

Built by Nature prize



Winners and Finalists 2024

Celebrating Global Innovation in Biobased Construction Materials



Introduction

It is forecast that the footprint of the built environment is set double worldwide over the next 30 years, and around 80% of that development will take place in the Global South. Given that our built environment already accounts for around 40% of global greenhouse gas emissions, 25% of which are attributable to the carbon-intensive materials we typically use for modern buildings, we simply cannot afford to continue to build these new towns and cities in the same ways.

Ironically, alternative, low-carbon, natural and renewable construction materials are the oldest known to humankind, and yet the modern built environment industry has largely forgotten how to use them as materials like concrete and steel have become so ubiquitous.

The Built by Nature Prize was launched to explore the bounty of natural, biobased

construction materials that is being discovered or rediscovered around the world. When we cast the net in November 2023, we had no idea what or how much we might find. We were delighted when, by the end of January, we had received almost 300 submissions, half of which came from Africa, Asia and the Americas. Materials ranging from seaweed to mycelium, sheep's wool to hemp; the waste byproducts of sugar production and coconut harvesting, and timber from demolished buildings featured alongside seashells and invasive water weeds.

We were looking for tried and tested, scalable construction solutions. Structural elements, boards and partitions, insulation, and cladding. Products that deliver significant carbon savings and provide environmental and social benefits for the places and people who supply them. The prizes themselves were intended to

support the development of these products and facilitate their uptake, while raising awareness of their possibilities to accelerate the biobased material transformation of our built environment.

Beyond the prize money itself, we will provide the winners with professional coaching, mentoring, and connections to our growing industry networks across Europe and through our global network of partners. We have already learned a lot, but this booklet shows that we all have much more to learn and to share, to turn some brilliant ideas and innovations into mainstream solutions, a further step towards a built environment that works in unison with nature.

Paul King
CEO
Built by Nature

About the Built by Nature Prize



FIRST-PRIZE
WINNER

WIDUZ
Singapore



RUNNER-UP

CASA CONGO
Italy, Nicaragua, Mexico



RUNNER-UP

ELEMENTERRE
Senegal



RUNNER-UP

SUGARCRETE®
UK, India

The Built by Nature Prize was designed and launched to identify, highlight and reward scalable, market-ready innovations in biobased construction materials -- the world's first prize initiative totaling €500,000 in awards and support to stimulate uptake of these materials to help redefine sustainable building and regenerative cities, and to create positive outcomes for the climate, nature and local communities.

Our finalists have met the Prize criteria: presenting solutions composed mainly of biobased materials and intended for use in the built environment; providing proof that the product can be successfully manufactured using currently available technology and demonstrating that the product is already in the marketplace, whether through an early-stage pilot project or openly available.

The Prize's overall winner is awarded €250,000, along with three runners-up prizes of €50,000 each. An additional €100,000 in funds has been allocated for a support programme of mentoring, coaching and networking for all winners and selected finalists.

We are delighted that our finalists represent all regions – from Europe, Africa, Asia, North and South America. Equally exciting is the variety of innovations in construction materials and production techniques presented.

Built by Nature wishes to thank all the organisations that have provided first-round submissions, and we offer our heartfelt congratulations to our four winners and extend our appreciation to the other 11 finalists of our inaugural Prize. We are pleased to present their solutions here.



Contents

Winners

Widuz Singapore	7
Casa Congo Italy, Nicaragua, Mexico	9
Elementerre Senegal	11
Sugarcrete UK, India	13

Finalists

BlueBlocks The Netherlands	15	MycoTile Kenya	22
Ecovon Ghana	16	Plantd USA	23
GreenJams India	17	Strawcture Eco India	24
IndiNature UK	18	Urban Machine USA	25
iStraw Germany	19		
Lanarq Chile	20		
Modulina Lithuania	21		

HONORY ADVISOR DR YASMEEN LARI



ARIEL SHTARKMAN



LIZ OGBU



ARIEF RABIK



STIG HESSELLUND



MAE-LING LOKKO

ANA BELIZARIO



The Prize Jury

Reflecting the global scope of the Built by Nature Prize, our judging panel comprises thought leaders from around the world with unparalleled expertise in architecture, finance, and biobased materials. We extend our deepest gratitude to all our jury members for their invaluable guidance and insights – thank you for your dedication to driving innovation and sustainability in the built environment.

The Prize Jury

DR YASMEEN LARI HONORARY ADVISOR

Pakistan's first female architect and renowned for her leadership at the intersection of architecture and social justice, Dr Lari graduated from the Oxford School of Architecture in 1964, and became an elected Member of the Royal Institute of British Architects (RIBA) in 1969. Since her official retirement from architectural practice in 2000, her UN-recognised NGO Heritage Foundation Pakistan has been taking on humanitarian relief work and historical conservation projects in rural villages all around Pakistan. She was awarded the prestigious Fukuoka Prize in 2016 and the RIBA's Royal Gold Medal in 2023.

ANA BELIZARIO

Ana is the Commercial Head of Urbem, a company leading a transformation of Brazilian construction, architecture, and real estate markets using Mass Timber as the primary material for structural systems. Since 2017, she has been leading Urbem's initiatives to enable increasingly agile, efficient, and sustainable construction projects in urban development.

With over 15 years of experience in the real estate market, Ana is an architect with a keen commitment to engaging experts and civil society in combating climate change by reducing carbon emissions from the construction sector.

STIG HESSELLUND

With broad experience as an executive, consultant and advocate, Stig is an architect and project manager with Realdania, a private philanthropic association in Denmark which supports projects in architecture and planning and sees the reduction of the construction industry's CO₂ emissions as a cornerstone in efforts to achieve that country's climate goals. Prior to his five years with Realdania, Stig worked with different architectural practices in Denmark. He has a personal and professional focus on sustainability within the construction industry – specifically, the technical properties of biobased materials, new production processes and value chains, a curiosity about the potential of innovative connections across industry sectors, along with a new paradigm of aesthetics.

MAE-LING LOKKO

Mae-ling is an Assistant Professor at Yale University's School of Architecture and Yale's Center for Ecosystems in Architecture. An architectural scientist and designer from Ghana and the Philippines, her work on the upcycling of agrowaste and biopolymer materials integrates technical, environmental, social and cultural criteria to accelerate upcycling between the global north and south. Mae-Ling is the founder of Willow Technologies, focused on the research, design and development of biobased building materials. Along with a global portfolio of several high-profile projects, Mae-Ling holds a PhD and MSc in Architectural Science from Rensselaer Polytechnic Institute and a B.A. from Tufts University.

LIZ OGBU

A designer, urbanist, and spatial justice activist, Liz is a global expert on engaging and transforming unjust urban environments. From designing shelters for immigrant day laborers in the U.S. to a water and health social enterprise for low-income Kenyans, Liz has a long history of working

with communities in need to leverage the power of design to catalyse community healing and foster environments that support people's capacity to thrive. She is Founder and Principal of Studio O, a multidisciplinary design consultancy that works at the intersection of racial and spatial justice. In addition to her practice, Liz has held academic appointments at several leading universities and is currently an inaugural University Fellow at the University of Virginia. She also previously served as the Australian Institute of Architect's Droga Architect-in-Residence, investigating urban marginalized populations and community development practices in the country.

ARIEF RABIK

Arief is Chair and Founder of Bamboo Village Trust, launched in Indonesia to build 1,000 bamboo villages and restore 2 million hectares of degraded land with bamboo agroforestry, and aiming to expand its impact across the world's tropical belt. With his unwavering commitment to sustainability, innovation, and community empowerment,

Arief is also founder and CEO of PT Indobamboo Lestari in Indonesia, producing engineered bamboo products and solidifying his position as a respected authority in the global bamboo industry while brokering public and private support and investment in village-level bamboo production.

ARIEL SHTARKMAN

As Managing Partner of Undivided Ventures, Ariel identifies pathways to a more sustainable future for real estate, infrastructure and cities. Passionate about the future of the built environment, she is also the Founder of Orca Capital, a boutique investment firm focusing on real estate and technology. Ariel has held real estate finance positions with Citibank in Hongkong, ING Clarion in New York and ING Real Estate Investment Management in Hong Kong. Ariel holds an MBA from Columbia Business School with a specialisation in real estate, and a B.Sc. from Tel Aviv University. She serves as Urban Land Institute (ULI) Global Governing Trustee and as a Vice Chair of ULI Hong Kong. ■

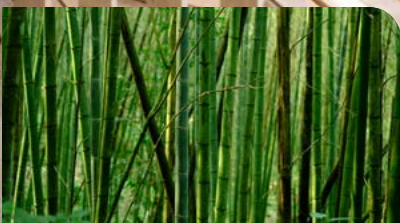


First Prize Winner: Widuz



“The Built by Nature Prize brings incredible opportunities for Widuz. It opens doors to new markets, partners, and for global outreach. This support helps us secure key certifications and advance our research, shaping the future of sustainable construction with our Bamboo Veneer Lumber technology.”

WIDUZ



widuz.com

Location **Singapore**

Material **Bamboo**

Established **2018**

Team **5**

BVL™ from Singapore-based company Widuz is a range of structural bamboo biocomposite products using fast-growing bamboo fibres and biobased adhesives to offer superior strength, durability, and environmental benefits compared to traditional materials such as timber, concrete, and steel. BVL has been deployed for various structural elements, interior furnishings, and exterior components, demonstrating its versatility and practicality in real-world applications.

With a carbon footprint of up to 40% less than conventional construction materials, BVL is a high-performance structural biocomposite combining the inherent strength of bamboo with advanced engineering techniques. The patented processing method ensures that BVL retains and even enhances bamboo's natural strength, making it up to three times stronger than engineered timber products while being 20% lighter. Bamboo's rapid growth cycle of just four years makes it at least five times more renewable than most timber species, which in turn addresses

the urgent need for sustainable building materials.

With the market demand for such materials driven by factors such as rising costs, and carbon constraints, BVL offers a viable solution with its alternative for structural and non-structural applications in construction and furniture. And to demonstrate BVL's practical feasibility and benefits, the company has

facilities to stimulate rural economies and strengthen local communities. The company also adheres to ethical sourcing, partnering with responsible FSC-certified plantations, and fair compensation practices to ensure that their supply chain upholds high standards of social responsibility.

Widuz's commitment to sustainability extends beyond

The BVL product line scalability is encouraged by several factors, including standardisation and compliance with local regulations, diverse market applications, abundant raw material supply, limited competition, and economies of scale. Through ongoing research and development efforts, Widuz seeks to enhance BVL's performance, optimise manufacturing processes, and

“There is already a very mature technology called strand woven, and it's an iteration of it that, which actually is much more efficient and uses less glue. So it's a great technology. I was very impressed with it and they also had a hollow block, which is, I mean, almost too good to be true.” PRIZE JURY COMMENTARY

successfully completed a proof-of-concept project in Batam, Indonesia, collaborating with ETH Zurich and Singapore-ETH Centre to construct an exemplar three-storey house.

BVL also contributes to social and economic development by providing long-term employment in bamboo plantations and processing

product development to influence regulatory progress, academic research, and industry partnerships. By engaging with regulatory bodies, research institutions, and industry associations, the company aims to accelerate the adoption of green building materials and promote a broader shift towards environmentally conscious construction practices.

expand its range of applications across various industries.

Moving forward, the company intends to focus on obtaining necessary certifications, developing “BVL 2.0” with advanced manufacturing techniques, and fostering partnerships with key stakeholders in the construction and furniture industries. ■



Casa Congo

“The Built by Nature prize will allow Casa Congo to introduce its low-carbon bamboo housing prefabricated solution to Mexico and build three prototypes to showcase Latin American developers and humanitarian housing organisations that bamboo homes are durable, affordable and beautiful.”

CASA CONGO



casacongo.org

Location **Italy, Nicaragua, Mexico**

Material **Bamboo**

Established **2021**

Team **5**



KuNa, the bamboo-adobe housing program in Nicaragua developed by Casa Congo, focuses on providing affordable, sustainable, and resilient housing solutions for communities in emerging economies. Featuring modular scalability and technical simplicity, KuNa offers designs that can be tailored to different housing needs, ranging from emergency shelters to social housing.

In regions where sustainable housing is lacking, KuNa fills a crucial gap by delivering well-designed homes that improve livelihoods while reducing reliance on imported materials such as concrete, steel, and zinc. By leveraging bamboo's rapid growth and abundance,

KuNa promotes local economic development, empowers communities, and addresses climate change challenges. Along with their affordability, resilience and aesthetics, KuNa homes' dynamic lifecycle assessment shows a 70% reduction in emissions compared to traditional housing – while being quick to deploy and creating local employment and education opportunities. With Latin America facing a housing deficit of over 60 million units, KuNa is poised to address this critical need by offering sustainable housing solutions at scale with minimal greenhouse gas emissions.

As an example of responsiveness and innovation, Casa Congo delivered 21 KuNa housing units to homeless

families in Nicaragua following the devastation caused by hurricanes ETA and IOTA in 2020, while also establishing a bamboo value chain there – “from farm to wall”.

Today, Casa Congo envisions expanding the KuNa model to more underserved communities across Latin America, particularly those in proximity to bamboo-rich regions to deliver significant social benefits, including job creation, gender equality in employment, and community-driven development.

Casa Congo has ambitious goals for KuNa: in addition to fostering a bamboo-based economy and promoting knowledge exchange with local governments and communities, the company will continue the establishment of local supply chains, manufacturing code-compliant net-zero homes, increasing awareness of biobased building solutions, and reaching economies of scale to make KuNa more cost-effective than traditional building materials and techniques. ■

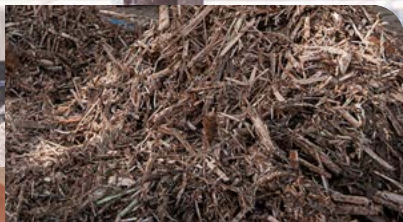
▶ [CLICK BOX TO PLAY THE VIDEO](#)



Elementerre

“We are proud to be among the winners, very excited to be able to work with you and aware of the opportunity this award gives us to improve our production and profitability... We aspire to see a future where biobased-and-clay materials become a popular construction choice for firms, private households, and governments not only in Senegal but also across the region, potentially benefiting millions of low and middle-income families.”

ELEMENTERRE



elementerre-sarl.com

Location **Senegal**
 Material **Typha, clay**
 Established **2016**
 Team **10**



Elementerre is committed to delivering results against three areas of impact: addressing the housing crisis, promoting ecological resilience, and fostering social equity. To accomplish this, leveraging strategic partnerships, technological innovation, and community engagement sum up Elementerre's approach to sustainable construction and offering a model for environmentally responsible development that can be replicated across the continent.

environmental stewardship. By leveraging locally available materials and employing traditional building techniques adapted to contemporary needs, Elementerre's mission is to provide affordable and environmentally friendly housing options for low- and middle-income communities.

The company's products, featuring load-bearing typha and earthen bricks and insulating boards, offer advantages over conventional

material directly contributes to ecosystem restoration and biodiversity conservation along the Senegal River.

Recognising the importance of alliances and collaboration, the company has secured partnerships with local stakeholders, architectural firms, and government agencies to promote the adoption of its products and foster a culture of environmental consciousness within the construction sector.

For Elementerre, next steps include establishing a scalable production supply chain to produce Typha and clay products at scale, thereby lowering costs and making products accessible to a broader segment of the population. This means utilising funding to invest in production infrastructure, including efficient, mechanised technologies and equipment to increase productivity and reduce costs, and by doing so, the company aims to meet growing demand for its Typha and clay products and make significant contributions to the affordable housing sector in Senegal and beyond. ■

"It's a very beautiful project...when you look at the context of Senegal and the type of construction that's being built there. You can add some technology and some biobased material, and it's culturally connected to the place where it belongs." PRIZE JURY COMMENTARY

Elementerre's innovative use of clay and Typha (common bullrush, or cattail) for construction in Senegal presents a promising solution to address the region's housing deficit while promoting sustainability and

materials such as concrete in terms of carbon footprint, thermal performance, and environmental impact. As an additional benefit, Elementerre's efforts to repurpose Typha, a highly invasive plant, for construction



Sugarcrete®

“We are really grateful, honoured, and excited for this incredible opportunity! Support from Built by Nature will pave the way for Sugarcrete® partnerships across the globe, enabling targeted R&D efforts and fostering collaborations with local partners.”

SUGARCRETE



uel.ac.uk/sugarcrete

Location **UK, India**
 Material **Sugarcane, bagasse**
 Established **2021**
 Team **13**



Sugarcrete® is a low-carbon construction material that transforms sugarcane waste into sturdy building elements, using mineral binders to achieve different degrees of structural strength. Its applications range from new-build construction to retrofitting existing buildings, offering exceptional thermal, acoustic, and fire-resistant properties. This innovative material not only addresses the pressing need for sustainable construction solutions but also contributes significantly to reducing global carbon emissions.

By upcycling sugarcane waste, or bagasse (the dry fibrous material that remains after crushing sugarcane or sorghum stalks). With sugarcane being the most abundant crop globally and boasting significant carbon sequestration capabilities, the potential for reducing CO₂ emissions is substantial. Additionally, by utilising bagasse waste streams that would otherwise be burnt, Sugarcrete® locks carbon into durable building materials, further reducing environmental impact.

The open-source nature of Sugarcrete® research conducted at the University of East London fosters collaboration and enables local adoption in sugarcane producing countries worldwide. This approach not only promotes knowledge exchange but also supports communities in addressing their specific building needs, such as thermal efficiency, seismic resilience, and flood resistance.

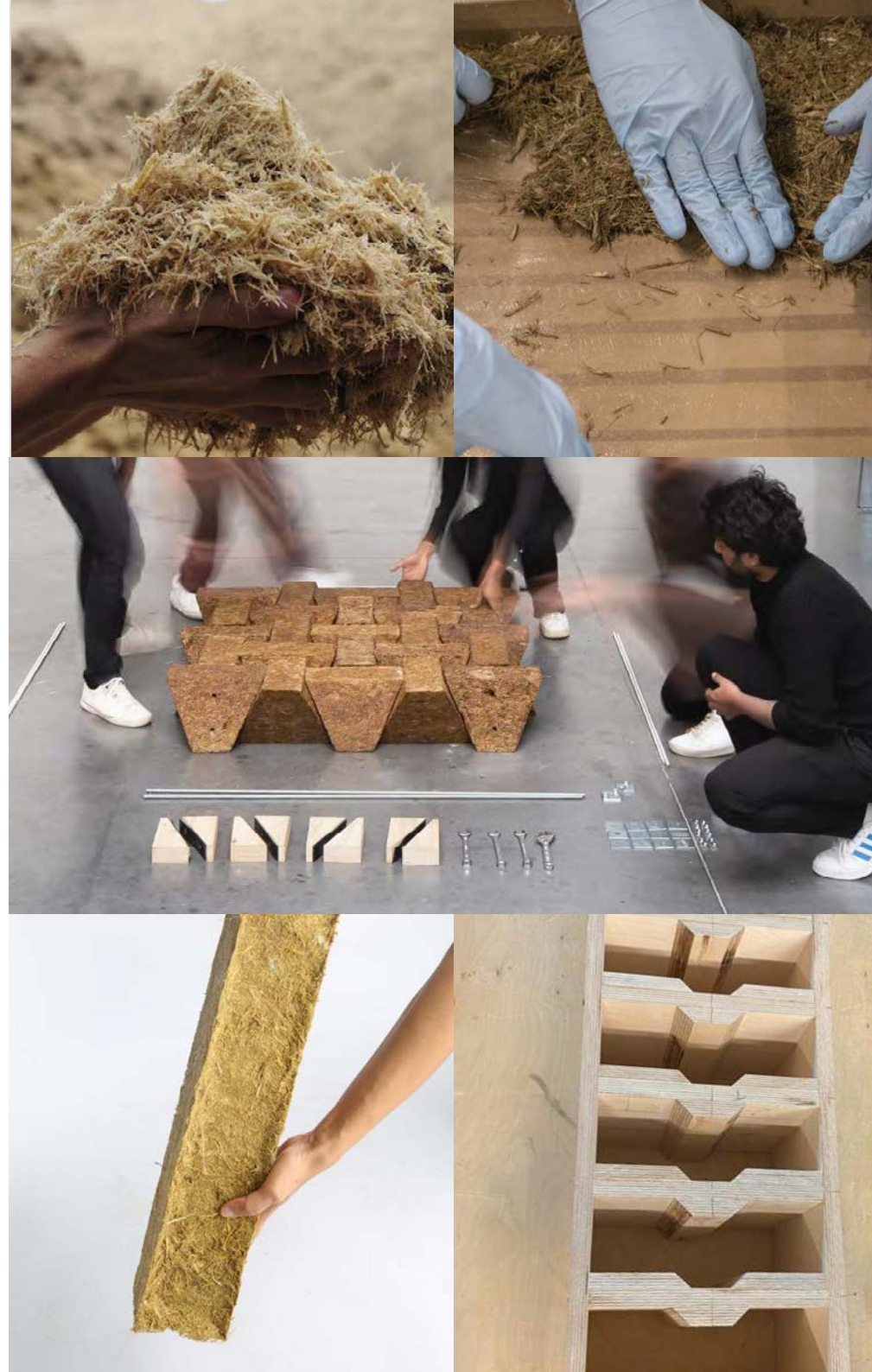
“I’m fairly positive because they’re able to use this agricultural waste product and actually use it in load-bearing structures... From a perspective of idealism and creating a change I think they definitely have something good going.”

PRIZE JURY COMMENTARY

In regions like Uttar Pradesh, India, where traditional building materials like concrete trap heat, Sugarcrete® offers a cost-effective alternative with superior insulation properties, while its recyclability and compatibility with existing concrete block production machinery make it a practical choice for local manufacturing and construction.

Through partnerships with local producers and international manufacturers, increased production and research support, Sugarcrete® aims to establish itself as a viable, sustainable construction material across diverse geographical and economic contexts. Its impact extends beyond the environmental to include job creation, especially in marginalised

communities involved in sugarcane cultivation. By empowering local stakeholders and promoting ethical supply chains, Sugarcrete® not only revolutionises construction practices but also fosters inclusive economic development – all by harnessing the potential of sugarcane waste. ■



BlueBlocks



With the world's seas and oceans now recognised as a valuable yet under-appreciated source of biobased resources for the built environment, SeaWood products from Rotterdam-based Blue Blocks offer natural board materials made from seaweed and agricultural residual fibres. The company transforms these fibres into self-binding material for finishing non-load bearing interior walls, acoustic panels, and furniture.

SeaWood's "toxic-free materials for a healthy living environment" are made with low-energy processes to create healthy spaces, while helping to restore natural marine ecosystems and support coastal communities.

In the Netherlands and elsewhere, the building sector faces challenges of housing demand, resource scarcity, and environmental impacts, which is why SeaWood targets the issue of non-recycled partition wall materials by providing sustainable, regenerative alternatives.

The positive impacts of SeaWood include carbon capture of its raw materials and marine ecosystem regeneration – both significant aspects of a biocircular economy – along with new economic

opportunities for local communities. The company also believes its impact and influence in the building sector extends beyond its products through collaborative value chains, educational initiatives, and active participation in sustainable communities such as Gideon's Tribe.

With a business model that involves collaboration with construction companies, wholesalers, and seaweed processors to secure sustainable supply chains, SeaWood is seeking to expand production to provide the market with competitive products and continue pursuing wholesaler partnerships for distribution.

The company is confident about its prospects for scalability, achievable through

lightweight construction processes, low carbon emissions, and vast market applicability – all bolstered through technical testing, market research, and collaborations. SeaWood sees its main value proposition as offering products with natural aesthetic, functional and health benefits, while offering a viable sustainable choice for construction companies and architects. ■



blueblocks.nl

Location **The Netherlands**
Material **Seaweed, agricultural residue**
Established **2020**
Team **5**

Ecovon



Creating value from what has been previously viewed as waste, Ecovon produces a renewable wood product from coconut husks and sugarcane bagasse, utilising these abundant agricultural residues to present a viable solution to critical environmental and economic challenges by reducing waste, mitigating deforestation and lowering CO₂ emissions.

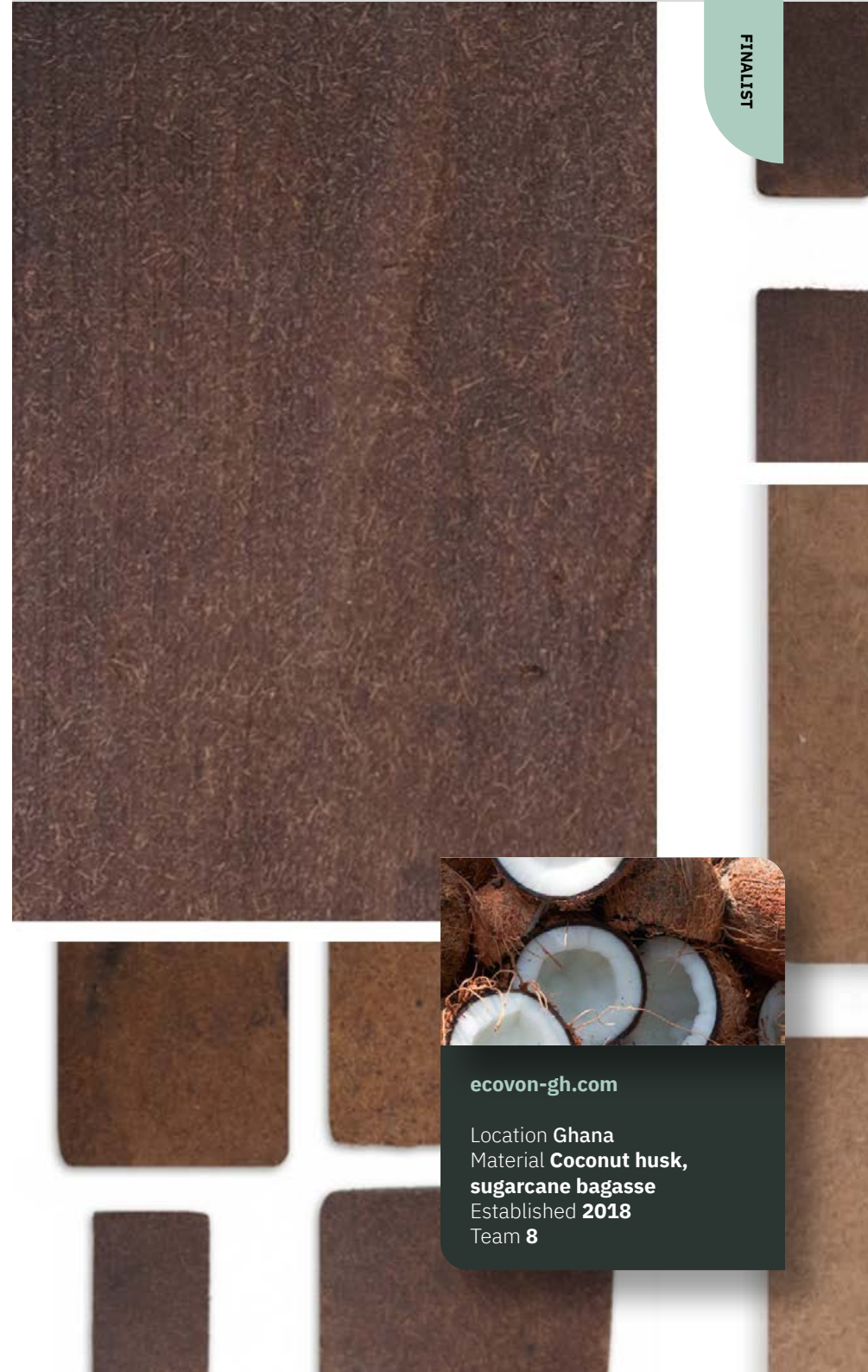
Ecovon's business model has the capacity to create multiple economic benefits. By creating a new industry around coconut husks and sugarcane bagasse, the company generates wealth and employment opportunities, particularly in rural areas of Ghana. This job creation, especially for youth and women, has the potential to significantly improve living standards and stimulate economic growth. And by

producing and providing access to affordable alternative building materials, Ecovon addresses the housing needs of low-income earners and rural farmers.

The scalability of Ecovon's business model is encouraging -- given the abundance of coconut husks and sugarcane bagasse in tropical countries, the company has the potential to expand its operations and make a substantial impact on

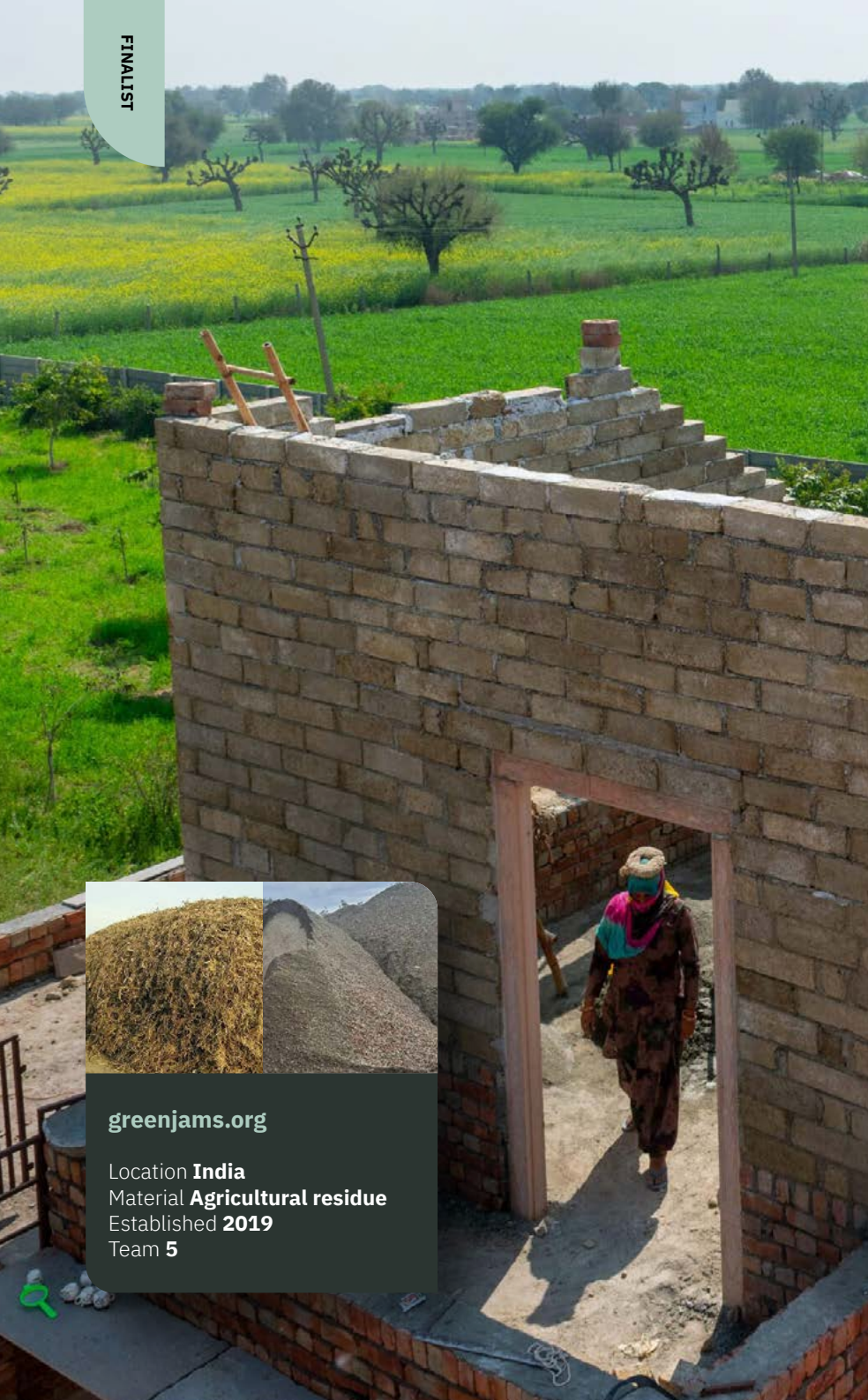
a global scale. Furthermore, the pursuit of partnerships with key stakeholders such as coconut farmers' associations, environmental agencies, and scientific institutions enhances Ecovon's capacity for innovation and market penetration.

By measuring its impact through metrics such as CO₂ emissions reduction, waste diversion, and socioeconomic development, Ecovon demonstrates its commitment to creating positive change and fostering a more sustainable future for all. And through its environmentally friendly production processes and innovative product offerings, Ecovon has set its sights on becoming a leader in coco fibre manufacturing, not only in Africa but also worldwide. ■



ecovon-gh.com

Location **Ghana**
Material **Coconut husk, sugarcane bagasse**
Established **2018**
Team **8**



greenjams.org

Location **India**
Material **Agricultural residue**
Established **2019**
Team **5**

GreenJams



GreenJams, headquartered in India, has created Agrocete®, a carbon-negative building material derived from crop residues and industrial by-products with a bold ambition to transform the construction industry.

Agrocete® eliminates the need for clinker-based cement (clinker is the ash and partially fused residues from a coal-fired furnace or fire). This innovation results in a material with the strength and durability of conventional concrete, but with significant environmental and functional benefits: In addition to being lightweight, Agrocete® offers permanent carbon sequestration, enhanced thermal and acoustic insulation, reduced structural loads, and improved resistance to cracks and impacts — all at a cost comparable to standard concrete.

With GreenJams' ability to deploy abundant agricultural waste materials and automated manufacturing processes, Agrocete® presents a promising solution to address

the environmental challenges associated with traditional construction materials while offering economic benefits and social empowerment opportunities to local communities.

Their target customers include both large corporations and small-to-medium builders and developers. Company revenue is generated through sales of Agrocete® and GreenJams is exploring the sales potential of verifiable carbon market credits.

The company sees scalability and market expansion as being based on knowledge sharing, and partnership-based agreements establishing manufacturing units to maximise impact beyond direct product deployment. Recruitment of skilled



personnel, technology upgrades, and research and development initiatives will also be vital to realising expanded commercialisation and market potential.

GreenJams describes Agrocete® as “a weapon for the war against climate change”, and by scaling up, the company objective is to remove 10% of global carbon emissions, upcycle 35 billion tonnes of agricultural and industrial wastes, and provide significant income to farmers while generating returns on investment for the business. ■

IndiNature



Industrial Nature Ltd (IndiNature) has worked for seven years to establish its first IndiNature mill as part of a natural industrial revolution: a new non-woven textiles facility addressing gaps in manufacturing capabilities for circular, biobased and natural fibre materials, initially in the United Kingdom and with ambition to replicate and expand geographically.

IndiNature offers low-carbon, healthy, and sustainable materials for various applications, addressing the need for lower embodied carbon products and healthier living environments. IndiNature aims to revolutionise manufacturing by providing circular, biobased, and natural fibre materials, beginning with industrial hemp insulation.

Since first being manufactured in October 2022, IndiNature's inaugural product -- IndiTherm industrial hemp thermal construction insulation -- has

achieved the first British Board of Agrément (BBA) certificate for a hemp insulation in the UK. This unlocks use at scale by both retrofit and new build house builders, as well as social housing landlords, for acoustic and thermal insulation in roofs, lofts, walls and underfloor applications in all types of domestic and commercial buildings.

Through development of an additional product range using hemp, recycled jute, sheep's wool, cotton and other natural fibres, IndiNature serves multiple markets including construction, mattresses and furniture, and automotive. Across all applications, IndiNature focuses on reducing carbon emissions, and supporting regenerative agriculture. The company also emphasises local sourcing and

production to support regional economies, and provides fair employment opportunities, particularly in areas facing industrial decline.

With core principles of innovation, production and supply chain establishment, market development, team development, and replication of its operational model, IndiNature sees international scalability as achievable through partnerships, licensing, and replication of manufacturing facilities, with a focus on market demand and regulatory support as being key.

Over the next several years, IndiNature aims to establish several new manufacturing facilities, create jobs, secure investment, and significantly increase its carbon capture impact. ■



FINALIST



indinature.co

Location **UK**
Material **Hemp**
Established **2016**
Team **15**

iStraw

istraw[®]
one straw ahead to the future

iStraw, manufactured from annually renewable fibres such as straw and locally available grasses, is working towards a future where traditional plasterboard drywall becomes obsolete. The German company's products boast exceptional carbon sequestration capabilities, with each square metre of panel storing significant amounts of CO₂ and by replacing conventional materials, they have the potential to save millions of tonnes of carbon emissions annually.

The panels are reusable to promote resource efficiency and reduce waste. iStraw also contributes to regional value chains, creating job opportunities, and reducing reliance on environmentally harmful practices such as gypsum extraction from coal-fired power plants or natural deposits, thus paving the way for carbon-neutral construction projects.

The company has introduced a technological point of differentiation: integration of a passive Radio Frequency Identification (RFID) chip in each panel ensures transparency and enables building owners and purchasers to trace the sourcing and history of the panels and the construction project over the long term.

The target market for iStraw includes project developers, public sector clients, commercial clients such as prefabricated house manufacturers, private clients, and OEM product manufacturers seeking sustainable alternatives to plasterboard. The company's value chain partners include farmers, franchise partners, architects, craftsmen, universities, and wholesalers.

The future feasibility of iStraw products is based on resource availability, market demand, and a franchise model to accelerate the growth and distribution of production units and maximise support for sustainable construction practices. This model enables rapid scaling, with franchise partners acquiring production

licenses and operating production lines according to specifications. Revenue sources include plant licenses, raw material sales, franchise fees, and panel sales margins.

Additional certifications and product development are expected to contribute to sales growth, with the company's ideal outcome one of a scalable structure that accelerates the transition to sustainable construction practices, with annually renewable fibres playing a pivotal role in building a more sustainable future. ■



[istraw.tech](https://www.istraw.tech)

Location **Germany**
Material **Straw, grass**
Established **2013**
Team **8**

Lanarq



Sheep's wool has a long history of supplying warmth and insulation from the elements in clothing, what about as a building material? Lanarq is a unique offering from Chile – prefabricated wood panels filled with sheep and llama wool to provide natural fibre insulation in housing.

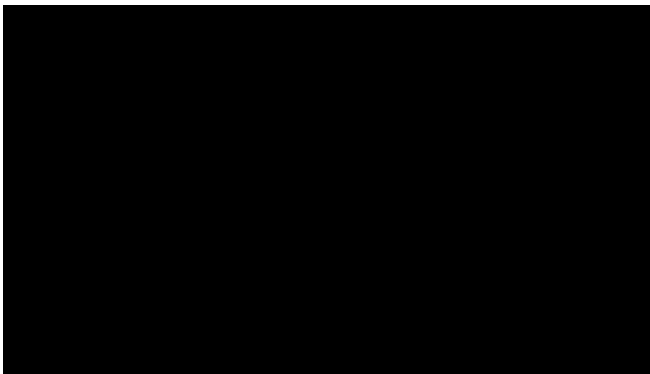
The company originated in Patagonia, a region with cold oceanic climates and high energy demand for heating. By incorporating wool as a locally sourced insulation material, the company aims to improve housing conditions and reduce energy consumption. Lanarq leverages local resources via cooperative value chains throughout its operations in Chilean and Argentinian

Patagonia, as well as the Andean highlands.

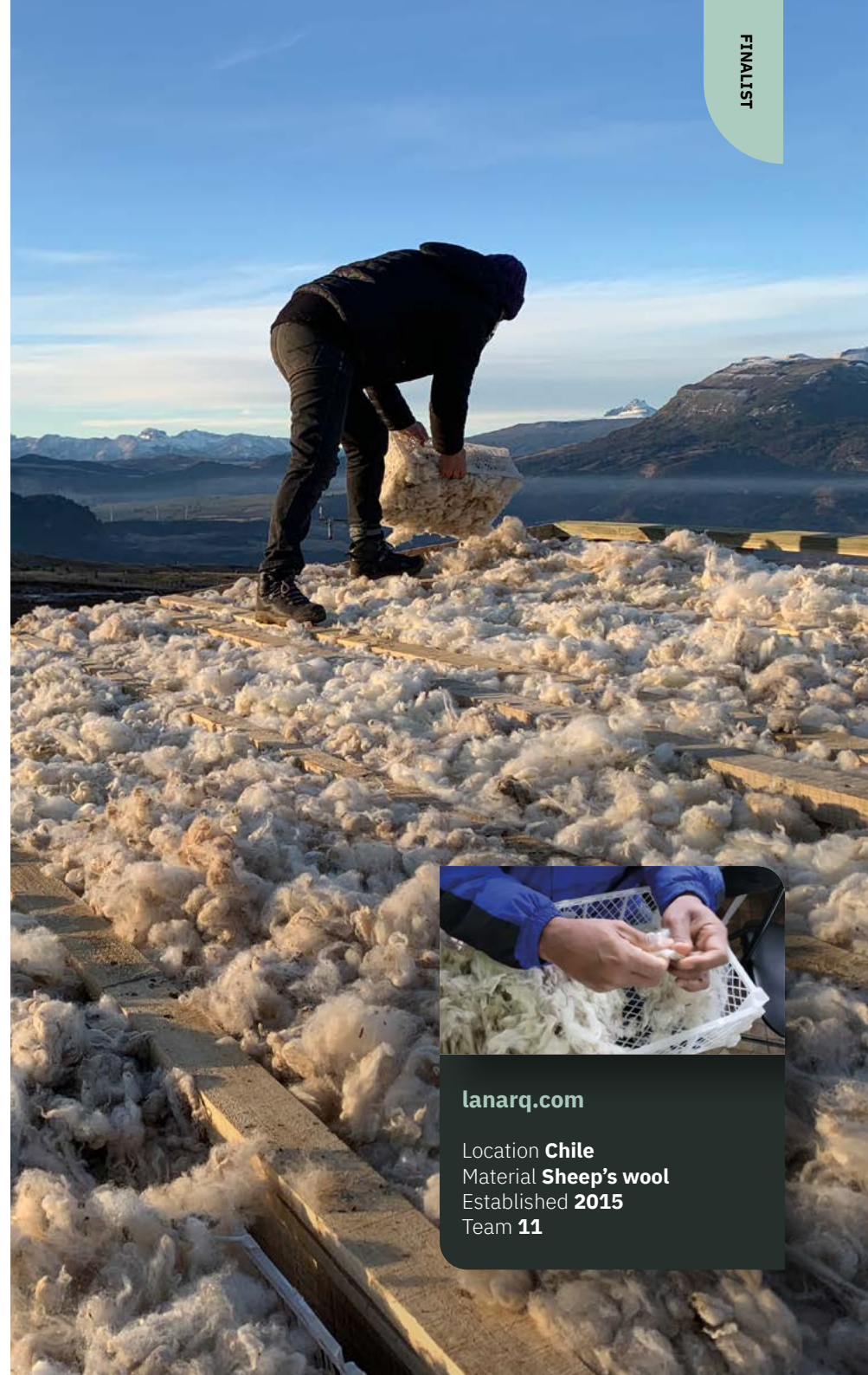
The company has established a robust value chain, collaborating with wool producers, textile companies, governmental entities, universities, and agricultural academic institutions to develop and deliver its sustainable construction solutions.

Lanarq seeks to expand its impact by promoting the use of natural fibre insulation in more farming communities across the Andes and Patagonia. Current projects such as Lanarq Andino and Lanarq Patagonico aim to scale up production and outreach efforts, and the company sees its solutions as viable for expansion within South American markets, especially in regions with similar climates and wool-producing communities.

To expand its reach and impact, Lanarq seeks to pursue additional pilot projects and certifications, and acquire more equipment to increase production. Lanarq aims to inspire others to adopt sustainable practices and contribute to building a better world, “one fleece at a time”. ■



► CLICK ABOVE TO PLAY THE VIDEO



lanarq.com

Location **Chile**
Material **Sheep's wool**
Established **2015**
Team **11**

Modulina



Modulina manufactures prefabricated load-bearing timber frame panels with compressed straw infill for insulation, an innovative construction product offering that not only reduces CO₂ emissions but also provides a healthy indoor climate. Based in Lithuania, the company sources its straw locally, minimising transportation costs. In development for over a decade, their technology has been gaining traction due to its environmental benefits.

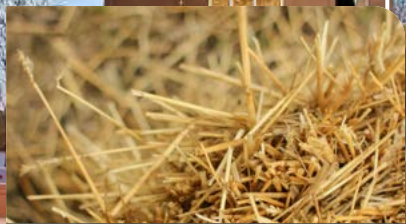
Straw panels offer a biobased, fast, and accurate construction alternative with a minimal CO₂ footprint. The company's unique machinery, built in-house, along with on-site prefabrication installation techniques, allows for flexibility and adaptation to various market needs. By utilising straw, a by-product of crop agriculture, biogenic carbon is stored in buildings, contributing to carbon neutrality.

Modulina's goal is to make straw systems a credible alternative to conventional building techniques by dispelling misconceptions and demonstrating the technology's effectiveness. They aim to establish local production sites worldwide to reduce transportation emissions and promote sustainability.

The company's approach promotes a healthy working environment for builders and allows homeowners to participate in construction. Clients typically value sustainability and prioritise a healthy indoor climate. Currently a small company, Modulina plans to expand operations in Europe, focusing on markets with high potential.

Challenges include regulatory barriers and certification requirements. However, their involvement in initiatives like the Ukrainian Rebuild Green program demonstrates their commitment to overcoming these obstacles. By collaborating with governments, NGOs, and international organisations, Modulina aims to drive systemic change and promote sustainable urban development.

Looking forward, Modulina foresees organising an International Urban Hackathon in Ukraine and expanding business operations in Europe, focusing on Denmark, Poland, and Italy. Overall, their interdisciplinary approach aligns with the principles behind the European Green Deal and contributes to a more sustainable future for construction. ■



modulina.eu

Location **Lithuania**
Material **Straw**
Established **2019**
Team **3**

MycoTile



MycoTile introduces an environmentally friendly alternative to traditional building materials by harnessing mushroom mycelium to bond agricultural waste. The company's low-carbon process transforms materials such as sugarcane bagasse, maize cobs, and coffee husks into high-performance insulation panels with superior acoustic and fire-resistant properties.

The company is based in Kenya, where imported construction materials are costly and often of subpar quality, and where the demand for housing far exceeds supply. In response, MycoTile is addressing the pressing need for affordable and sustainable housing solutions through a pilot programme providing affordable and inert insulation to improve indoor climates for thin-walled (often corrugated iron) buildings.

Their business model, with sales targeting individual homeowners, landlords, property developers, architects, and designers seeking affordable, safe, and locally available materials, focuses on direct sales of its competitively priced products. For construction companies, the material offers a sustainable

alternative to conventional materials which is 30% lighter than drywall, resulting in less weight for transport and easier handling on site.

Through partnerships with local farmers and factories, MycoTile helps create jobs and generate extra income, particularly for women and youth involved in waste collection and panel production.

Growth is a key focus for the company, with Kenya's massive housing deficit presenting a \$150 million market in Nairobi alone. MycoTile's affordability and functional performance are seen as key to scalability of the business, utilising numerous and varied agricultural waste streams and expanding beyond insulation to include building blocks, furniture boards, and more.

Strategic marketing and collaboration with government research agencies such as KIRDI (Kenya Industrial Research and Development Institute) have been identified by MycoTile as key to overcoming perception challenges and obtaining certifications, along with influencing building codes and fostering partnerships with educational institutions.

To capitalise on the potential within Kenya and the broader African marketplace, the company will explore options towards expansion of production capabilities, while partnerships with KIRDI and Habitat for Humanity Kenya are anticipated to ensure research support and wider market reach. ■



FINALIST

mycotile.eco

Location **Kenya**
Material **Mycelium;**
agricultural residue
Established **2019**
Team **13**

Plantd



The regenerative power of perennial grass is being harvested by Plantd, transforming grass fibres into Plantd Structural Panels to create a nature-based solution to climate change through sustainable building materials. Located in North Carolina's tobacco country, Plantd offers tobacco farmers a new crop that sequesters atmospheric carbon efficiently, improves soil health, and yields high biomass.

Utilising 100% electric, modular, and zero-waste production technology in light-industrial factories, Plantd manufactures moisture-resistant and durable sheathing panels, third-party tested to meet International Building Code standards. The company's grass stock, currently cultivated on thousands of acres, produces a high yield of biomaterial to provide a cost-effective and environmentally friendly alternative to traditional options.

With its integrated supply chain -- from grass cultivation to panel production -- Plantd

provides architects, engineers, builders and asset owners high-performance, sustainable materials.

Scalability is a key focus, with plans to expand grass cultivation, machinery production, and product manufacturing. By leveraging efficient land use and electric production technology, Plantd aims to scale production capacity and achieve economies of scale.

To navigate certification and regulation barriers and secure high-volume orders, Plantd is committed to additional testing, strategic partnerships and ramping up commercialisation efforts through business development.

Ultimately, Plantd seeks to drive demand for its grass-



based building materials, secure procurement contracts, and redefine the materials used in resilient, efficient, and sustainable buildings. ■



plantdmaterials.com

Location **USA**
Material **Grass**
Established **2021**
Team **65**

Strawcture Eco



Founded in India in 2018, Strawcture Eco launched AgriBioPanels as a sustainable alternative to traditional drywall paneling. Made primarily of straw and biodegradable felt, these panels – which are compressed using hot press technology and free from formaldehyde binders – are commercially available for various applications such as cladding, drywall, and flooring in commercial offices, hospitals, and schools.

The concept behind Strawcture was inspired by the founder's firsthand experience living in a rural village and witnessing the environmental impact of straw burning. With a vision to utilise agricultural residues and sheep's wool for building materials and support small farmers, Strawcture was created to address the issue of straw and crop stubble burning while empowering local communities.

Strawcture's product portfolio expanded in 2023 to include a

100% biobased insulation made from wool and honeycomb framing systems made from recycled cellulose fibers. These products not only contribute to creating insulated and soundproof interior spaces but also serve to reduce volatile organic compounds (VOCs) and carbon emissions.

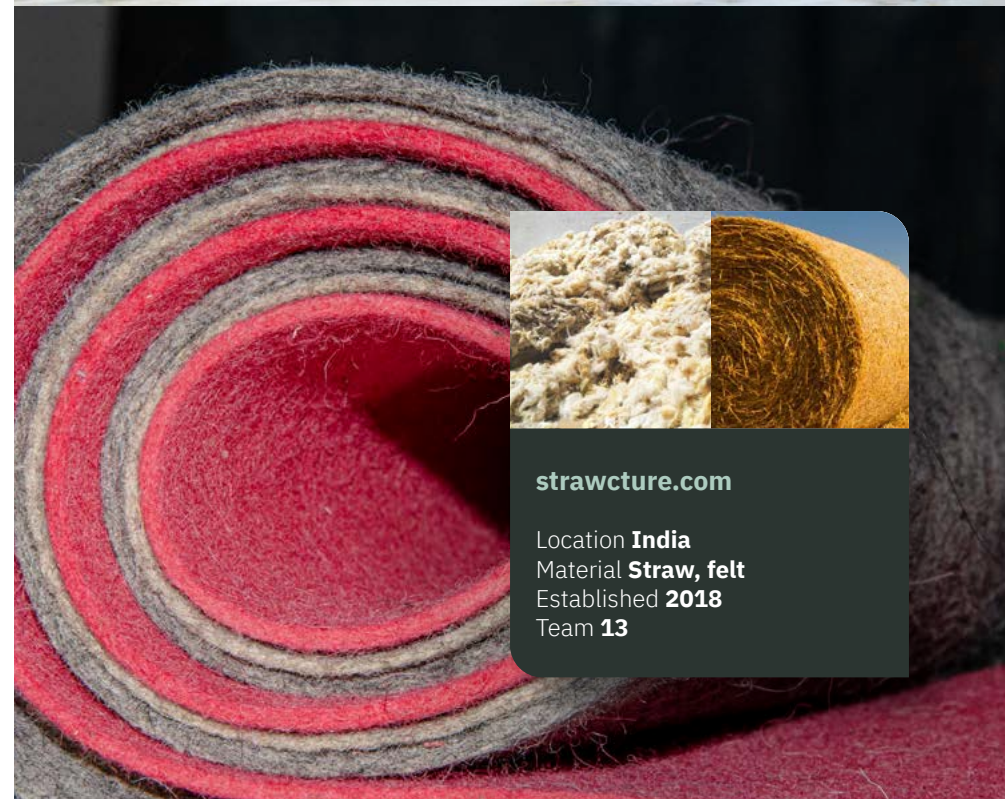
The company's value proposition lies in its comprehensive system solutions for walls, ceilings, and flooring, which offer superior thermal performance, reduced crack formation, and a potential reduction in a building's energy consumption by a minimum of 10%. Their commitment to sustainability is evident in its products' carbon-storage attributes, with AgriBioPanels alone sequestering approximately 2.5 kg of CO₂ per square foot.

In terms of scalability, Strawcture operates with the goal of offering solutions rather than just products, aiming to penetrate India's \$20 billion market for engineered building materials, and sell over 25 million square feet of panels in the next three years while working with more than 1000 farmers to source agricultural residues. The company's lean manufacturing process allows for decentralised production, making it adaptable to various geographical regions.

Its plans include further development and growth of Strawcture wall systems for passive insulation, pilots in diverse regions, and compliance with green standards – all designed to demonstrate biobased building materials as commercially viable, mainstream, and affordable alternatives. ■



FINALIST



strawcture.com

Location **India**
Material **Straw, felt**
Established **2018**
Team **13**



Urban Machine



Urban Machine wants to revolutionise the construction industry by converting millions of tonnes of wood waste into premium lumber products. Using cutting-edge robotics and AI technology, the company's machines efficiently salvage lumber waste by removing bulk fasteners from dimensional lumber -- bird beak-like pickers simultaneously extract nails and staples from all four planes of wood and ensure the wood is ready for reuse in new construction projects.

The construction and demolition industries generate an estimated 37 million tonnes of wood waste annually in the US alone, and manual salvaging of lumber is laborious and expensive, leading to inefficient and harmful practices such as incineration or disposal in landfill. Urban Machine addresses this by reclaiming wood waste at a rate of 16,000 board feet per day, equivalent to salvaging one single-family house each day.

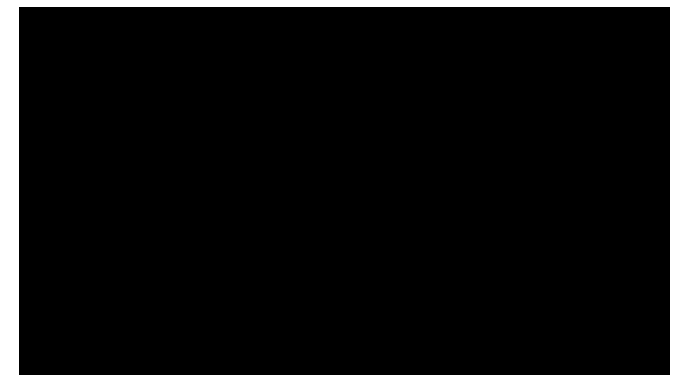
This technology directly contributes to carbon reduction by reclaiming carbon-sequestering wood and providing a second life in new construction projects, a reclamation loop that helps mitigate deforestation by keeping wood waste out of

landfills and in circulation. Their business model involves sourcing dimensional wood waste from demolition sites, and recycling facilities, then processing and selling the reclaimed material to lumber yards, developers, contractors, and builders.

Revenue is generated through material sales and service fees for de-nailing wood

waste. Upscaling of the business involves a transition to a leasing model for the machines.

Incentivising deconstruction over demolition and updating building codes to facilitate the use of reclaimed lumber are essential for maximising the Urban Machine's impact. ■



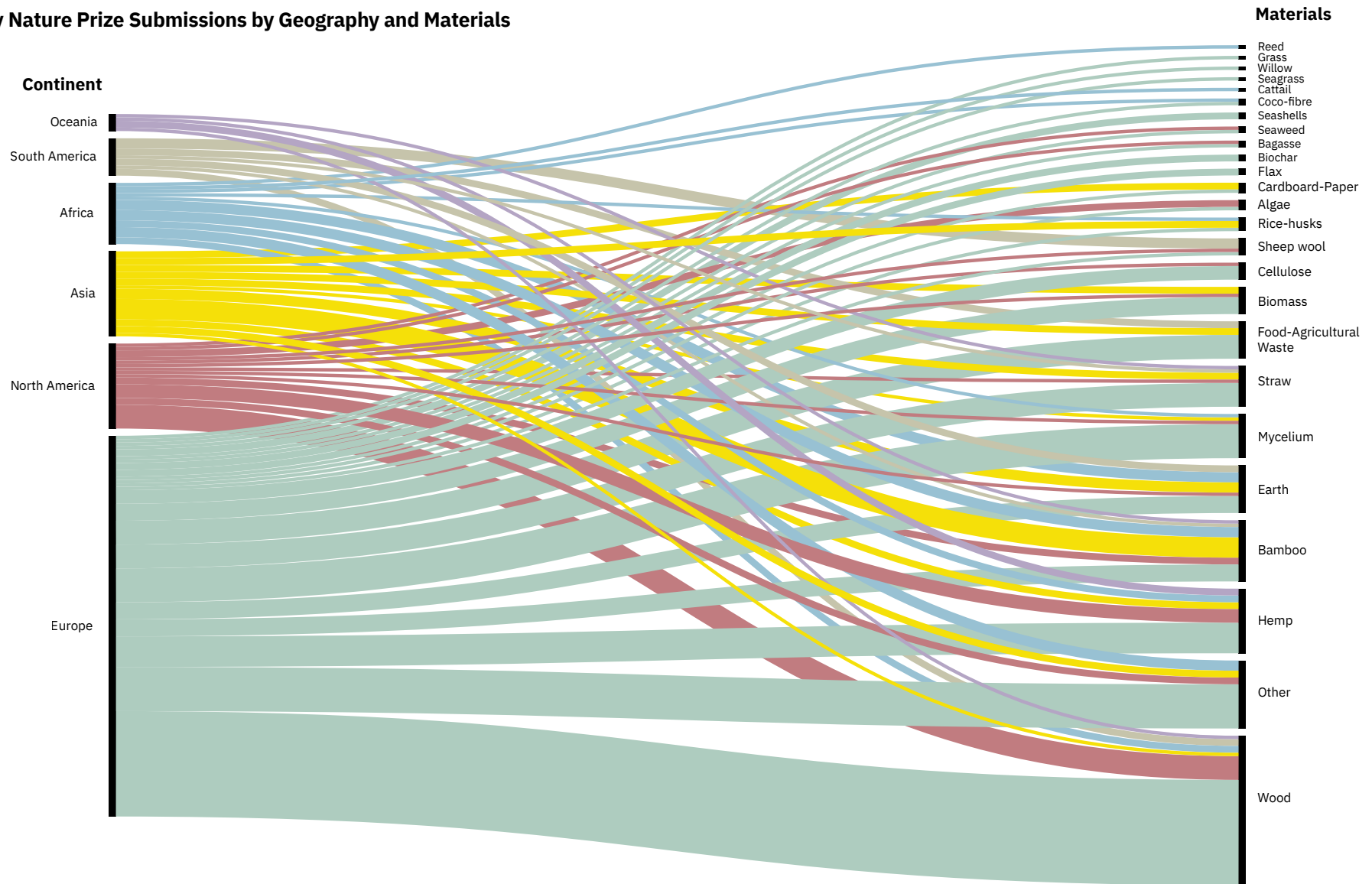
▶ CLICK ABOVE TO PLAY THE VIDEO

urbanmachine.build

Location **USA**
Material **Reclaimed (secondary) lumber**
Established **2021**
Team **15**

Geography and Materials

Built by Nature Prize Submissions by Geography and Materials



Built by Nature gratefully acknowledges the generous support of our Founding Partner Laudes Foundation and Funding Partner LTPP

Laudes ———
—— Foundation

LTPP

Built by Nature
prize