

UNPACKING LOW-CARBON DESIGN SERIES

CHAPTER 6: **BENEFITS & CHALLENGES OF IMPLEMENTING LCA's**



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Life Cycle Assessment's (LCA) are becoming a critical tool for informed, data-driven decision-making. By evaluating the environmental impacts of materials, systems, and construction processes across a building's entire life cycle, LCAs offer the potential to drive more sustainable design outcomes, support regulatory compliance, and demonstrate climate accountability.

However, integrating LCA's into the design and delivery process is not without its challenges. From data quality and availability to workflow integration and industry expertise, there are practical and systemic hurdles that must be addressed to realise the full value of LCA.

This chapter explores the key benefits of implementing LCAs in building projects, alongside the common challenges encountered, offering insights into how the industry can scale up their adoption in meaningful, efficient, and impactful ways.

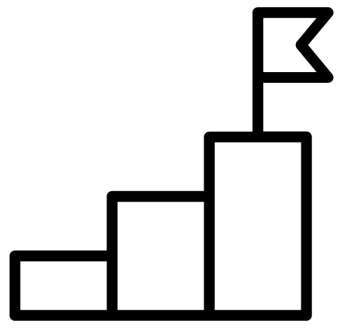


Benefits of Life Cycle Assessment's



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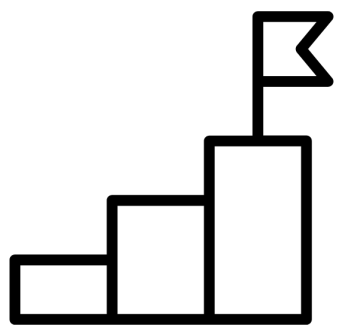
Benefits of Life Cycle Assessment's



Holistic Environmental Insight:

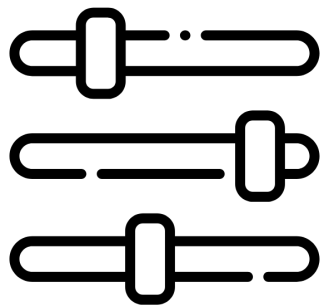
LCA evaluates all stages of a product's life, from raw material extraction, manufacturing, use, and end of life, revealing "hotspots" of environmental impact.

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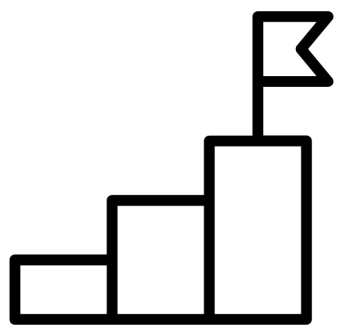
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Multi impact evaluation:

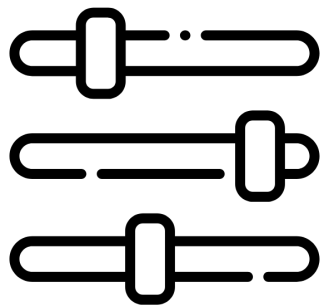
It quantifies a range of environmental indicators (e.g., global warming potential, eutrophication, acidification), allowing organisations to balance trade offs.

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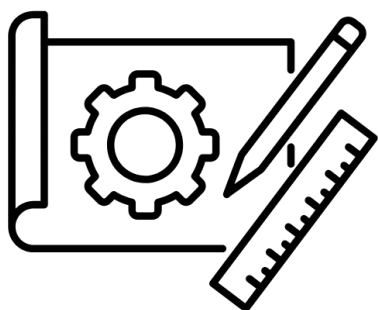
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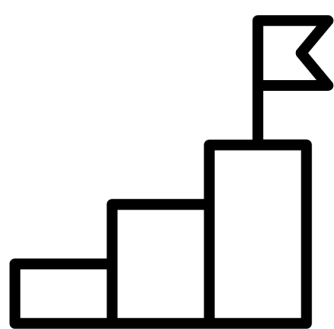
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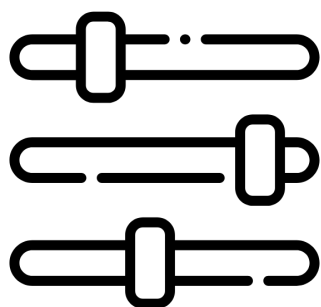
By pinpointing the most impactful stages, designers can target material substitutions, process efficiencies, or alternative energy sources that mean the greatest overall benefit.

Benefits of Life Cycle Assessment's



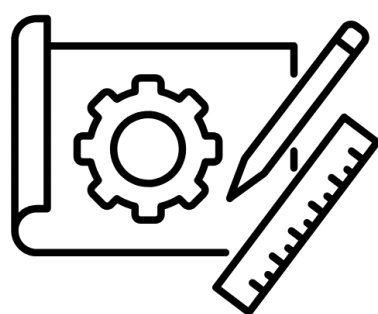
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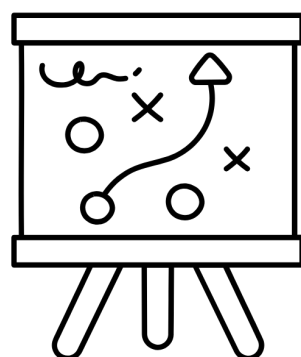
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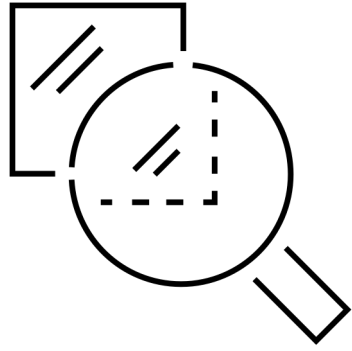
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Strategic planning and policy support:

LCA supplies data driven evidence for corporate sustainability strategies, regulatory compliance and eco labeling claims.

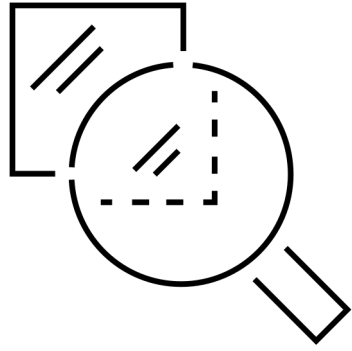
Benefits of Life Cycle Assessment's



Transparency and communication:

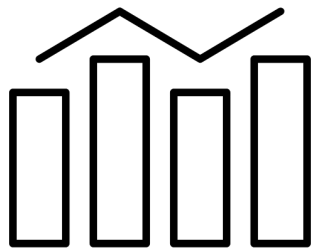
Publicly sharing LCA results builds stakeholder trust, differentiates brands on sustainability, and supports green marketing claims.

Benefits of Life Cycle Assessment's



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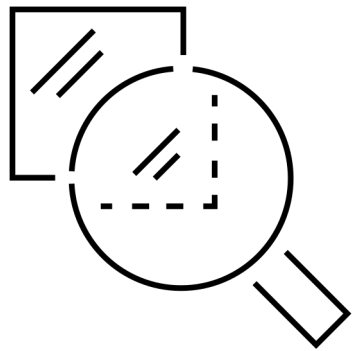
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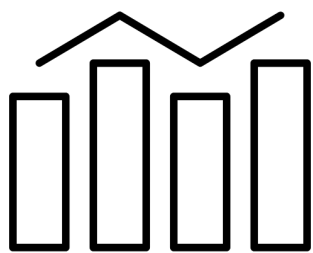
Regular LCA studies enable tracking progress over time and benchmarking against industry peers.

Benefits of Life Cycle Assessment's



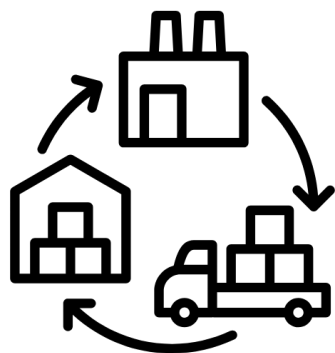
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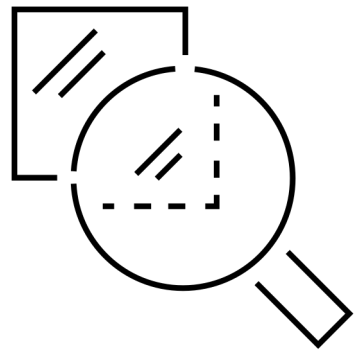
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Supply chain resilience:

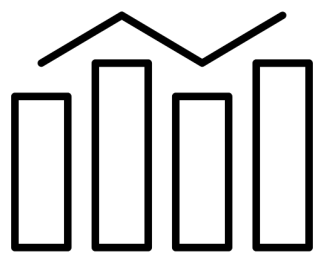
Understanding upstream environmental impacts helps identify vulnerabilities (e.g., scarce resources or energy intensive processes) and develop mitigation strategies.

Benefits of Life Cycle Assessment's



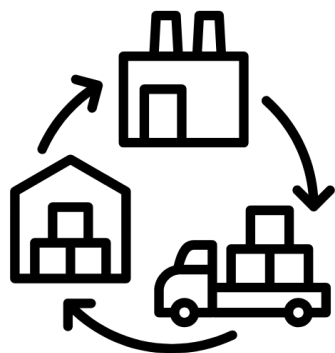
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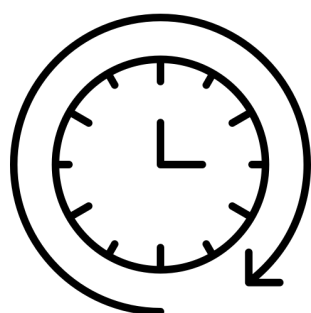
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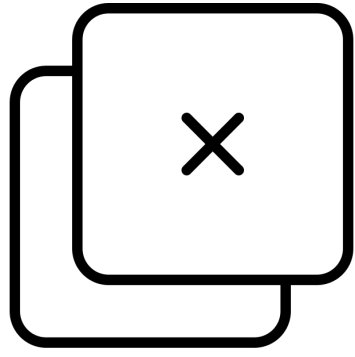
Early adoption of LCA positions companies ahead of tightening environmental regulations, reducing future compliance costs.

Challenges of Life Cycle Assessment's



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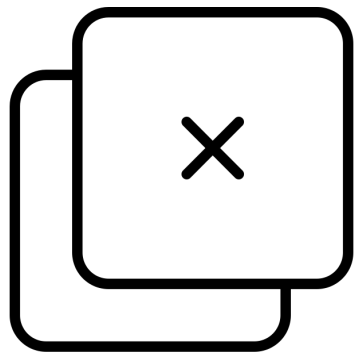
Challenges of Life Cycle Assessment's



Lack of data availability and quality:

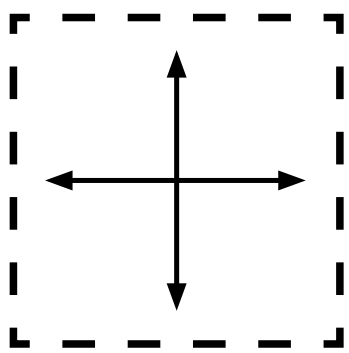
Reliable, site-specific data can be difficult to obtain, especially in complex supply chains. This often leads to use of generic databases, which may not reflect actual conditions and cause uncertainty.

Challenges of Life Cycle Assessment's



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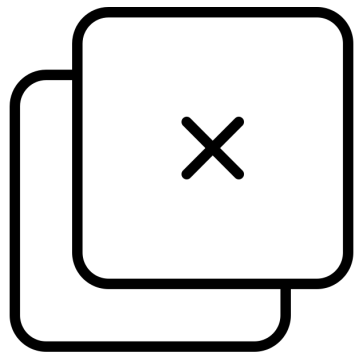
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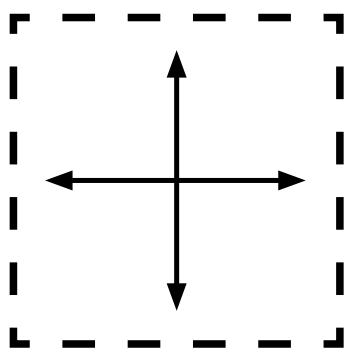
Deciding which life cycle stages, processes, and co-products to include affects consistency and comparability. Allocation methods in multi-output processes can also influence results significantly.

Challenges of Life Cycle Assessment's



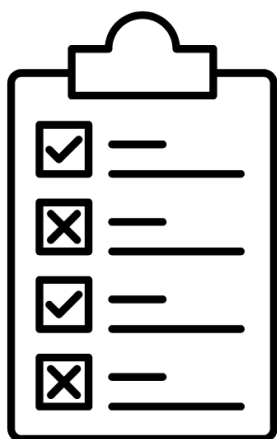
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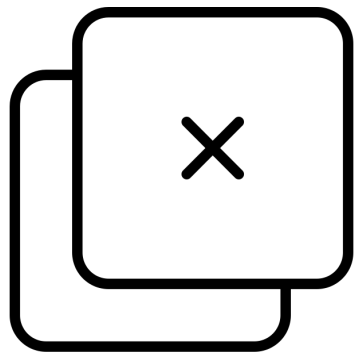
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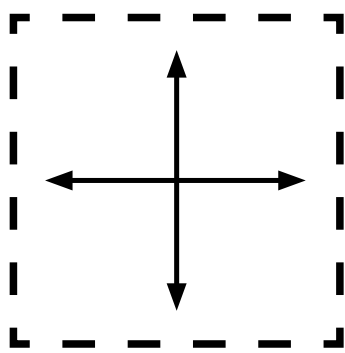
LCAs can be time-consuming and costly, often requiring input from multiple disciplines. Using LCA tools and aligning with evolving standards demands specialist training and ongoing effort.

Challenges of Life Cycle Assessment's



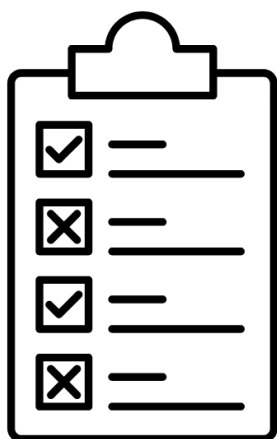
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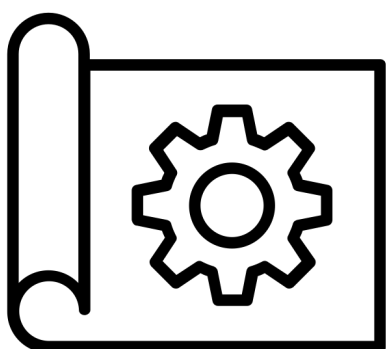
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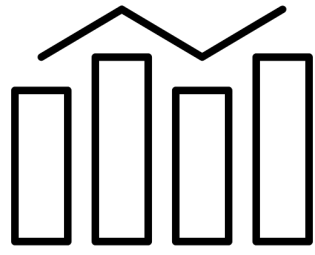
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Data extraction from BIM and drawings:

Early-stage design models often lack detailed material information, making accurate quantity take-offs difficult. Manual estimation or model refinement is frequently needed.

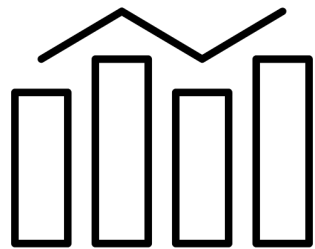
Challenges of Life Cycle Assessment's



Comparability and benchmarking:

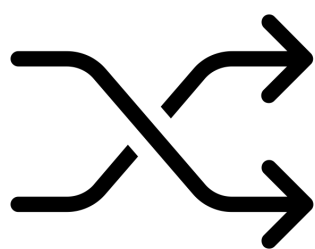
Differences in assumptions, boundaries, and data sources make it hard to compare LCAs across projects or sectors, limiting their usefulness for benchmarking or public disclosure.

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Rapidly changing systems:

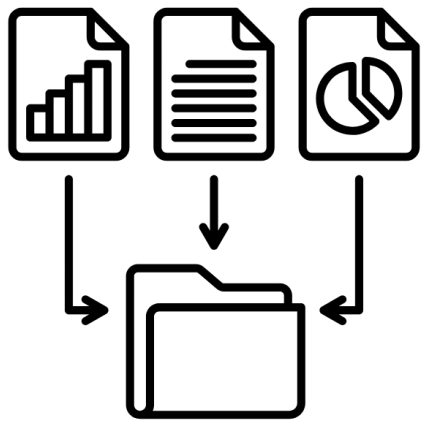
Technological advances and evolving energy mixes can quickly make LCA results outdated. Without regular updates, assessments may lose relevance and decision-making value.

How to Tackle Challenges of Life Cycle Assessment's



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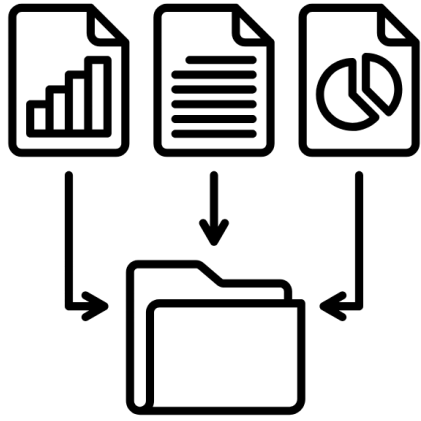
How to **Tackle Challenges** of Life Cycle Assessment's



Make data collection easier:

Integrate your LCA tool with BIM or CAD software to pull material quantities directly. Maintain a library of common materials with environmental data, and request supplier-specific figures early in the process.

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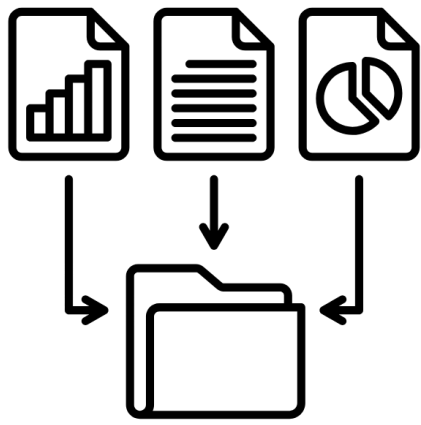
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Keep your scope clear:

Begin with a screening LCA to identify key impact areas, then focus detailed efforts where they matter most. Agree upfront on which life cycle stages and elements will be included to maintain clarity.

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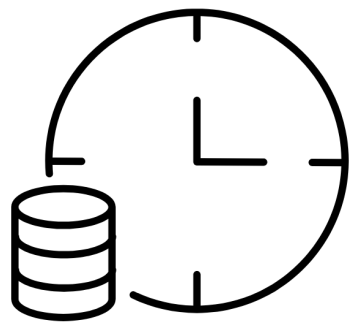
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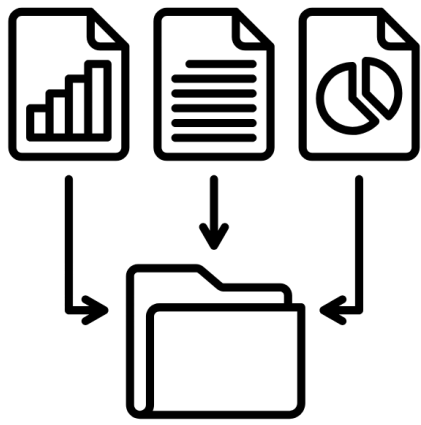
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Save time and money:

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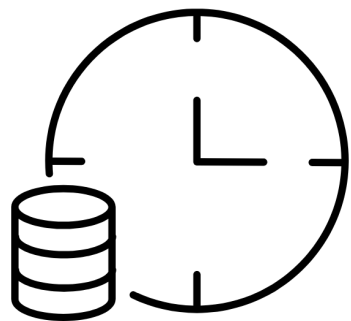
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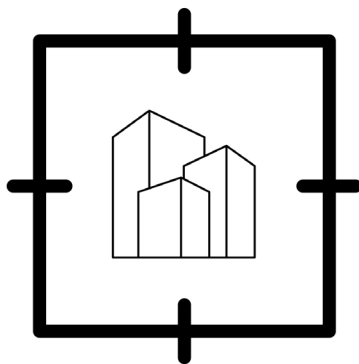
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Improve model accuracy:

Ensure BIM models are updated through each design phase to reflect material breakdowns. Use project milestones to review and fill data gaps before they impact outcomes.

How to **Tackle Challenges** of Life Cycle Assessment's



Handle uncertainty:

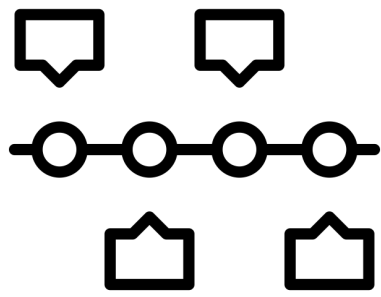
Run sensitivity analyses to identify which assumptions or inputs have the biggest effect on results. Keep a record of all data sources and assumptions to support transparency and consistency.

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Share and embed LCA in your workflow:

Schedule LCA check-ins throughout the project timeline rather than treating them as a final step. Use clear visuals to communicate results, making them accessible to non-specialists.

Our next post will
explore the **future of**
Life Cycle
Assessments (LCA's)
in architecture



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