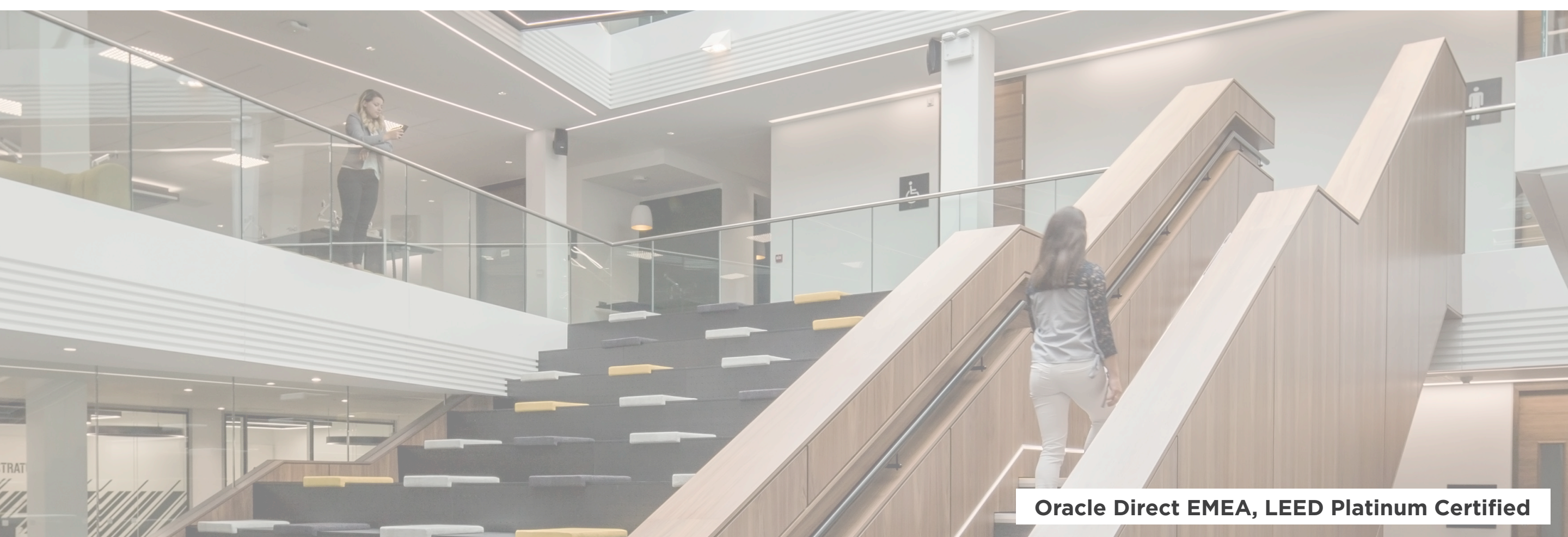
LCA is becoming more interactive. Architects and engineers no longer need to export models to external software or wait days for results.

What's happening now:

- Tools like One Click LCA, Tally, or EC3 offer plugins with BIM platforms (e.g. Revit, Rhino, Grasshopper), allowing users to analyse carbon in real-time as they model.
- This enables “live” carbon feedback, so teams can instantly compare design alternatives, e.g. timber vs. concrete structure, or brick vs. stone façade
- Dashboards and visualisations make the data accessible to non-specialists and support more informed client conversations.

Future potential:

- Design optimisation algorithms could soon use LCA outputs to auto-suggest lower carbon design options.
- Integrated platforms may combine LCA with cost estimating, energy modelling, or spatial analysis—breaking down silos between disciplines.



Emerging Trends Shaping the Future of LCA in Architecture

3. AI and Automation in LCA Modelling

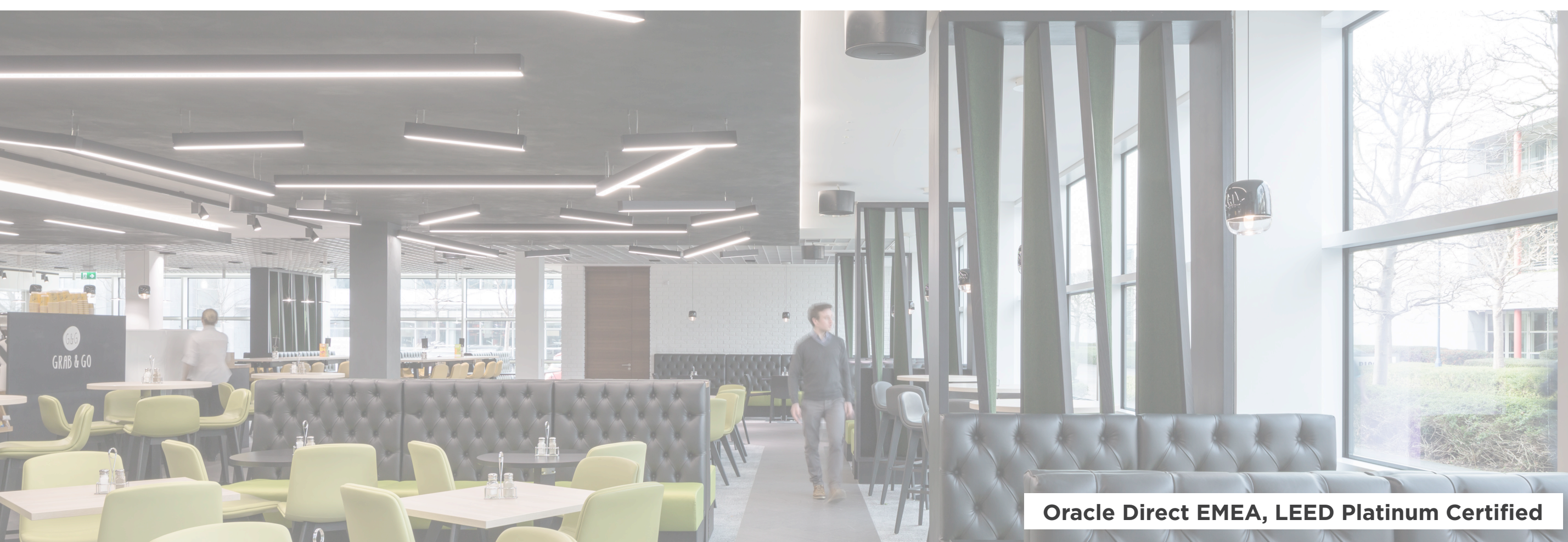
Manual LCA modelling can be time-consuming, especially for complex buildings or portfolios. But AI and automation are rapidly improving this.

What's emerging:

- Machine learning is being used to auto-classify materials and systems from BIM geometry or IFC exports.
- Tools are beginning to suggest default material assemblies based on design typology and local practice, reducing data entry time.
- AI can flag anomalies, suggest missing data, or estimate carbon impacts based on similar past projects—reducing user error.

Implication:

- Faster, more accessible LCAs could empower smaller practices, early-stage teams, and non-experts to engage with carbon modelling—democratising access.



Emerging Trends Shaping the Future of LCA in Architecture

4. Alignment with ESG, Reporting, and Procurement

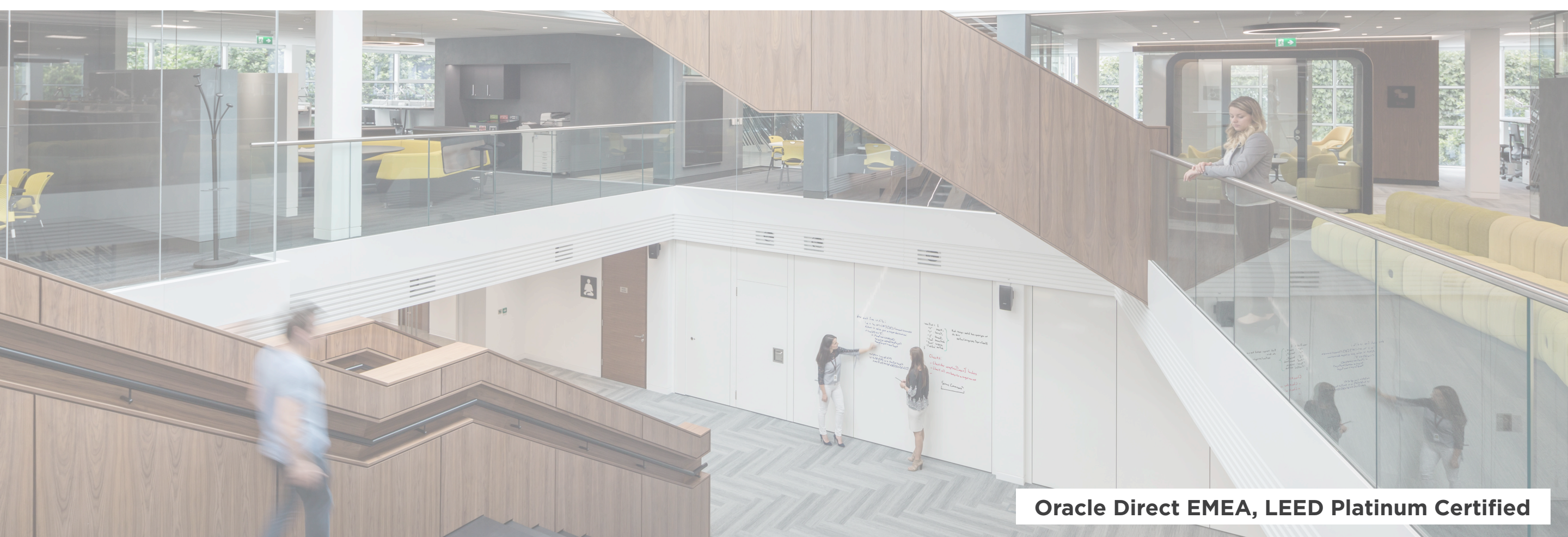
LCA is increasingly feeding into broader sustainability and business strategies, not just design metrics.

Key shifts:

- Developers and asset managers are incorporating LCA outputs into ESG and GRESB reporting, often across entire portfolios.
- Public and private clients are starting to include embodied carbon limits in tender requirements, pushing design teams to optimise from day one.
- Some clients use LCA outputs to guide product selection, supplier engagement, and offsetting strategies.

Example:

- A hotel group may compare LCAs across refurbishments to define internal carbon benchmarks.
- A local authority may set embodied carbon targets for social housing frameworks, informed by LCAs on pilot projects.



Emerging Trends Shaping the Future of LCA in Architecture

5. Standardisation and Benchmarking

One of the challenges to broader LCA adoption has been lack of consistency, different tools, scopes, assumptions, and databases produce different results. That's changing.

What's happening:

- Initiatives like Level(s) (EU), RICS WLCA guidance (UK), and EN 15978 are standardising how whole life carbon is calculated and reported.
- Projects are increasingly compared against carbon benchmarks (e.g. LETI, RIBA 2030 Climate Challenge), enabling teams to assess performance in context.
- Public clients and certifiers are requesting transparent, auditable LCA data, which is improving quality across the board.

Implication:

- More consistent, comparable LCAs build trust with clients and regulators, and provide stronger evidence for climate claims.



Emerging Trends Shaping the Future of LCA in Architecture

6. LCA at Portfolio and City Scale

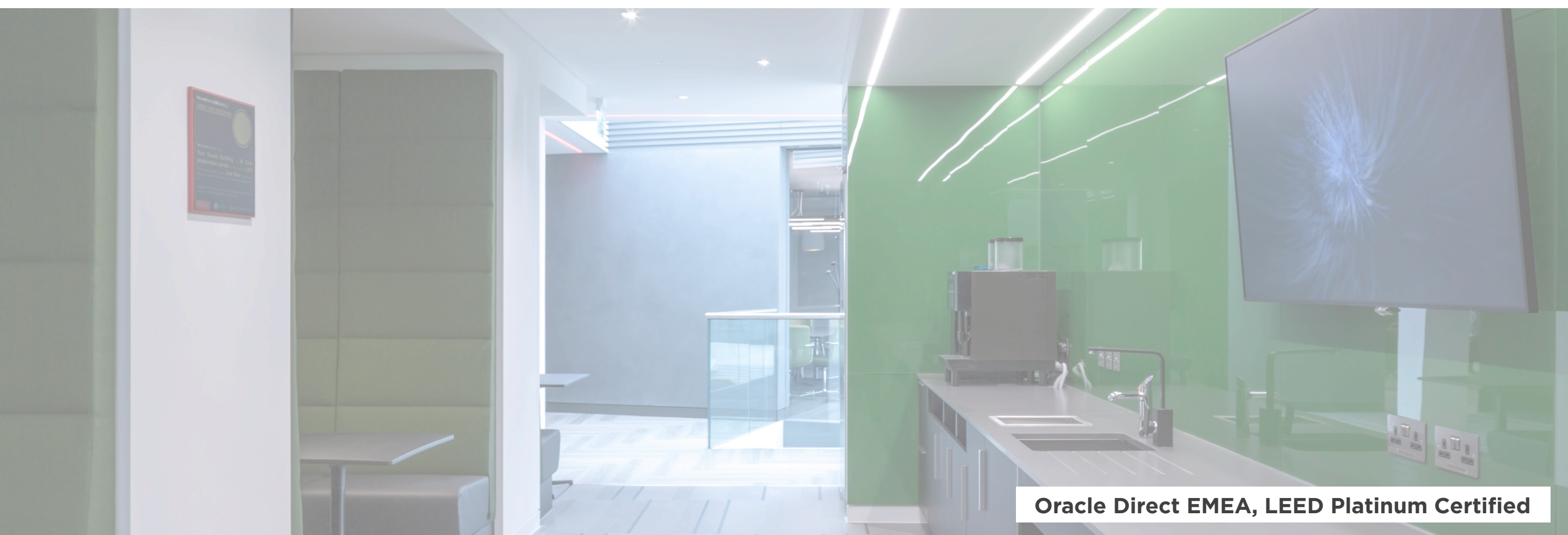
LCA is starting to move beyond individual buildings to support broader sustainability strategies.

Examples include:

- Portfolio-wide carbon auditing to track embodied emissions across all new developments or retrofits.
- Masterplanning tools that use early-stage LCA to compare different massing, density, and infrastructure options.
- Using LCA to support circular economy planning, by tracking material flows and reuse potential across a site or city.

What's next:

- Integration with material passports and digital twins to enable circular tracking of materials post-demolition or renovation.
- Embedding LCA outputs into carbon budgets and city-level policy for new development.



Our next post will be a
Life Cycle Assessment (LCA)
easy study



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