Bio-Based Materials: Educational Resource Guide

BBMC

Contributors & Reviewers

This guide reflects the collective effort of a transdisciplinary group of contributors whose expertise spans the full lifecycle of bio-based materials. The Bio-Based Materials Collective extends its sincere appreciation to the reviewers for their time, insight, and commitment to building a shared, credible knowledge base. Their combined perspectives ensure that this guide represents a balanced, credible, and practice-informed foundation for the Bio-Based Materials: Educational Resource Guide.

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Contents

1. Purpose & Intent

The Bio-Based Materials: Educational Resource Guide is an initiative of the Bio-Based Materials Collective (BBMC), designed to build a trusted, transdisciplinary, and accessible knowledge base.

Its intent is to accelerate the adoption of bio-based materials by connecting practitioners, policymakers, and researchers to high-quality, vetted resources that support informed decision making across the built environment. This first phase establishes a shared evaluation framework, activates review teams, identifies high-value existing resources contributed and reviewed by BBMC members, and uncovers audience-specific knowledge gaps to guide future development and continuous growth of the resource.

Together, these efforts form the foundation for a living, evolving educational ecosystem, shaped through the collective expertise of contributors and reviewers across the field.

2. Process

This guide is the result of a coordinated review by five transdisciplinary teams aligned with BBMC's primary audiences: cultivation and sourcing, processing and manufacturing, design and specification, construction and application, and use, maintenance, and end of life. This structure ensures that resources are evaluated across the full materials lifecycle and through multiple professional perspectives.

All resources were assessed using the CRIT(c) Assessment Tool, a shared framework that evaluates whether a resource is Critical, Relevant, Innovative, and Trusted. The tool supports consistent and transparent review by considering urgency and impact, audience fit and usability, contribution of new ideas, and strength of evidence. Each resource is scored on a 75-point scale, enabling alignment across teams while allowing for informed discussion and consensus-based decision making.

The review followed a structured five-step process, including individual review, team discussion, cross-team consensus review, and final acceptance and integration. Reviewers first assessed resources independently, then met as teams to compare insights and identify areas of alignment or divergence. Team leaders facilitated cross-team discussions to reach consensus on complex or borderline submissions, ensuring a balanced and collectively supported outcome.

Throughout the process, reviewers were guided by key questions aligned with the CRIT(c) criteria: Does the resource address urgent challenges or gaps related to climate, health, equity, or regulation? Is it clear, accessible, and usable across disciplines and real-world applications? Does it introduce new ideas, methods, or circular strategies? And is it credible, transparent, and supported by reliable evidence, safety considerations, and validation where applicable? These questions anchored evaluation while allowing flexibility across different resource types.

This work reflects the contributions of a broad network of reviewers and team leaders, whose perspectives and expertise were critical in shaping a balanced, credible, and cross-disciplinary resource set.

Resources included in this guide represent those that met the criteria for Acceptance and Integration. Approved submissions are mapped to relevant audiences, and tagged for future education and content development.

3. How to Use This Guide

This guide is designed for users across the bio-based materials ecosystem, from those building foundational knowledge to those advancing technical expertise.

Resources are organized by learning level, supporting progression from foundational understanding to applied strategies and advanced technical content. They are also aligned with audience and lifecycle stages, enabling users to identify content relevant to their role within cultivation, manufacturing, design, construction, or long-term use and circularity. A range of formats, including books, courses, reports, tools, and media, supports different learning preferences and applications.

The guide can be used to support education and training, inform design and specification decisions, advance policy and advocacy, and identify gaps for future research and innovation. It is intended not only as a reference, but as a tool for action.

Important Notes

Resources identified as Highly Recommended (60–75 points) demonstrate strong alignment with BBMC criteria and values. However, inclusion in this guide does not constitute endorsement. All resources are provided for educational purposes, and users are encouraged to apply professional judgment and consider project-specific context.

Resource summaries included in this guide were developed with AI-assisted support, based on available source materials including descriptions, abstracts, and reviewer comments. These summaries are intended to enhance accessibility and consistency, while remaining grounded in the original content and expert review.

This guide is a starting point and an invitation.
To learn, to contribute, and to help shape the future of bio-based materials in the built environment.

Citation

Sorrento, L., & Marini, B. (2020–2025). *CRIT(c) Assessment Tool: A framework for evaluating educational resources across criticality, relevance, innovation, and trust*. Adapted for the Bio-Based Materials Collective (BBMC).

4. Reviewed Resource Summaries

Bio construcción en el mundo: detalles constructivos

Resource: Aguirre Morales, R. (Ed.). (2022). Bio construcción en el mundo: detalles constructivos [E-book]. Carteles Editores. Retrieved from https://www.fundacionantoniofontdebedoya.es/bio-construccion-en-el-mundo-ibomex-y-proterra/
Format: Book
Reviewers: Team 1: Cultivation & Sourcing
Summary: This resource offers a visually rich, case study–based exploration of bio-based construction across multiple regions, with strong representation from Latin America. Organized into chapters and detailed assemblies, it brings together 91 construction details developed by contributors from the PROTERRA network, showing how natural materials are applied in real projects. It is worth reading because it operates at both an inspirational and practical level. The illustrated format makes it accessible as a reference for ideas and precedents, while the technical details support real-world application. For designers, builders, and educators, it provides a broad yet grounded view of bio-based methodologies shaped by regional knowledge, craft, and material availability.
Learning Level: Intermediate (Applied)
Bio-based Material Focus: Multiple (earth, straw, regional materials)
Suggested audiences: Designers, builders, educators, and practitioners seeking applied precedents

Straw Bale Building Redefined: Innovative Infill and Prefab Techniques & Practical Insights for Energy-Efficient Construction.

Resource: Bružas, R. (2024). Straw Bale Building Redefined: Innovative Infill and Prefab Techniques & Practical Insights for Energy-Efficient Construction. Straw Building Books. Retrieved August 29, 2025, from https://strawbuildingbooks.com/products/straw-bale-building-redefined-innovative-infill-and-prefab-techniques-practical-insights-for-energy-efficient-construction
Format: Book
Reviewers: Team 1: Cultivation & Sourcing
Summary: This resource offers a highly visual and detailed guide to contemporary straw bale construction, with a focus on infill systems, prefabricated panels, and double stud wall assemblies. Through step by step diagrams, case studies, and construction details, it shows how straw based systems are designed and built in practice, drawing from the author's experience as a contractor working primarily in a European context. It is worth reading because it serves as both a reference and a practical guide for designers, builders, educators, and hands-on learners. The clarity of the drawings and sequencing makes complex assemblies accessible and actionable. While the examples are regionally grounded and less focused on broader building science topics such as moisture, fire, and pest performance, the book provides valuable insight into constructability, detailing, and the growing role of prefabrication in scaling straw based building systems.

Learning Level: Intermediate (Applied)
Bio-based Materials Focus: Specific (straw)
Suggested Audiences: Builders, contractors, designers, educators, and hands on practitioners

Cultivated Building Materials: Industrialized Natural Resources for Architecture and Construction.

Resource: Hebel, D. E., & Heisel, F. (2025). Cultivated Building Materials: Industrialized Natural Resources for Architecture and Construction. Birkhäuser. Retrieved August 29, 2025, from https://birkhauser.com/books/9783035608922/cultivated-building-materials-industrialized-natural-resources-for-architecture-and-construction
Format: Book
Reviewers: Team 1: Cultivation & Sourcing
Summary: This resource provides a forward looking overview of how bio based and cultivated materials are shaping a new phase of industrial production in the built environment. Framed within the context of a circular and waste to value economy, it traces the evolution of innovative materials and introduces emerging systems such as mycelium, algae, engineered earth, bamboo technologies, and biologically derived binders. The book highlights how these materials can be developed and scaled through industrialized processes to support contemporary construction. It is worth reading because it positions natural materials within the next generation of manufacturing and design innovation. For designers, researchers, and product manufacturers, it offers insight into how cultivated materials can move from experimental applications into scalable systems. While it is lighter on social and policy dimensions, it serves as a strong foundation for understanding the technical and production potential of bio based materials in a rapidly evolving industry.
Learning Level: Advanced (Expert / Technical)
Bio-based Materials Focus: Multiple (mycelium, algae, bamboo, earth)
Suggested Audiences: Researchers, product manufacturers, designers, and advanced practitioners

Natural Building Techniques: A Guide to Ecological Methods and Materials.

Resource: Woolley, T. (2022). Natural Building Techniques: A Guide to Ecological Methods and Materials. The Crowood Press. Retrieved August 29, 2025, from https://www.crowood.com/products/natural-building-techniques-by-tom-woolley
Format: Book
Reviewers: Team 1: Cultivation & Sourcing
Summary: This resource provides a clear and well structured introduction to natural building, bringing together a wide range of ecological materials such as earth, straw, lime, and timber. It combines foundational concepts with practical guidance, including construction methods, material properties, and illustrated examples that show how these systems are applied in real projects. The content reflects both long standing traditions and contemporary approaches to low impact building. It is worth reading because it serves as a

reliable reference for understanding and applying natural building techniques across different contexts. For designers, builders, educators, and those new to the field, it offers accessible explanations supported by practical examples. While it is not deeply technical or research driven, it provides a strong grounding in materials and methods, making it especially useful for building confidence and competence in ecological construction.
Learning Level: Basic (Foundational) to Intermediate (Applied)
Bio-based Materials Focus: Multiple (earth, lime, straw, timber)
Suggested Audiences: Designers, builders, educators, and early stage practitioners

The potential of emerging bio-based products to reduce environmental impacts.

Resource: Zuiderveen, E. A. R., Kuipers, K. J. J., Caldeira, C., et al. (2023). The potential of emerging bio-based products to reduce environmental impacts. Nature Communications, 14, Article 8521. https://doi.org/10.1038/s41467-023-43797-9
Format: Scientific article
Reviewers: Team 1: Cultivation & Sourcing
Summary: This resource presents a comprehensive meta analysis of prospective life cycle assessments comparing emerging bio based products with their fossil based counterparts. Drawing from a large body of studies across nearly one hundred products, it quantifies environmental impacts and tradeoffs, showing that while bio based products often reduce greenhouse gas emissions, they do not guarantee improved outcomes and can increase impacts such as eutrophication. The research takes a systems perspective, while noting limitations in areas such as land and water use, toxicity, and end of life assumptions. It is worth reading because it brings critical rigor to the conversation around bio based materials, challenging assumptions and highlighting the need for case by case evaluation. For researchers, policymakers, and industry stakeholders, it offers valuable guidance for life cycle assessment and policy development. While the technical depth may limit accessibility for broader audiences, it provides an important evidence base for more informed and responsible decision making.
Learning Level: Advanced (Expert / Technical)
Bio-based Materials Focus: Multiple (broad bio-based vs fossil)
Suggested Audiences: Researchers, policymakers, product manufacturers, and advanced practitioners

Transitioning to a regenerative built environment: A Changemaker's Guide

Resource: Bauhaus Earth & Toni Piëch Foundation. (2025). Transitioning to a regenerative built environment: A Changemaker's Guide [Web report]. Retrieved August 30, 2025, from https://www.bauhauserde.org/subpages/a-changemakers-guide
Format: Report / Guide (Web-based, with supporting webinars)
Reviewers: Team 1: Cultivation & Sourcing
Summary: This resource presents a strategic framework for initiating and guiding the transition to a regenerative built environment. It combines systems thinking with roadmapping tools to help stakeholders analyze current conditions and identify pathways for change across materials, policy, finance, and industry. Supported by webinars and case

studies from regions such as Cape Town, Rwanda, and the Kumaon Himalaya in India, it illustrates how regenerative approaches are being explored in diverse contexts. It is worth reading because it translates complex regenerative principles into an accessible and action oriented guide for a wide range of stakeholders. For policymakers, researchers, industry leaders, and practitioners, it offers a shared framework for aligning efforts toward system level change. While it is less focused on specific implementation techniques and reflects geographically specific examples, it provides a valuable foundation for understanding how to begin and structure the transition to regenerative practice.
Learning Level: Intermediate (Applied)
Bio-based Materials Focus: General (bio-based within regenerative systems)
Suggested Audiences: Policymakers, researchers, industry leaders, and practitioners

Biobased construction materials, a sustainable solution?

Resource: INRAE. (2023, February 16). Biobased construction materials, a sustainable solution? [Web report]. Retrieved August 29, 2025, from https://www.inrae.fr/en/reports/biobased-construction-materials-sustainable-solution
Format: Report
Reviewers: Team 1: Cultivation & Sourcing
Summary: This resource provides a research based overview of the role bio based construction materials play within France's building sector, examining their potential to reduce greenhouse gas emissions alongside economic and agricultural implications. It highlights materials such as straw, hemp, and sunflower, and explores both the opportunities and constraints shaping the industry, including land use, scalability, and supply chain development. Framed through an agricultural and national lens, it offers insight into how a more mature bio based materials market has evolved over time. It is worth reading because it presents a credible and balanced view of both promise and limitation, grounded in real world industry conditions. For policymakers, producers, suppliers, and broader stakeholders, it serves as a useful reference for understanding how to assess and frame the development of bio based materials within a specific geography. While it does not include detailed case studies or design guidance, it offers a valuable template for evaluating market readiness, identifying barriers, and informing future growth strategies.
Learning Level: Intermediate (Applied)
Bio-based Materials Focus: Multiple (straw, hemp, sunflower)
Suggested Audiences: Policymakers, producers, suppliers, and industry stakeholders

Building materials and the climate: Constructing a new future. Global Alliance for Buildings and Construction.

Resource: United Nations Environment Programme. (2023). Building materials and the climate: Constructing a new future. Global Alliance for Buildings and Construction. Retrieved August 30, 2025, from https://www.unep.org/resources/report/building-materials-and-climate-constructing-new-future

Format: Report
Reviewers: Team 1: Cultivation & Sourcing
Summary: This resource provides a global analysis of the significant role building materials play in climate change, emphasizing that while operational emissions are declining with electrification, embodied carbon from material extraction and production is becoming increasingly dominant. It takes a whole life cycle approach, outlining strategies such as material efficiency, circularity, reuse, recycling, and the integration of low carbon and bio based materials. The report also highlights systemic challenges including gaps in data quality and availability, and the need for consistent standards across international contexts. It is worth reading because it connects global climate goals to material decisions and industry transformation at scale. For policymakers, designers, and construction leaders, it offers a clear framework for advancing circular and low carbon practices through collaboration across sectors. While it is less detailed in project level implementation and case studies, it serves as a strong foundation for shaping policy, aligning industry efforts, and accelerating the transition to a more sustainable materials economy
Learning Level: Intermediate (Applied) to Advanced (Expert / Technical)
Bio-based Materials Focus: General (includes bio-based among other materials)
Suggested Audiences: Policymakers, designers, construction professionals, and industry stakeholders

What is the BioPreferred® Program?

Resource: United States Department of Agriculture. (n.d.). What is the BioPreferred® Program? Retrieved August 31, 2025, from https://www.biopreferred.gov/BioPreferred/faces/pages/AboutBioPreferred.xhtml
Format: Website
Reviewers: Team 1: Cultivation & Sourcing
Summary: This resource explains the BioPreferred® Program, a federal certification and procurement initiative designed to increase the use of bio based products in the United States. It outlines how the program establishes minimum bio based content requirements, supports federal purchasing preferences, and offers a voluntary labeling system to help identify qualifying products. The program is primarily geared toward manufacturers and suppliers seeking to access government markets and differentiate products, with examples highlighting companies that have successfully achieved certification and procurement opportunities. It is worth reading because it demonstrates how policy and certification can help create demand for bio based products through procurement and market signaling. For producers and suppliers, it provides a clear pathway to participation in federal purchasing programs and potential marketing advantages. While the resource is less comprehensive in technical guidance and broader system impacts, and thresholds for bio based content may be considered relatively low, it remains a valuable entry point for understanding how certification frameworks can support the growth of the bioeconomy.
Learning Level: Basic (Foundational)
Bio-based Materials Focus: General (all bio-based products)
Suggested Audiences: Producers, suppliers, manufacturers, and procurement professionals

California Straw Building Association (CASBA)

Resource: California Straw Building Association. (n.d.). California Straw Building Association (CASBA) [Organization website]. Retrieved August 30, 2025, from https://www.strawbuilding.org/
Format: Website
Reviewers: Team 1: Cultivation & Sourcing
Summary: This resource provides a comprehensive collection of information and tools to support straw bale and light straw clay construction, with a strong emphasis on design, construction, and code integration. Established in 1996, the organization has played a key role in advancing straw building through advocacy, technical guidance, and education. The site includes building standards, testing information, professional directories, and access to publications and journals, offering a well developed knowledge base grounded in California practice and policy. It is worth reading because it brings together a deep and credible set of resources that support real world application and regulatory acceptance of straw based systems. For designers, builders, and code officials, it serves as a practical reference for implementation. While the content is focused on specific methodologies and regional context, and offers limited insight into broader building science, land use, and social impacts, it remains an essential resource for advancing straw construction within established frameworks.
Learning Level: Intermediate (Applied)
Bio-based Materials Focus: Specific (straw)
Suggested Audiences: Designers, builders, code officials, researchers, and policymakers

Oregon State University Global Hemp Innovation Center

Resource: Oregon State University Global Hemp Innovation Center. (n.d.). About [webpage]. Oregon State University College of Agricultural Sciences. Retrieved August 28, 2025, from https://agsci.oregonstate.edu/hemp/about
Format: Website
Reviewers: Team 1: Cultivation & Sourcing
Summary: This resource provides an overview of a leading academic center advancing hemp research, education, and market development across the full supply chain. Based within Oregon State University's College of Agricultural Sciences, the center brings together interdisciplinary expertise to explore hemp applications in construction, textiles, food, chemicals, and environmental solutions. It highlights partnerships with industry, government, and communities, including case studies from Tribal lands, demonstrating both global reach and regional impact. It is worth reading because it shows how coordinated research, extension, and industry collaboration can accelerate the development of a bio based material at scale. For farmers, producers, policymakers, and academics, it offers insight into cultivation, product innovation, and market pathways. While the focus is primarily on hemp, it serves as a strong model for how bio based materials can be supported from agriculture through to end use.
Learning Level: Basic (Foundational) to Intermediate (Applied)

Bio-based Materials Focus: Specific (hemp)
Suggested Audiences: Farmers, producers, policymakers, researchers, and academics

Trace Material: Season 1 – Hemp

Resource: Healthy Materials Lab. (2021). Trace Material: Season 1 – Hemp [Audio podcast series]. Parsons School of Design. Retrieved September 2, 2025, from https://healthymaterialslab.org/projects/season-1
Format: Podcast series
Reviewers: Team 1: Cultivation & Sourcing
Summary: This resource is an audio podcast series that explores hemp through a broad cultural, historical, and material lens. Through conversations with designers, researchers, farmers, and advocates, it traces hemp's journey from cultivation to construction while also examining its complex history in the United States. Episodes explore connections to slavery, the impacts of drug policy, and perspectives from voices such as environmental activist Winona LaDuke, alongside discussions of hemp's potential to contribute to more just and regenerative futures. It is worth reading because it expands the conversation beyond performance and application to include social, cultural, and environmental context. For designers, students, and a broad range of stakeholders, it offers an accessible and human centered understanding of how materials are shaped by history, policy, and lived experience. It helps build a more holistic perspective on what it means to work with bio based materials today.
Learning Level: Basic (Foundational) to Intermediate (Applied)
Bio-based Materials Focus: Specific (Hemp)
Suggested Audiences: Designers, students, educators, and broad stakeholder audiences

Industrial Hemp Podcast

Resource: Hurlock, E. (Host). (2018–2025). Industrial Hemp Podcast [Audio podcast series]. Lancaster Farming. Retrieved August 31, 2025, from https://open.spotify.com/show/4xV5g4gsZRLQYNSnyrOYtN
Format: Podcast series
Reviewers: Team 1: Cultivation & Sourcing
Summary: This resource is an audio podcast series that explores the evolving hemp industry through interviews with farmers, processors, entrepreneurs, researchers, and policymakers. It covers the full value chain from cultivation and processing to product development, markets, and regulation, offering timely insights into how hemp is being integrated into sectors such as construction and materials. The conversational format brings forward real world experience and diverse perspectives across the industry. It is worth reading because it provides a current and practice grounded view of how the hemp sector is developing in real time. For producers, manufacturers, and industry stakeholders, it offers useful insight into market dynamics, policy shifts, and operational challenges. While it is less structured than formal research and varies by episode depth, it remains a valuable resource for understanding the opportunities and complexities shaping hemp's role in the bio based economy.

Learning Level: Basic (Foundational) to Intermediate (Applied)
Bio-based Materials Focus: Specific (Hemp)
Suggested Audiences: Producers, manufacturers, policymakers, researchers, and industry stakeholders

Mass Timber Today

Resource: Applegath, C., & Koven, A. (Hosts). (2024–2025). Mass Timber Today [Audio podcast series]. Mass Timber Institute, University of Toronto. Retrieved August 30, 2025, from https://open.spotify.com/show/7uvXnZqH26hhV1AkrHua2O
Format: Podcast series
Reviewers: Team 1: Cultivation & Sourcing
Summary: This resource is an audio podcast series that explores the growing role of mass timber in the built environment through conversations with leaders in design, engineering, forestry, and industry. Based in Canada with perspectives from the United States and Europe, it covers topics such as structural systems, policy and code development, supply chains, and environmental performance. The discussions consistently reflect a life cycle perspective, connecting forestry, material processing, and building applications. It is worth reading because it offers an accessible and current view of mass timber across the full material lifecycle. For designers and construction professionals, it provides practical insight into real world applications and emerging practices. At the same time, the breadth of topics and perspectives makes it valuable for anyone interested in bio based materials, helping to build a deeper understanding of how material decisions connect from resource to building and beyond.
Learning Level: Basic (Foundational) to Intermediate (Applied)
Bio-based Materials Focus: Specific (wood/timber)
Suggested Audiences: Designers, construction professionals, and broad stakeholder audiences

Embodied Energy and Design: Making Architecture Between Metrics and Narratives.

Resource: Benjamin, D. (Ed.). (2017). Embodied Energy and Design: Making Architecture Between Metrics and Narratives. Columbia University GSAPP & Lars Müller Publishers. Retrieved August 28, 2025, from https://www.lars-mueller-publishers.com/embodied-energy-and-design
Format: Book
Reviewers: Team 2: Processing & Manufacturing
Summary: This resource is a collection of essays and design explorations that examine embodied energy through both quantitative metrics and qualitative narratives. It brings together diverse perspectives to question how buildings are made, how materials flow through systems, and how design decisions carry environmental, cultural, and ethical implications. The book explores buildings as dynamic systems rather than static objects, highlighting challenges in measuring embodied energy and the need to balance data with broader considerations such as reuse, supply chains, and long term impact. It is worth

reading because it expands the conversation beyond calculation to include meaning, context, and responsibility in design. For designers, educators, and researchers, it offers an accessible and thought provoking introduction to embodied energy that is not overly technical. While the collection format varies in depth and requires some navigation, it provides valuable insight into how metrics and narratives together can shape more informed and accountable design practice.
Learning Level: Basic (Foundational) to Intermediate (Applied)
Bio-based Materials Focus: General (materials broadly)
Suggested Audiences: Designers, educators, researchers, and building product stakeholders

The Ecology of Building Materials

Resource: Berge, B. (2009). The Ecology of Building Materials (2nd ed.; C. Butters & F. Henley, Trans.). Routledge.
https://www.routledge.com/The-Ecology-of-Building-Materials/Berge/p/book/9781856175371
Format: Book
Reviewers: Team 2: Processing & Manufacturing
Summary: This resource is a comprehensive reference that examines building materials through an ecological lens, organizing information by environmental criteria, raw materials, and specific applications. It evaluates impacts such as pollution, energy use, resource depletion, and long term waste, while emphasizing that materials are not neutral and carry consequences for ecosystems and human systems alike. Grounded in life cycle thinking and European policy context, it presents materials as part of larger environmental flows, encouraging design approaches that support reuse, compatibility with natural systems, and long term ecological balance. It is worth reading because it provides a rigorous and structured framework for understanding material impacts in depth. For designers, specifiers, and building professionals, it serves as a reliable reference to support informed material selection and comparison. While the content is dense, technical, and not intended to be read cover to cover, it remains a foundational resource for those seeking to integrate ecological thinking into material decisions.
Learning Level: Intermediate (Applied) to Advanced (Expert / Technical)
Bio-based Materials Focus: Multiple (bio-based + conventional)
Suggested Audiences: Designers, specifiers, researchers, and building professionals

The Hempcrete Book: Designing and Building with Hemp-Lime

Resource: Stanwix, W., & Sparrow, A. (2014). The Hempcrete Book: Designing and Building with Hemp-Lime (Vol. 5, Sustainable Building series). Green Books.
https://www.bloomsbury.com/us/hempcrete-book-9780857841223/
Format: Book
Reviewers: Team 2: Processing & Manufacturing
Summary: This resource provides a comprehensive and accessible guide to hemp lime construction, covering the history of hemp, the role of lime, and key principles of

sustainable building. Organized in three parts, it moves from foundational concepts to practical construction methods, including sourcing, mixing, and building techniques, and concludes with guidance on tools, health, safety, and project logistics. Drawing from practitioner experience, it offers clear explanations and real world examples, primarily grounded in a UK and European context. It is worth reading because it serves as a reliable introduction to hempcrete for both professionals and self builders. For designers, builders, and homeowners, it provides practical insight into how the material performs and how to work with it on site. While it is focused specifically on hemp lime systems, with limited coverage of broader ecological or policy issues and regional differences in standards, it remains a well regarded resource for understanding and applying this bio based construction method.
Learning Level: Basic (Foundational) to Intermediate (Applied)
Bio-based Materials Focus: Specific (hemp-lime)
Suggested Audiences: Designers, builders, homeowners, and practitioners

Light Earth Building: A Handbook for Building with Wood and Earth.

Resource: Volhard, F. (2016). Light Earth Building: A Handbook for Building with Wood and Earth. Birkhäuser. https://www.birkhauser.com/en/book/9783035606348
Format: Book
Reviewers: Team 2: Processing & Manufacturing
Summary: This resource provides a comprehensive handbook on light earth construction, focusing on timber frame systems with clay or earth infill. It covers the history, material properties, and design considerations of earthen buildings, along with detailed guidance on production methods, mix design, and construction techniques. The book includes practical tips for self building and illustrates how light earth can be used in both new construction and the renovation of traditional timber structures, particularly within a European context. It is worth reading because it offers a well developed and practical foundation for working with earth as a building material. For architects, engineers, builders, and self builders, it provides clear guidance on how to design and construct light earth systems. While the content is specific to this construction typology and assumes proper execution for performance, it remains a strong reference for those seeking to apply earthen methods in contemporary building, with the understanding that additional engineering and regional adaptation may be required.
Learning Level: Intermediate (Applied)
Bio-based Materials Focus: Specific (earth)
Suggested Audiences: Architects, engineers, builders, manufacturers, and self builders

Bio-based building materials: Proceedings of ICBBM 2025

Resource: Amziane, S., Toledo Filho, R. D., Rajiv da Gloria, M. Y., & Page, J. (Eds.). (2025). Bio-based building materials: Proceedings of ICBBM 2025 (Vol. 60, RILEM Bookseries). Springer Cham. https://doi.org/10.1007/978-3-031-92777-5
Format: Scientific proceedings
Reviewers: Team 2: Processing & Manufacturing

Summary: This resource is a collection of peer reviewed papers from the International Conference on Bio based Building Materials, presenting current research on a wide range of materials and systems. Topics include material properties, structural performance, durability, processing methods, and emerging applications such as agricultural byproducts and bio composites, with some coverage of life cycle assessment and circularity. The papers reflect ongoing innovation across the field, though they vary in depth and focus and are organized as individual studies rather than a unified narrative. It is worth reading because it offers a valuable snapshot of where research is heading and what topics are gaining attention across the global research community. For researchers, engineers, and manufacturers, it provides access to detailed studies and comparative performance data that can inform future development. While the content can be difficult to navigate, is often small scale, and is less focused on real world application, policy, or market adoption, it remains an important resource for understanding emerging directions and technical advancements in bio based materials.
Learning Level: Advanced (Expert / Technical)
Bio-based Materials Focus: Multiple (wide range bio-based)
Suggested Audiences: Researchers, engineers, academics, and manufacturers

BEAM Estimator

Resource: Builders for Climate Action. (n.d.). BEAM Estimator [Web-based embodied carbon estimation tool]. Retrieved August 30, 2025, from https://www.buildersforclimateaction.org/beam-estimator.html
Format: Web Tool
Reviewers: Team 2: Processing & Manufacturing
Summary: This resource is a web based tool that estimates the embodied carbon of residential building projects, allowing users to compare material choices and explore lower carbon alternatives, including some bio based options. Designed for early stage use, it works from schematic inputs to provide accessible, transparent calculations that help guide design decisions. The tool focuses on cradle to gate impacts and includes a defined set of materials, making it best suited for quick comparisons rather than comprehensive life cycle analysis. It is worth reading because it makes embodied carbon visible and actionable in a simple and user friendly format. For designers, builders, and homeowners, it offers a practical way to test options and adjust specifications toward lower carbon outcomes early in the process. While it does not integrate with BIM, excludes some systems, and is not a full life cycle tool, it is highly effective as an entry point and screening tool, often used alongside more detailed software for deeper analysis.
Learning Level: Basic (Foundational) to Intermediate (Applied)
Bio-based Materials Focus: General (includes bio-based options)
Suggested Audiences: Designers, builders, homeowners, and manufacturers

Material Cultures

Resource: Material Cultures. (2023). Planting Buildings Reports [Postgraduate technical research report]. ETH Zurich. Retrieved August 29, 2025, from https://materialcultures.org/planting-buildings-reports/
Format: Research report / interactive website
Reviewers: Team 2: Processing & Manufacturing
Summary: This resource is a series of postgraduate research reports and interactive materials that explore plant based building materials through the lens of cultivation, processing, and application. Organized in part by feedstock, it examines how materials grow, how they are processed, and how they can be used in construction, supported by prototypes, case studies, and design research. Grounded in European and UK contexts, the work connects agriculture, land use, and building systems, highlighting how local production, labor, and ecological conditions shape material possibilities. It is worth reading because it offers an engaging and accessible way to explore bio-based materials as part of a larger system that includes land, community, and construction. For designers, students, manufacturers, and specifiers, it provides valuable insight into alternative materials and emerging applications. While it does not provide direct material comparisons or detailed embodied carbon data, it stands out for its creative, systems based approach and its ability to connect material innovation with ecological and social context.
Learning Level: Basic (Foundational) to Intermediate (Applied)
Bio-based Materials Focus: Multiple (plant-based systems)
Suggested Audiences: Design students, designers, manufacturers, specifiers, and building professionals

Biofabricate, & Fashion for Good

Resource: Biofabricate, & Fashion for Good. (2020). Understanding biomaterial innovations: 2021 report [Web report]. Fashion for Good & Biofabricate. Retrieved August 30, 2025, from https://app.box.com/s/amjq9anszv8hvwdexoxg6wubes4aaxqa
Format: Report
Reviewers: Team 2: Processing & Manufacturing
Summary: This resource provides an overview of emerging biomaterials, offering clear definitions, process maps, and a snapshot of innovation across materials derived from biological systems such as mycelium, fermentation, and bio engineered fibers. While centered on the fashion and textile industry, it outlines how biomaterials are researched, tested, validated, and brought to market, including considerations of environmental and social impacts, circularity, and early stage scalability. Many of the materials discussed are still in development, so the report focuses more on frameworks and opportunities than detailed technical performance. It is worth reading because it establishes a common language and foundational understanding for a rapidly evolving field. For innovators, manufacturers, and researchers, it provides a useful reference for how biomaterials move from concept to commercialization. While its direct application to the building industry is limited, the insights into material development, supply chains, and scaling pathways are

transferable. It serves as a strong entry point for those beginning to explore or develop bio based materials.
Learning Level: Basic (Foundational) to Intermediate (Applied)
Bio-based Materials Focus: Multiple (mycelium, bio-fibers, etc.)
Suggested Audiences: Manufacturers, innovators, researchers, and industry stakeholders

Building with biomass: A new American harvest—How manufacturing building products from domestically sourced upcycled biomass can create more jobs and affordable healthy housing

Resource: Magwood, C., Bukauskas, A., Huynh, T., & Olgyay, V. (2025, April). Building with biomass: A new American harvest—How manufacturing building products from domestically sourced upcycled biomass can create more jobs and affordable healthy housing [Web report]. Rocky Mountain Institute.
https://rmi.org/insight/building-with-biomass-a-new-american-harvest/
Format: Report
Reviewers: Team 2: Processing & Manufacturing
Summary: This resource presents a comprehensive analysis of how upcycled biomass from agriculture and forestry can be transformed into building products that store carbon, reduce emissions, and support domestic manufacturing. It outlines a regional and circular supply chain approach, showing how underutilized feedstocks can be converted into materials that contribute to affordable housing, job creation, and climate mitigation. The report includes background on embodied carbon, a range of bio based product types, and case examples, while also identifying gaps in current markets and opportunities for scaling production across the United States. It is worth reading because it connects material innovation with economic and policy strategy in a clear and actionable way. For manufacturers, designers, builders, and policymakers, it provides a compelling case for expanding bio based materials through coordinated supply chains and supportive policy frameworks. While some technical aspects may be complex and areas such as safety and public acceptance are less developed, it remains a strong and well documented resource for advancing carbon storing materials at scale.
Learning Level: Intermediate (Applied) to Advanced (Expert / Technical
Bio-based Materials Focus: Multiple (agricultural + forestry biomass)
Suggested Audiences: Manufacturers, designers, builders, policymakers, agricultural stakeholders, and industry leaders

Embodied carbon review

Resource: One Click LCA Ltd. (2018). Embodied carbon review [Report]. One Click LCA.
https://143253260.fs1.hubspotusercontent-eu1.net/hubfs/143253260/Ebooks/Embodied_Carbon_Review_updated%202021.pdf
Format: Report
Reviewers: Team 2: Processing & Manufacturing
Summary: This resource provides a comprehensive overview of embodied carbon in the built environment, covering carbon accounting methods, reduction strategies, and global trends. It maps how emissions occur across the material lifecycle and highlights the

growing importance of embodied carbon as operational impacts decline. The report includes a broad review of international policies, certification systems, and standards, comparing how different regions are addressing embodied carbon through regulations, building codes, and industry frameworks. It also outlines best practices, including material efficiency, use of bio based and low carbon materials, and case examples of implementation. It is worth reading because it brings together a wide range of global approaches into a clear and structured reference. For policymakers, city planners, designers, manufacturers, and builders, it offers a strong primer on how embodied carbon is being measured, regulated, and reduced across jurisdictions. While it focuses primarily on carbon and less on social or labor considerations, it provides valuable insight into the current landscape and the need for coordinated standards and policy to drive meaningful change.
Learning Level: Basic (Foundational) to Intermediate (Applied)
Bio-based Materials Focus: General (includes bio-based)
Suggested Audiences: Policymakers, city planners, designers, manufacturers, and builders

2050 Materials: Sustainability data for building materials

Resource: 2050 Materials. (n.d.). 2050 Materials: Sustainability data for building materials [Website]. Retrieved August 31, 2025, from https://2050-materials.com/
Format: Website
Reviewers: Team 2: Processing & Manufacturing
Summary: This resource is a digital platform that aggregates sustainability data for building materials, with a strong focus on embodied carbon and environmental product declarations. It allows users to search, filter, and compare materials, supporting specification and procurement decisions with accessible performance data. The platform brings together a large dataset of products and certifications, enabling users to evaluate options and identify lower carbon alternatives across projects. It is worth reading because it supports more data driven material selection by making environmental information easier to access and compare. For designers and specifiers, it offers a useful tool for assessing embodied carbon and exploring alternative products. While the platform is most effective for those who already understand what data to look for, and may have gaps in certain material categories, it remains a valuable resource for navigating sustainability data within existing product markets.
Learning Level: Intermediate (Applied)
Bio-based Materials Focus: General (database includes bio-based)
Suggested Audiences: Designers, specifiers, and procurement professionals

Free Encyclopedia of Sustainable Building Materials

Resource: Endeavour Centre. (n.d.). Free Encyclopedia of Sustainable Building Materials [Online materials encyclopedia]. Retrieved August 31, 2025, from https://endeavourcentre.org/resources-for-building-green/free-encyclopedia-of-sustainable-building-materials/

Format: Website
Reviewers: Team 2: Processing & Manufacturing
Summary: This resource is an online encyclopedia that provides an extensive and searchable collection of sustainable and bio based building materials, along with related systems and design approaches. Organized by material type and supported by a set of evaluation criteria, it offers accessible overviews of properties, sourcing, environmental impacts, and applications. The platform also connects to courses and additional educational resources, helping users build foundational knowledge across a wide range of materials. It is worth reading because it makes sustainable material options visible and approachable, showing that natural alternatives exist for many common building applications. For designers, builders, and clients, it serves as a practical reference for exploring and selecting materials. While the depth of information can vary and citations are not always fully transparent, it remains a highly useful starting point for understanding material choices, performance considerations, and low carbon strategies.
Learning Level: Basic (Foundational)
Bio-based Materials Focus: Multiple (wide material library)
Suggested Audiences: Designers, builders, clients, manufacturers, and DIY practitioners

Trace Material: Season 2 - Plastics

Resource: Healthy Materials Lab. (2022). Trace Material: Season 2 – Plastics [Audio podcast series]. Parsons School of Design. Retrieved September 2, 2025, from https://healthymaterialslab.org/projects/season-2
Format: Podcast series
Reviewers: Team 2: Processing & Manufacturing
Summary: This resource is an audio podcast series that explores plastics through environmental, cultural, and material perspectives, as part of a broader set of seasons examining materials such as hemp and fungi. Through conversations with designers, researchers, and advocates, it traces the rise of plastics from invention to widespread use, examining their impacts on human health, including microplastics, as well as environmental and policy implications. The series connects material development with systems of production, consumption, and regulation.It is worth reading because it offers an accessible and engaging way to understand the complexity and consequences of material choices. For general audiences, designers, and students, it provides a compelling narrative that builds awareness of our dependence on plastics while encouraging reflection on alternatives and future pathways. While it does not offer direct technical solutions, it is a strong educational resource that raises critical questions and highlights the urgency of material transitions.
Learning Level: Basic (Foundational) to Intermediate (Applied)
Bio-based Materials Focus: None (other material)
Suggested Audiences: General audiences, designers, students, educators, and industry stakeholders

Manual of Biogenic House Sections

Resource: Lewis, P., Tsurumaki, M., & Lewis, D. J. (2022). Manual of Biogenic House Sections. ORO Editions. Retrieved August 29, 2025, from https://oroeditions.com/product/manual-of-biogenic-house-sections
Format: Book
Reviewers: Team 3: Design & Specification
Summary: This resource presents a collection of detailed architectural sections from fifty five built projects, illustrating how biogenic materials such as timber, cellulose, cork, and earth can be integrated into residential construction. Through precise drawings, axonometrics, and supporting imagery, it makes building assemblies legible, showing how material choices, layering, and construction techniques contribute to carbon reduction, regenerative cycles, and healthier living environments. The book builds a visually compelling case for rethinking the material basis of architecture in response to environmental challenges. It is worth reading because it translates the promise of biogenic materials into real world design and construction detail. For architects, designers, and students, it serves as both a reference and a teaching tool, offering clear examples that can inform specification and application. While it focuses on case studies rather than broader theory, it is a valuable complement to other resources, helping bridge the gap between concept and built work.
Learning Level: Intermediate (Applied)
Bio-based Materials Focus: Multiple (timber, cork, cellulose, earth)
Suggested Audiences: Architects, designers, students, educators, and practitioners

Material Reform: Building for a Post-Carbon Future

Resource: Material Cultures. (2024). Material Reform: Building for a Post-Carbon Future [Illustrated edition]. MACK Books. Retrieved August 29, 2025, from https://materialcultures.org/material-reform/
Format: Book
Reviewers: Team 3: Design & Specification
Summary: This resource presents an illustrated collection of essays and conversations that examine the systems, cultures, and infrastructures shaping today's building materials industry. Through text and visuals, it critiques the environmental impacts of current construction practices and explores how locally sourced, bio based materials can support a shift toward post carbon building. The work emphasizes reconnecting design with land, labor, and material production, offering a thoughtful exploration of how architecture can engage more directly with ecological and regional systems. It is worth reading because it clearly articulates the "why" behind material transformation, helping to frame the urgency and opportunity of moving toward bio based and regenerative approaches. For designers and builders, it provides a strong conceptual foundation and a compelling perspective on how everyday project decisions can contribute to broader change. While more focused on ideas and ethos than detailed technical guidance, and with limited cited sourcing in places, it remains a valuable resource for understanding current material systems and imagining more responsible alternatives.
Learning Level: Intermediate (Applied)

Bio-based Materials Focus: General to Multiple (local bio-based emphasis)
Suggested Audiences: Designers, builders, researchers, and practitioners

Build Beyond Zero: New Ideas for Carbon-Smart Architecture

Resource: King, B., & Magwood, C. (2022). Build Beyond Zero: New Ideas for Carbon-Smart Architecture. Island Press. Retrieved August 29, 2025, from https://islandpress.org/books/build-beyond-zero
Format: Book
Reviewers: Team 3: Design & Specification
Summary: This resource presents a clear and accessible exploration of how the built environment can move beyond reducing emissions to actively storing carbon. It outlines the challenges of current construction practices and introduces practical solutions centered on bio based materials, low carbon systems, and design strategies that bank carbon in buildings. Drawing from a range of expert voices, the book connects material choices, policy, and cultural shifts needed to advance carbon smart and regenerative architecture. It is worth reading because it serves as a strong primer on embodied carbon and the role of materials in climate action. For designers, builders, policymakers, and industry stakeholders, it offers both a compelling case for change and actionable pathways to achieve it. The strength of the book lies in its ability to make complex concepts understandable and relevant across the industry, positioning carbon storing materials as a critical part of a regenerative future.
Learning Level: Basic (Foundational) to Intermediate (Applied)
Bio-based Materials Focus: Multiple (bio-based carbon-storing materials)
Suggested Audiences: Designers, builders, policymakers, and industry stakeholders

Innovation of Nothing: The capabilities needed to lead sustainable change in the built environment

Resource: Mossin, N., Hau, I. C., Beim, A., Thomassen, M., Munch-Petersen, P., & Lønberg Petersen, T. (Eds.). (2023). Innovation of Nothing: The capabilities needed to lead sustainable change in the built environment (1st ed.). Det Kongelige Akademi – Institut for Bygningskunst og Teknologi. Retrieved August 29, 2025, from https://royaldanishacademy.com/en/publications
Format: Report / book
Reviewers: Team 3: Design & Specification
Summary: This resource explores how reducing material use and rethinking existing systems can drive meaningful change in the built environment. Through essays, case studies, and research, it introduces approaches centered on sufficiency, reuse, and extending the life of buildings and materials. It brings together examples of innovation in design, construction, and material development, including bio based and passive strategies, while also presenting a methodology for leading change across projects, organizations, and regulatory contexts. It is worth reading because it provides both inspiration and practical guidance for advancing more sustainable and regenerative practices. For designers and industry practitioners, it offers tools, methods, and case

studies that help build confidence and agency to lead change, including how to navigate conversations with clients, funders, and regulatory authorities. While not solely focused on bio based materials, it offers a valuable systems perspective on how these materials fit within broader strategies for transformation, making it a strong resource for addressing both the why and the how of change.
Learning Level: Intermediate (Applied)
Bio-based Materials Focus: General (includes bio-based)
Suggested Audiences: Designers, practitioners, educators, policymakers, and industry leaders

Clay and lime renders, plasters and paints: A how-to guide to using natural finishes

Resource: Weismann, A., & Bryce, K. (2015). Clay and lime renders, plasters and paints: A how-to guide to using natural finishes (Sustainable Building series). Bloomsbury Publishing. Retrieved from https://www.bloomsbury.com/us/clay-and-lime-renders-plasters-and-paints-9780857842718/
Format: Book
Reviewers: Team 3: Design & Specification
Summary: This resource provides a comprehensive and practical guide to natural finishes, focusing on clay and lime renders, plasters, and paints. It covers material types, sourcing, mix design, and application techniques, drawing from the authors' hands-on experience as practitioners. The book walks through how these materials are used in real projects, explaining performance characteristics such as moisture regulation and durability, and offering detailed guidance for installation and finishing. It is worth reading because it serves as a reliable "how to" resource for those ready to work directly with natural finishes. For builders, designers, and hands-on practitioners, it provides clear and applicable knowledge that can be used on site. While the content is niche and primarily geared toward those already interested in these materials, and includes limited referenced research, it remains a strong, experience based guide for applying clay and lime systems in practice.
Learning Level: Basic (Foundational) to Intermediate (Applied)
Bio-based Materials Focus: Specific (clay, lime)
Suggested Audiences: Builders, designers, and hands on practitioners

National wbLCA Practitioner's Guide: Embodied Carbon, Vancouver-specific compliance additions

Resource: City of Vancouver. (2025, April 14). Addendum (v1.0) to the National wbLCA Practitioner's Guide: Embodied Carbon, Vancouver-specific compliance additions [Professional addendum]. City of Vancouver. Retrieved August 31, 2025, from https://www.vancouver.ca/files/cov/embodied-carbon-vancouver-addendum-national-wblca-practitioners-guide.pdf
Format: Professional addendum / report
Reviewers: Team 3: Design & Specification
Summary: This resource provides a Vancouver specific addendum to the national whole

building life cycle assessment guide, outlining how embodied carbon requirements are defined and applied within a municipal regulatory framework. It clarifies compliance pathways, reporting expectations, and calculation boundaries, including definitions such as short cycle biogenic carbon and guidance on how biogenic materials are accounted for in LCA. The document also acknowledges limitations in current tools and methodologies, offering insight into how these challenges are being addressed in practice. It is worth reading because it demonstrates how embodied carbon policy is moving from guidance into enforceable regulation at the city level. For designers, consultants, manufacturers, and policymakers, it offers a clear example of how biogenic materials and carbon accounting are being defined and implemented in real projects. While it is part of a larger national guide and more focused on compliance than broader material strategy, it provides valuable clarity on evolving standards and signals the direction of future regulatory frameworks.
Learning Level: Advanced (Expert / Technical)
Bio-based Materials Focus: General (includes biogenic carbon)
Suggested Audiences: Designers, consultants, manufacturers, policymakers, and regulatory professionals

Communicating the importance of embodied carbon and bio-based materials in the built environment

Resource: Carbon Neutral Cities Alliance. (2022). Communicating the importance of embodied carbon and bio-based materials in the built environment [Factsheet]. Carbon Neutral Cities Alliance.
https://carbonneutralcities.org/wp-content/uploads/2022/06/3.d.-Comms_Embodied-carbon_Biobased_Factsheets.pdf
Format: Factsheet
Reviewers: Team 3: Design & Specification
Summary: This resource is a concise and highly accessible factsheet that explains the importance of embodied carbon in the built environment and provides strategies for communicating its impact. It presents key data, clear messaging, and real world municipal examples to support policy development and implementation, emphasizing whole life cycle thinking and the need to reduce emissions through material choices and reuse strategies. While it introduces lower carbon materials, including bio based options, the primary focus remains on embodied carbon policy and communication. It is worth reading because it translates complex concepts into clear, actionable language that can support decision making and advocacy. For policymakers, urban planners, and designers, it serves as a practical tool for building the case for embodied carbon regulations and aligning stakeholders around shared goals. While it offers limited depth on bio-based materials and topics such as equity or health, it is a strong and effective resource for advancing policy conversations and guiding early stage strategies across cities.
Learning Level: Basic (Foundational) to Intermediate (Applied)
Bio-based Materials Focus: General (includes bio-based)
Suggested Audiences: Policymakers, urban planners, designers, and decision makers

Healthy Materials Lab

Resource: Healthy Materials Lab. (n.d.). Healthy Materials Lab [Design research lab website]. Parsons School of Design. Retrieved August 30, 2025, from https://healthymaterialslab.org/
Format: Website
Reviewers: Team 3: Design & Specification
Summary: This resource is a design research platform dedicated to advancing healthier building materials, with a focus on human and environmental health, particularly for vulnerable populations such as women and children in residential environments. It offers a wide range of resources including material guidance, case studies, articles, courses, and tools grounded in frameworks such as the Six Classes approach to reducing toxic exposures. The site brings together research, education, and practice to support more informed material selection and design decisions. It is worth reading because it provides an accessible and evolving knowledge base for integrating health into material choices. For designers, architects, and specifiers, it offers practical guidance, curated product information, and educational content from leading experts. While the breadth of resources can vary in depth and benefit from careful curation, it remains a valuable platform for building literacy around material health and advancing healthier, more responsible design practices.
Learning Level: Basic (Foundational) to Intermediate (Applied)
Bio-based Materials Focus: General (includes bio-based options)
Suggested Audiences: Designers, architects, specifiers, educators, and students

Trace Material: Season 3 – Fungi

Resource: Healthy Materials Lab. (2023). Trace Material: Season 3 – Fungi [Audio podcast series]. Parsons School of Design. Retrieved September 2, 2025, from https://healthymaterialslab.org/projects/season-3-fungi
Format: Podcast series
Reviewers: Team 3: Design & Specification
Summary: This resource is an audio podcast series that explores fungi as an emerging bio based material through conversations with designers, scientists, and innovators. It examines fungi's role in ecological systems and its potential applications across industries, including mycelium based materials for construction, textiles, and remediation. Through a range of voices and perspectives, the series highlights how fungi can be grown and shaped into useful products while also addressing the opportunities and limitations of this evolving material field. It is worth reading because it offers an engaging and accessible way to learn about a rapidly developing material category. For audiences interested in cultivation, sourcing, and material innovation, it provides valuable insight into how fungi based systems are produced and applied. While it is less suited for direct design specification without additional research, it serves as a strong educational entry point that builds awareness and curiosity around future material possibilities.
Learning Level: Basic (Foundational) to Intermediate (Applied)
Bio-based Materials Focus: Specific (fungi / mycelium)
Suggested Audiences: Students, educators, researchers, manufacturers, and general audiences

Trace Material: Series

Resource: Robinson, A., & Brown, B. (Hosts). (2020–). Trace Material [Audio podcast series]. Healthy Materials Lab, Parsons School of Design. Retrieved August 30, 2025, from https://healthymaterialslab.org/projects/podcast-trace-material/
Format: Podcast series
Reviewers: Team 3: Design & Specification
Summary: This resource is an ongoing audio podcast series that explores materials through environmental, cultural, and human health perspectives. Across multiple seasons focused on materials such as hemp, plastics, and fungi, it brings together diverse voices to examine supply chains, market forces, policy, and real world applications. The series traces materials from origin to impact, offering a well researched and engaging view of how materials shape the built environment and broader systems. It is worth reading because it provides an accessible and flexible way to learn about complex material topics through storytelling and expert dialogue. For a wide range of audiences, it builds awareness of how materials connect to health, environment, and industry practices, often encouraging deeper exploration through related resources. While the podcast format limits visual and technical detail and reflects a curated, media driven lens, it remains a valuable and engaging educational tool that supports understanding across sectors.
Learning Level: Basic (Foundational) to Intermediate (Applied)
Bio-based Materials Focus: Multiple
Suggested Audiences: Designers, builders, educators, students, and general audiences

Earthen Floors: A Modern Approach to an Ancient Practice

Resource: Crimmel, S. R., & Thomson, J. (2025). Earthen Floors: A Modern Approach to an Ancient Practice (2nd ed.). New Society Publishers. Retrieved August 28, 2025, from https://books.google.com/books/about/Earthen_Floors_Second_Edition.html?id=XKh-EQAAQBAJ
Format: Book
Reviewers: Team 4: Construction & Application
Summary: This resource provides a comprehensive and accessible guide to designing and installing earthen floors, combining traditional knowledge with contemporary practice. It walks through the full process from material selection and soil assessment to installation, finishing, and maintenance, supported by real world experience and case based insight. The book situates earthen floors within both historical context and current building practice, offering a clear understanding of how this method can be applied in modern residential construction. It is worth reading because it serves as a practical training tool for working with natural materials at the building scale. For builders, designers, homeowners, and contractors, it offers step by step guidance that can be directly applied in practice. While focused on a specific application and requiring adaptation to local soil conditions, it provides a strong foundation for those looking to implement low impact, earth based construction techniques with confidence.
Learning Level: Basic (Foundational) to Intermediate (Applied)

Bio-based Materials Focus: Specific (earth)
Suggested Audiences: Builders, designers, homeowners, contractors, and practitioners

Martin Rauch: Refined Earth – Construction & Design with Rammed Earth

Resource: Kapfinger, O., & Sauer, M. (Eds.). (2015). Martin Rauch: Refined Earth – Construction & Design with Rammed Earth [E-book]. Birkhäuser. Retrieved August 28, 2025, https://www.degruyterbrill.com/document/doi/10.11129/9783955532741/html#overview
Format: Book
Reviewers: Team 4: Construction & Application
Summary: This resource presents a detailed exploration of rammed earth construction through the work of Martin Rauch, combining design philosophy, technical development, and built case studies. It includes annotated drawings, section details, and project examples that illustrate how rammed earth is used in walls, floors, and prefabricated elements, along with guidance on structural considerations such as openings and assemblies. The book documents the evolution of rammed earth into a refined contemporary system, grounded in both traditional knowledge and advanced architectural practice. It is worth reading because it offers a strong balance of technical insight and design application. For architects, designers, builders, and educators, it provides practical information that can inform real world projects, particularly for those working with earthen systems at a professional level. While not a step by step manual and potentially more accessible to those with industry experience, it remains a valuable reference for understanding how rammed earth can be executed with precision and innovation.
Learning Level: Intermediate (Applied) to Advanced (Expert / Technical)
Bio-based Materials Focus: Specific (rammed earth)
Suggested Audiences: Architects, designers, builders, contractors, and educators

Essential Hempcrete Construction: The Complete Step-by-Step Guide

Resource: Magwood, C. (2016). Essential Hempcrete Construction: The Complete Step-by-Step Guide. New Society Publishers. Retrieved August 29, 2025, from https://books.google.com/books/about/Essential_Hempcrete_Construction.html?id=eU6HDAAAQBAJ
Format: Book
Reviewers: Team 4: Construction & Application
Summary: This resource provides a comprehensive and accessible guide to designing and building with hempcrete, covering everything from basic material properties and building science principles to mix design, formwork, installation, and finishing. Supported by diagrams, tables, and step by step instruction, it offers practical guidance grounded in real world application, along with context on building codes and permitting. The content is largely situated in a North American context and focuses on cast in place systems. It is worth reading because it serves as a reliable manual for applying hempcrete in practice. For builders, designers, and homeowners, it offers clear and actionable instruction that can support both design and construction phases. While newer methods such as spray

applications and prefabricated systems are less developed in this edition, it remains a strong foundational resource, particularly for small scale projects and those entering hemp based construction.
Learning Level: Basic (Foundational) to Intermediate (Applied)
Bio-based Materials Focus: Specific (hempcrete)
Suggested Audiences: Builders, designers, homeowners, and practitioners

Essential Prefab Straw Bale Construction: The Complete Step-by-Step Guide

Resource: Magwood, C. (2016). Essential Prefab Straw Bale Construction: The Complete Step-by-Step Guide. New Society Publishers. Retrieved August 29, 2025, from https://newsociety.com/book/essential-prefab-straw-bale-construction/?gad_source=1&gad_campaignid=21715137017&gbraid=0AAAAAC6H4jcqxMTMJxNZkldidkau2qgU0&gclid=Cj0KCQjww4TGBhCKARIsAFLXndTFHsfwgYD1dzcvA27OfGJHPnFbzJG3PYUsUcO7k6cw_u-HRUiNwBAaAs_uEALw_wcB
Format: Book
Reviewers: Team 4: Construction & Application
Summary: This resource provides a practical guide to prefabricated straw bale construction, focusing on panelized systems that improve efficiency, consistency, and performance. It explains the evolution from site built straw bale methods to prefabricated panels, outlining design considerations, fabrication processes, and on site assembly. Supported by step by step instruction, technical specifications, and references to US and Canadian building codes, the book addresses challenges such as labor intensity and limited adoption, while demonstrating how off site construction can improve quality control and scalability. It is worth reading because it offers a clear pathway for translating straw bale construction into a more repeatable and market ready system. For designers, builders, contractors, and entrepreneurs, it provides actionable guidance and insight into both construction techniques and opportunities for product development. While focused on a specific system and with limited discussion of end of life scenarios, it remains a valuable resource for advancing bio based construction through prefabrication.
Learning Level: Intermediate (Applied)
Bio-based Materials Focus: Specific (straw)
Suggested Audiences: Designers, builders, contractors, entrepreneurs, and practitioners

Building with Earth: Design and Technology of a Sustainable Architecture

Resource: Minke, G. (2025). Building with Earth: Design and Technology of a Sustainable Architecture (5th rev. ed.). Birkhäuser. Retrieved August 29, 2025, from https://birkhauser.com/en/book/9783035627688
Format: Book
Reviewers: Team 4: Construction & Application
Summary: This resource provides a comprehensive and technically grounded overview of earthen construction, covering a wide range of applications including walls, floors, plasters, and structural systems. It explores the history and capabilities of earth as a building material while detailing material properties, testing methods, preparation, and

construction techniques such as rammed earth, adobe, and earth blocks. The book integrates traditional knowledge with contemporary practice and includes examples of built projects across different climates, along with technical topics such as structural performance and seismic behavior. It is worth reading because it serves as a foundational reference for understanding earth as a viable and sophisticated construction material. For architects, engineers, and builders, it offers in-depth technical knowledge supported by decades of research and practice. While the content is dense and best suited for those with some industry background, and case studies are less focused on detailed application analysis, it remains one of the most comprehensive resources available for advancing earthen construction in modern architecture.
Learning Level: Intermediate (Applied) to Advanced (Expert / Technical)
Bio-based Materials Focus: Specific (earth)
Suggested Audiences: Architects, engineers, builders, researchers, and advanced practitioners

The Natural Building Companion: A Comprehensive Guide to Integrative Design and Construction

Resource: Racusin, J. D., & McArleton, A. (2012). The Natural Building Companion: A Comprehensive Guide to Integrative Design and Construction (illustrated ed.). Chelsea Green Publishing. Retrieved August 29, 2025, from https://books.google.com/books/about/The_Natural_Building_Companion.html?id=k354gKVr0wIC
Format: Book
Reviewers: Team 4: Construction & Application
Summary: This resource provides a comprehensive and integrative overview of natural building, connecting design, materials, and construction into a cohesive whole. It covers systems such as straw bale, timber framing, and earthen construction, while emphasizing building science, durability, and performance, particularly in challenging climates. The book presents both conceptual frameworks and practical guidance, supported by examples, appendices, and resources that help translate holistic design into real world application. It is worth reading because it offers a strong big picture understanding of how natural materials work together within complete building systems. For designers, builders, and clients, it serves as both an inspirational and instructional guide to integrative design. While written over a decade ago and less focused on newer innovations or highly detailed technical documentation, it remains a valuable and widely respected resource for grounding practice in holistic, performance based natural building principles.
Learning Level: Intermediate (Applied)
Bio-based Materials Focus: Multiple (straw, earth, timber)
Suggested Audiences: Designers, builders, clients, students, and practitioners

Sustainable building essentials series

Resource: New Society Publishers. (2016–2024). Sustainable building essentials series (14 vols.). Gabriola Island, BC: New Society Publishers.

https://newsociety.com/series/sustainable-building-essentials-series
Format: Book series
Reviewers: Team 4: Construction & Application
Summary: This resource is a collection of concise, topic focused books covering a wide range of sustainable and bio based building materials and systems, including straw, hemp, earth construction, and natural building strategies. Each volume offers practical, step by step guidance supported by illustrations, diagrams, and real world experience, making complex construction methods accessible. Together, the series provides a cross disciplinary foundation that connects design, building science, and hands-on construction. It is worth reading because it serves as a reliable set of technical manuals for learning and applying natural building methods. For designers, builders, contractors, and homeowners, the series offers focused guidance that can be used individually or as a broader learning pathway. While some volumes reflect methods and knowledge from the late 2010s and may benefit from more recent updates, the core principles, construction techniques, and material insights remain highly relevant and widely applicable.
Learning Level: Basic (Foundational) to Intermediate (Applied)
Bio-based Materials Focus: Multiple (straw hemp, earth, systems)
Suggested Audiences: Designers, builders, contractors, homeowners, and practitioners

Prescriptions for a Healthy House, 4th edition: A practical guide for architects, builders and homeowners

Resource: Baker-Laporte, P., & Banta, J. C. (2022). Prescriptions for a Healthy House, 4th edition: A practical guide for architects, builders and homeowners. MCWriting.com. Retrieved August 29, 2025, from https://www.econestarchitecture.com/shop/prescriptions-for-a-healthy-house-4th-edition-a-practical-guide-for-architects-builders-homeowners
Format: Book
Reviewers: Team 5: Use, Maintenance, End-of-Life
Summary: This resource provides a comprehensive and practical guide to designing, building, and maintaining homes that prioritize human health. It covers the full building system from foundation to finishes, with a strong focus on indoor air quality, moisture control, material toxicity, and ventilation. Drawing from decades of field experience, the book offers detailed recommendations for reducing harmful exposures and creating durable, health supportive environments, with expanded content in this edition addressing furnishings and ongoing maintenance. It is worth reading because it offers clear, actionable guidance for integrating health into residential design and construction. For architects, builders, homeowners, and health focused practitioners, it serves as a valuable reference for making informed material and system choices. While its emphasis is on occupant health rather than embodied carbon or circularity, and some recommendations may benefit from further validation against broader research, it remains a strong supplementary resource for understanding the relationship between materials, building systems, and human well being.
Learning Level: Basic (Foundational) to Intermediate (Applied)

Bio-based Materials Focus: General to Multiple (includes some bio-based)
Suggested Audiences: Architects, builders, homeowners, and health focused practitioners

Natural Building Materials S, M, L: 30 x Architecture and Construction

Resource: Hofmeister, S. (Ed.). (2024). Natural Building Materials S, M, L: 30 x Architecture and Construction [Paperback]. Edition Detail. Retrieved August 29, 2025, from https://www.detail.de/de_en/naturbaustoffe-s-m-l (DETAIL Architecture)
Format: Book
Reviewers: Team 5: Use, Maintenance, End-of-Life
Summary: This resource presents a curated collection of 30 built projects that demonstrate the use of natural and bio based materials across a range of architectural scales. Through detailed drawings, photographs, and project documentation, it highlights how materials such as timber, earth, and plant based systems are applied in real world construction, with a focus on assemblies, detailing, and performance. The projects reflect a strong alignment with environmental goals and emerging standards, offering insight into how natural materials can be integrated into contemporary practice. It is worth reading because it provides both inspiration and technical grounding through built examples. For architects, planners, and sustainability professionals, it serves as a valuable reference for understanding how bio based materials perform and how they can be implemented across project types. While the content is more accessible as case based exploration than step by step guidance, and may lean toward European standards, it offers a strong foundation for design ideation, professional education, and advancing natural materials in practice.
Learning Level: Intermediate (Applied) to Advanced (Expert / Technical)
Bio-based Materials Focus: Multiple (timber, earth, plant-based)
Suggested Audiences: Architects, planners, educators, sustainability professionals, and practitioners

Upscaling bio-based construction: Challenges and opportunities

Resource: Dams, B., Maskell, D., Shea, A., Allen, S., Cascione, V., & Walker, P. (2023). Upscaling bio-based construction: Challenges and opportunities. Building Research & Information, 51(7), 764–782. https://doi.org/10.1080/09613218.2023.2204414
Format: Scientific article
Reviewers: Team 5: Use, Maintenance, End-of-Life
Summary: This resource examines the challenges and opportunities involved in scaling bio based construction from niche applications to broader industry adoption. Drawing on peer reviewed research and expert insights, it identifies key barriers including supply chain limitations, regulatory constraints, financial models, and market readiness. The article highlights opportunities for growth through standardization, policy alignment, local production, and industry collaboration, offering a systems level perspective on how bio based materials can move into mainstream practice. It is worth reading because it provides a credible and well structured analysis of the conditions needed to scale bio based construction. For policymakers, researchers, and industry leaders, it offers clear identification of leverage points such as procurement strategies, incentives, and

partnerships that can accelerate adoption. While more strategic than practical in application and written in an academic tone, it serves as a strong foundation for policy development, education, and long term planning, particularly when paired with more applied tools and frameworks.
Learning Level: Advanced (Expert / Technical)
Bio-based Materials Focus: General (bio-based systems)
Suggested Audiences: Policymakers, researchers, architects, engineers, and sustainability professionals

Barriers and opportunities of fast-growing biobased material use in buildings

Resource: Göswein, V., Arehart, J., Phan-Huy, C., Pomponi, F., & Habert, G. (2022). Barriers and opportunities of fast-growing biobased material use in buildings. Buildings and Cities, 3(1), 745–755. https://doi.org/10.5334/bc.254
Format: Scientific article
Reviewers: Team 5: Use, Maintenance, End-of-Life
Summary: This resource examines the role of fast growing bio based materials such as straw, hemp, and bamboo in reducing the environmental impact of the built environment. It combines quantitative modeling with systems analysis to compare carbon benefits, timelines, and availability, while identifying barriers related to supply chains, land use, regulation, and market adoption. The article highlights how different materials can serve distinct roles, such as insulation strategies in retrofit contexts and structural applications in rapidly developing regions. It is worth reading because it provides a clear, evidence based perspective on how fast growing materials can contribute to decarbonization at scale. For policymakers, researchers, and industry professionals, it offers valuable insight into material availability, carbon accounting, and strategic use cases that can inform both policy and design decisions. While the content is analytical and less focused on built examples or social dimensions, it serves as a strong foundation for advocacy, education, and long term planning around bio based materials.
Learning Level: Advanced (Expert / Technical)
Bio-based Materials Focus: Specific + Multiple (straw, bamboo, hemp)
Suggested Audiences: Policymakers, researchers, architects, engineers, and sustainability professionals

Wood: Is It Still Good? Part One: Embodied Carbon

Resource: Melton, P. J. (2024, January 29). Wood: Is It Still Good? Part One: Embodied Carbon. BuildingGreen Spotlight Report. BuildingGreen, Inc. Retrieved August 30, 2025, from
https://www.buildinggreen.com/feature/wood-it-still-good-part-one-embodied-carbon
Format: Report / article
Reviewers: Team 5: Use, Maintenance, End-of-Life
Summary: This resource critically examines the assumption that wood is inherently carbon neutral, drawing on perspectives from organizations such as the World Resources Institute, IPCC, ISO frameworks, and LCA practitioners. It explores how forestry practices, carbon

accounting methods, and life cycle assumptions influence the true climate impact of wood products. The report highlights key issues such as timing of carbon storage, scale of harvesting, and the limitations of current LCA methodologies, emphasizing the need for more transparent and accurate approaches. It is worth reading because it challenges widely held assumptions and provides a more nuanced, evidence based understanding of biogenic carbon. For designers, policymakers, manufacturers, and sustainability professionals, it offers critical insight into how wood should be evaluated within low carbon strategies. While the content is technically dense and does not provide step by step tools or case studies, it serves as an important reference for questioning current practices and supporting more responsible, circular, and informed material decisions.
Learning Level: Intermediate (Applied) to Advanced (Expert / Technical)
Bio-based Materials Focus: Specific (wood)
Suggested Audiences: Designers, policymakers, manufacturers, sustainability professionals, and researchers

Wood: Is It Still Good? Part Two: Moving from Carbon to Climate

Resource: Melton, P. J. (2024, February 26). Wood: Is It Still Good? Part Two: Moving from Carbon to Climate. BuildingGreen Feature. BuildingGreen, Inc. Retrieved August 30, 2025, from https://www.buildinggreen.com/feature/wood-it-still-good-part-two-moving-carbon-climate
Format: Report / article
Reviewers: Team 5: Use, Maintenance, End-of-Life
Summary: This resource expands the discussion of wood beyond carbon accounting to a broader evaluation of climate impact. It introduces the concept of climate smart forestry, emphasizing the importance of forest ecosystems, biodiversity, rural economies, and social considerations alongside carbon metrics. Drawing on perspectives from scientists, foresters, and industry voices, the article outlines practical guidance through key principles such as material efficiency, diversity in forestry models, and economic fairness in sourcing. It is worth reading because it reframes how wood should be evaluated within sustainable design, moving from simplified carbon calculations toward a more holistic, systems based understanding. For designers, policymakers, and sustainability professionals, it offers a clearer and more accessible perspective than Part One, helping to bridge complex ideas into actionable thinking. While less focused on quantitative data or detailed technical frameworks, it is a valuable resource for education, planning discussions, and shaping more responsible material strategies.
Learning Level: Intermediate (Applied)
Bio-based Materials Focus: Specific (wood)
Suggested Audiences: Designers, policymakers, sustainability professionals, and industry stakeholders

Carbon-Storing Materials: Summary Report

Resource: Kriegh, J., Magwood, C., & Srubar, W. (2021, February). Carbon-Storing Materials: Summary Report [Web report]. Carbon Leadership Forum, University of Washington. Retrieved August 30, 2025, from https://carbonleadershipforum.org/carbon-storing-materials/
Format: Web report
Reviewers: Team 5: Use, Maintenance, End-of-Life
Summary: This resource provides an overview of carbon storing materials in the built environment, focusing on bio based and biogenic products such as wood, straw, hemp, and emerging materials. It explains how carbon is captured, stored, and accounted for across the material lifecycle, and presents structured comparisons, scenarios, and timelines for integrating these materials into building design. The report connects embodied carbon frameworks with policy and procurement strategies, highlighting near term opportunities and longer term pathways for scaling carbon storing materials. It is worth reading because it offers a clear and credible foundation for understanding how material choices can contribute to climate goals. For policymakers, designers, and industry professionals, it provides a strong reference for strategic planning, including identifying quick wins and aligning material selection with low carbon policies such as Buy Clean initiatives. While technically dense and less focused on equity or applied case studies, it serves as an important resource for advancing carbon informed design and policy decisions, particularly when paired with more implementation focused tools.
Learning Level: Intermediate (Applied) to Advanced (Expert / Technical)
Bio-based Materials Focus: Multiple (wood, straw, hemp, etc.)
Suggested Audiences: Policymakers, designers, engineers, sustainability professionals, and researchers

The promise of biobased materials—And how to use them now

Resource: Ehrlich, B. (2024, August 7). The promise of biobased materials—And how to use them now. BuildingGreen Spotlight Report. BuildingGreen, Inc. Retrieved August 30, 2025, from https://www.buildinggreen.com/feature/promise-biobased-materials-and-how-use-them-now
Format: Report / article
Reviewers: Team 5: Use, Maintenance, End-of-Life
Summary: This resource provides a comprehensive overview of bio-based materials, explaining their role in carbon storage, environmental performance, and alignment with current standards and certification frameworks. It examines a range of material categories, outlining benefits, trade offs, and appropriate applications, while also addressing the complexities of biogenic carbon accounting. The report synthesizes existing research and industry guidance to help practitioners better understand how these materials fit within current design and construction practices. It is worth reading because it offers a balanced and well structured primer for navigating bio based materials in practice. For designers, specifiers, and sustainability professionals, it supports early stage decision making by clarifying material options, certification pathways, and key considerations. While broad in scope and sometimes more descriptive than deeply technical, it provides a grounded and

practical resource for education, advocacy, and advancing more informed material choices.
Learning Level: Intermediate (Applied)
Bio-based Materials Focus: Multiple (comprehensive bio-based materials)
Suggested Audiences: Designers, specifiers, sustainability professionals, policymakers, and planners

Whole life carbon assessment for the built environment

Resource: Royal Institution of Chartered Surveyors. (2023, September). Whole life carbon assessment for the built environment (2nd ed., Version 3, effective July 1, 2024) [Professional standard]. RICS. ISBN 978-1-78321-503-4. Retrieved August 31, 2025, from https://www.rics.org/content/dam/ricsglobal/documents/standards/Whole_life_carbon_assessment_PS_Sept23.pdf
Format: Professional standard
Reviewers: Team 5: Use, Maintenance, End-of-Life
Summary: This resource is a comprehensive professional standard that establishes a consistent methodology for assessing whole life carbon across the built environment. It defines clear system boundaries and reporting structures across life cycle stages A through D, covering material extraction, construction, use, maintenance, and end of life. The document includes detailed guidance, templates, and appendices to support standardized calculation, benchmarking, and reporting, with alignment to international frameworks and integration of concepts such as biogenic carbon, circularity, and retrofit strategies. It is worth reading because it serves as a gold standard reference for carbon accounting in the built environment. For sustainability leads, policymakers, engineers, and design professionals, it provides the rigor needed to guide project level assessments, set targets, and align with regulatory and certification systems. While highly technical and less focused on social or health dimensions, and requiring adaptation outside UK contexts, it is an essential foundation for advancing consistent, data driven decarbonization strategies.
Learning Level: Advanced (Expert / Technical)
Bio-based Materials Focus: General
Suggested Audiences: Sustainability leads, policymakers, engineers, architects, LCA analysts, and industry professionals

Circularity and biobased materials in architecture and design: Evaluation of the status quo and defining future perspectives

Resource: Bekkering, J. D., Nan, C., & Schröder, T. W. A. (Eds.). (2021). Circularity and biobased materials in architecture and design: Evaluation of the status quo and defining future perspectives [Web report]. Design United. Retrieved August 30, 2025, from https://downloads.ctfassets.net/h0msiyds6poj/4cUyquZDX8Zx6WlmxEgw94/b32f801bbb24050527d10a00108617b9/CIRCULAR_Report.pdf
Format: Web report
Reviewers: Team 5: Use, Maintenance, End-of-Life
Summary: This resource examines the current state of circularity and bio based materials

in architecture and design, combining research, case studies, and practitioner insights to outline opportunities and challenges. It explores how material flows, product systems, and construction practices can shift toward circular models, while highlighting the role of bio-based materials in reducing environmental impact and supporting regenerative approaches. The report also includes interviews and forward looking perspectives that help frame future agendas for innovation and scaling. It is worth reading because it offers a clear strategic framework for understanding and advancing circular and bio based design. For designers, researchers, policymakers, and educators, it provides a valuable overview of system level challenges along with real world examples that illustrate emerging practices. While more conceptual than prescriptive and primarily grounded in a European context, it serves as a strong foundation for curriculum development, strategic planning, and cross disciplinary collaboration when paired with more technical implementation tools.
Learning Level: Intermediate (Applied) to Advanced (Expert / Technical)
Bio-based Materials Focus: General to Multiple
Suggested Audiences: Designers, researchers, policymakers, educators, and innovation leads

Building materials and the climate: Constructing a new future

Resource: United Nations Environment Programme. (2023). Building materials and the climate: Constructing a new future. Global Alliance for Buildings and Construction. Retrieved August 30, 2025, from https://www.unep.org/resources/report/building-materials-and-climate-constructing-new-future
Format: Report
Reviewers: Team 5: Use, Maintenance, End-of-Life
Summary: This resource provides a global, evidence based assessment of the role building materials play in climate change and outlines pathways to decarbonize the sector through a whole life cycle approach. It introduces the Avoid–Shift–Improve framework to guide action, emphasizing material efficiency, circular economy strategies, low carbon and bio based materials, and improved production processes. The report also integrates considerations of equity, gender, and just transitions, positioning material transformation within broader social and economic systems. It is worth reading because it serves as a high level roadmap for aligning policy, design, and industry around shared climate goals. For policymakers, industry leaders, designers, and researchers, it offers a clear and credible framework for advancing decarbonization strategies at multiple scales. While broad in scope and not a technical manual, it is a foundational resource for strategic planning, advocacy, and education, particularly when paired with more detailed tools and standards for implementation.
Learning Level: Basic (Foundational) to Intermediate (Applied)
Bio-based Materials Focus: General
Suggested Audiences: Policymakers, industry leaders, designers, researchers, and sustainability professionals

Biomaterials: A regional and global movement for climate justice and resilience

Resource: Northeast Sustainable Energy Association (NESEA). (2024). Biomaterials: A regional and global movement for climate justice and resilience [Online self-study course]. HeatSpring. Retrieved August 30, 2025, from https://www.heatspring.com/courses/biomaterials-a-regional-and-global-movement-for-climate-justice-and-resilience
Format: Online course
Reviewers: Team 5: Use, Maintenance, End-of-Life
Summary: This resource is an online self study course that introduces biomaterials as part of a broader strategy for climate action, resilience, and justice. It connects material sourcing and carbon cycles to larger systems such as agriculture, forestry, and regional economies, while grounding the discussion in real world case studies and global frameworks. The course links international strategies with regional movement building, showing how biomaterials can support both carbon reduction and social outcomes. It is worth reading because it offers a clear and compelling narrative that connects materials to climate justice and systems change. For designers, policymakers, and practitioners, it serves as a strong primer for understanding both the why and the how of transitioning to bio based materials, including how change happens across industries and regions. While it is not a technical training resource and requires additional tools for implementation, it is highly effective for education, workshops, and building alignment across stakeholders.
Learning Level: Basic (Foundational) to Intermediate (Applied)
Bio-based Materials Focus: Multiple
Suggested Audiences: Designers, policymakers, practitioners, educators, and sustainability professionals

Choosing healthier interior paints

Resource: Healthy Materials Lab. (n.d.). Choosing healthier interior paints [Online course]. Parsons School of Design. Retrieved September 2, 2025, from https://healthy-s-site-0761.thinkific.com/products/courses/masterclass-nontoxic-healthy-interior-paints
Format: Online course
Reviewers: Team 5: Use, Maintenance, End-of-Life
Summary: This resource is an online course that focuses on selecting healthier interior paints, with an emphasis on reducing toxic exposures and improving indoor air quality. It explains key concepts such as volatile organic compounds, ingredient transparency, and certifications, while offering guidance on evaluating safer alternatives, including mineral and plant based options. The course is supported by research and references, helping users understand trade offs and make more informed material choices. It is worth reading because it provides clear and actionable guidance within a specific material category that has a direct impact on occupant health. For designers, architects, and specifiers, it offers practical insight that can immediately influence material selection decisions. While focused on paints and not covering broader lifecycle or comparative analysis in depth, it is a strong educational resource that supports healthier specification practices and can be paired with additional tools for implementation.
Learning Level: Basic (Foundational) to Intermediate (Applied)

Bio-based Materials Focus: Specific (paints, some bio-based)
Suggested Audiences: Designers, architects, specifiers, policymakers, and students

Sustainable building: A Healthy Materials framework

Resource: Healthy Materials Lab. (n.d.). Sustainable building: A Healthy Materials framework [Online course bundle]. Parsons School of Design. Retrieved September 2, 2025, from https://healthy-s-site-0761.thinkific.com/bundles/sustainable-building-program
Format: Online course bundle
Reviewers: Team 5: Use, Maintenance, End-of-Life
Summary: This resource is an in depth online course bundle that provides a structured approach to integrating material health into sustainable building design. It introduces key frameworks such as the Six Classes of chemicals and explores topics including low toxicity materials, environmental impact, and responsible sourcing. Through expert led sessions, case studies, and applied guidance, the program builds material literacy and connects health, sustainability, and design decision making. It is worth reading because it offers a comprehensive learning pathway for professionals seeking to improve how materials are selected and specified. For architects, designers, planners, and students, it provides both foundational knowledge and practical insight that can inform project planning and material strategies. While the focus is primarily on material health and less on detailed life cycle or region specific regulatory guidance, it remains a strong resource for advancing healthier and more informed design practices, especially when paired with additional tools and frameworks.
Learning Level: Intermediate (Applied)
Bio-based Materials Focus: General to Multiple
Suggested Audiences: Architects, designers, planners, students, and sustainability professionals

Sustainable design strategies for healthier climate-ready projects

Resource: Healthy Materials Lab. (n.d.). Sustainable design strategies for healthier climate-ready projects [Online course]. Parsons School of Design. Retrieved September 2, 2025, from https://healthy-s-site-0761.thinkific.com/products/courses/masterclass-design-strategies
Format: Online course
Reviewers: Team 5: Use, Maintenance, End-of-Life
Summary: This resource is an online course that explores how material health, climate performance, and equity intersect in design practice. It provides a structured learning pathway from foundational concepts to applied strategies, connecting material choices to indoor environmental quality, resilience, and circular design. Through expert insights, tools, and examples, the course introduces frameworks that support more informed and responsible decision making in projects. It is worth reading because it offers a clear and accessible entry point into integrating health and climate considerations into design. For designers, architects, and sustainability professionals, it builds awareness while pointing to tools and resources that can be applied in practice. While it focuses more on background

and strategy than detailed implementation and would benefit from additional case studies, it remains a strong educational resource for shaping early stage design thinking and advancing healthier, climate ready projects.
Learning Level: Basic (Foundational) to Intermediate (Applied)
Bio-based Materials Focus: General to Multiple
Suggested Audiences: Designers, architects, planners, specifiers, and sustainability professionals

EPD Map: Map of manufacturers with EPDs

Resource: Building Transparency. (n.d.). EPD Map: Map of manufacturers with EPDs [Web map]. Retrieved August 31, 2025, from https://www.buildingtransparency.org/maps/
Format: Web map / tool
Reviewers: Team 5: Use, Maintenance, End-of-Life
Summary: This resource is an interactive web map that identifies manufacturers with Environmental Product Declarations, allowing users to locate products with verified environmental data by geography and material type. Integrated with tools such as EC3, it supports access to embodied carbon information and helps connect material selection with real suppliers and supply chains. The platform is designed to support specification and procurement decisions by making product level transparency more visible and actionable. It is worth reading because it directly supports low carbon design and sourcing strategies. For designers, specifiers, and procurement teams, it provides a practical tool to identify certified materials, evaluate alternatives, and consider factors such as proximity and embodied carbon. While dependent on the availability of EPDs and lacking guidance on broader issues such as equity or supplier accessibility, it remains a valuable resource for integrating data driven decision making into design and construction workflows.
Learning Level: Basic (Foundational) to Intermediate (Applied)
Bio-based Materials Focus: General (includes bio-based where EPDs exist)
Suggested Audiences: Designers, specifiers, procurement teams, and sustainability professionals

United Nations Environment Programme & Global Alliance for Buildings and Construction

Resource: United Nations Environment Programme & Global Alliance for Buildings and Construction. (n.d.). Sustainable Building Materials Hub [Resource hub]. Retrieved August 30, 2025, from https://globalabc.org/sustainable-materials-hub/home
Format: Resource hub / website
Reviewers: Team 5: Use, Maintenance, End-of-Life
Summary: This resource is a global online hub that curates guidance, tools, case studies, and reports related to sustainable building materials and decarbonization. Organized around key themes such as policy, lifecycle stages, building use, and material categories, it supports navigation across a wide range of resources. The platform aligns with the Avoid–Shift–Improve framework, helping users understand strategies for reducing emissions through material efficiency, substitution, and improved production practices, while connecting policy, design, and procurement perspectives. It is worth reading

because it serves as a highly credible, centralized entry point for global best practices in material decarbonization. For policymakers, designers, and industry professionals, it provides a structured way to explore strategies, align with international frameworks, and support early stage decision making. While the focus is broader than bio based materials and more strategic than implementation focused, it is a valuable resource for education, capacity building, and aligning initiatives across organizations and regions.
Learning Level: Basic (Foundational) to Intermediate (Applied)
Bio-based Materials Focus: General
Suggested Audiences: Policymakers, designers, industry professionals, researchers, and sustainability leaders

Lot 21: Design for decarbonization

Resource: Lot 21. (n.d.). Lot 21: Design for decarbonization [Organization website]. Retrieved August 31, 2025, from https://lot21.org/
Format: Organization website / resource platform
Reviewers: Team 5: Use, Maintenance, End-of-Life
Summary: This resource is an organization website and content platform that curates tools, materials, projects, and policy resources to support decarbonization in the built environment. It is structured to help design professionals navigate climate action through directories of case studies, material resources, and external tools, translating complex climate concepts into an accessible design context. The platform also encourages community participation through resource submissions and ongoing publications, creating a growing, practice-oriented knowledge base. It is worth reading because it serves as a curated hub that connects designers to relevant resources and real-world examples of low-carbon design. For architects, planners, and sustainability professionals, it offers an approachable entry point to explore materials, tools, and strategies that support climate action. While primarily focused on carbon reduction and less on broader topics such as equity, material health, or technical standards, it is a valuable awareness and discovery tool, especially when paired with more detailed or specialized resources.
Learning Level: Basic (Foundational) to Intermediate (Applied)

Bio-based Materials Focus: General (includes bio-based)

Suggested Audiences: Architects, designers, planners, educators, and sustainability professionals

Conclusion

Phase 1 represents an important first step, bringing together a curated set of reviewed resources that establish a credible foundation for the Bio-Based Materials Collective. As this work evolves, the guide will continue to grow through ongoing contributions, expanded coverage, and continuous refinement to better serve the needs of the full BBMC community and accelerate the adoption of bio-based materials across the built environment.

Appendix

This appendix provides a summary chart of all reviewed resources, organized by title and aligned with the BBMC review teams that evaluated them. It offers a quick reference to understand how resources map across the materials lifecycle and areas of expertise. *This chart reflects the Phase One methodology, where resources were distributed and assessed across transdisciplinary teams aligned with key lifecycle stages.*

Team 1: Cultivation & Sourcing	Team 2: Processing & Manufacturing	Team 3: Design & Specification	Team 4: Construction & Application	Team 5: Use, Maintenance, End of Life
Bio construcción en el mundo: detalles constructivos	Embodied Energy and Design: Making Architecture Between Metrics and Narratives.	Manual of Biogenic House Sections	Earthen Floors: A Modern Approach to an Ancient Practice	Prescriptions for a Healthy House: A practical guide for architects, builders and homeowners
Straw Bale Building Redefined: Innovative Infill and Prefab Techniques & Practical Insights for Energy-Efficient Construction.	The Ecology of Building Materials	Material Reform: Building for a Post-Carbon Future	Martin Rauch: Refined Earth - Construction & Ensign with Rammed Earth	Natural Building Materials S, M, L: 30 x Architecture and Construction
Cultivated Building Materials: Industrialized Natural Resources for Architecture and Construction	The Hempcrete Book: Designing and Building with Hemp-Lime	Build Beyond Zero: New Ideas for Carbon-Smart Architecture	Essential Hempcrete Construction: The Complete Step-by-Step Guide	Upscaling bio-based construction: Challenges and opportunities
Natural Building Techniques: A Guide to Ecological Methods and Materials	Light Earth Building: A Handbook for Building with Wood and Earth	Innovation of Nothing: The capabilities needed to lead sustainable change in the built environment	Essential Prefab Straw Bale Construction: The Complete Step-by-Step Guide	Barriers and opportunities of fast-growing biobased material use in buildings
The potential of emerging bio-based products to reduce environmental impacts	Bio-based building materials: Proceedings of ICBBM 2025	Clay and lime renders, plasters and paints: A how-to guide to using natural finishes	Building with Earth: Design and Technology of a Sustainable Architecture	Wood: Is It Still Good? Part One: Embodied Carbon
Transitioning to a regenerative built environment: A Changemaker's Guide	BEAM Estimator	National wbLCA Practitioner's Guide: Embodied Carbon, Vancouver-specific compliance additions	The Natural Building Companion: A Comprehensive Guide to Integrative Design and Construction	Wood: Is It Still Good? Part Two: Moving form Carbon to Climate

Biobased construction materials, a sustainable solution?	Material Cultures	Communicating the importance of embodied carbon and bio-based materials in the built environment	Sustainable building essentials series	Carbon-Storing Materials: Summary Report
Building materials and the climate: Constructing a new future. Global Alliance for Buildings and Construction	Biofabricate, & Fashion for Good	Healthy Materials Lab		The promise of biobased materials- And how to use them now
What is the BioPreferred® Program?	Building with biomass: A new American harvest-How manufacturing building products from domestically sourced upcycled biomass can create more jobs and affordable healthy housing	Trace Material: Season 3 - Fungi		Whole life carbon assessment for the built environment
California Straw Building Association (CASBA)	Embodied carbon review	Trace Material: Series		Circularity and biobased materials in architecture and design: Evaluation of the status quo and defining future perspective
Oregon State University Global Hemp Innovation Center	2050 Materials: Sustainability data for building materials			Building materials and the climate: Constructing a new future
Trace Material: Season 1 – Hemp	Free Encyclopedia of Sustainable Building Materials			Biomaterials: A regional and global movement for climate justice and resilience
Industrial Hemp Podcast	Trace Material: Season 2 - Plastics			Choosing healthier interior paints
Mass Timber Today				Sustainable building: A Healthy Materials framework
				Sustainable design strategies for healthier climate-ready projects
				EPD Map: Map of manufacturers with EPDs

				United Nations Environment Programme & Global Alliance for Buildings and Construction
				Lot 21: Design for decarbonization