

RIZOME

Climate-Positive Building

We're on a mission to sequester carbon and develop bamboo into a primary global construction material



Contents

Legal Notices	04
Overview	05
Product: Building Materials	06
Company History	07
2020 Product Specifications	08
Market and Growth: Building Materials	10
Product: Carbon Sequestration and Offsets	11
Market: Carbon Offsets	13
Why Now?	14
Traction	16
Resilience, Recession, and Risk	17
Impact	18
Competition	20
Corporate Profile and Financial Projections	21
Team	22



Legal Notices

This memorandum contains forward looking statements that involve risks and uncertainties. We use words such as “anticipates,” “believes,” “plans,” “expects,” “future,” “intends,” “seeks,” and similar expressions to identify such forward looking statements. You should not place undue reliance on these forward looking statements. RIZIOME’s actual results could differ materially from those anticipated in these forward looking statements for many reasons, including but not limited to the risks described in the section of this Memorandum entitled “Risk Factors”.

You should not rely on this Memorandum for investment, legal, or accounting advice. You should consult your own professional advisors before entering into any investment agreement. Please consult your tax adviser for information specific to your circumstances. We anticipate that investors are aligned with RIZOME’s environmental sustainability and social responsibility goals.

INVESTMENT IS SUBJECT TO CERTAIN RISKS, AND YOU SHOULD NOT INVEST IF YOU CANNOT AFFORD TO LOSE THE AMOUNT INVESTED (SEE THE SECTION OF THIS MEMORANDUM ENTITLED “RISK FACTORS”). THERE IS NO GUARANTEE OF A RETURN ON OR OF YOUR INVESTMENT.

Overview

**PLANT BAMBOO. MAKE ENGINEERED LUMBER.
REPEAT. SEQUESTER 10 GIGATONS OF CO₂ BY 2050.**

Mission

RIZOME will make bamboo the primary climate-positive construction material and establish one of the largest carbon drawdown projects on the planet.

Problem: Ecological Disaster

The construction industry is an ecological disaster. Embodied carbon from construction accounts for **11%** of global CO₂ emissions and **28%** including lifecycle building operations. Cement contributes **7%** and steel up to **8%** of global emissions. Wood requires huge land areas and is harvested globally at unsustainable rates, with **18.7** million acres of new deforestation each year. Large-scale reforestation to sequester carbon is slow, has been hampered by expensive and inaccurate verification, and is difficult to monetize in an inefficient and opaque offset market.



Solution: Regenerative Bamboo Building

RIZOME has developed a climate-positive bamboo alternative to wood, steel and concrete after two decades of innovation.

We believe that one of the largest revolutions in building materials in the coming years will be the widespread adoption of high-tech engineered bamboo lumber. As this shift occurs, every new building will support climate-positive CO₂ drawdown and provide regenerative local bamboo economies in regions that need it the most.



Product: Building Materials

WE HAVE CREATED A CLIMATE-POSITIVE BAMBOO ALTERNATIVE TO WOOD, STEEL, AND CONCRETE.

Bamboo engineered lumber has superior technical characteristics that can complement or replace wood, steel, and concrete for most structural building applications. RIZOME is at an inflection point where our products will be cheaper than wood within three years, which will mark a fundamental shift in climate-positive construction.

We are vertically integrating the bamboo supply chain and introducing modern western lumber manufacturing to achieve the lowest cost of production.

RIZOME Engineered Lumber

- **2.5x stronger** than steel by weight
- **Greater compressive strength** than concrete
- More **fire-resistant** than wood: Class A fire rating, chars rather than melts to prevent catastrophic collapse in high-rise buildings
- **Regenerative:** 10x carbon drawdown vs. trees, watershed restoration, grows faster when harvested, 12x less land use than wood

Definitions

- **CULM:** A single mature bamboo pole. Our giant bamboo is typically over 25-30m (80-100ft) tall and reaching 25-30cm (10-12in) in diameter, one of largest and strongest in the world.
- **CLUMP:** A single bamboo plant, typically 40-50 culms.
- **SLAT:** A long 38mm x 7mm x 2.6-3.2m planed section of bamboo
- **VENEER:** 1/4" 4'x8' panel



Company History

History

RIZOME and its sister companies have been leaders in climate-positive bamboo construction for 25 years, pioneering the use of bamboo in over 500 US residential developments and achieving the first bamboo building code ICC certification. Past projects used round bamboo timbers and so remained a highly customized construction process. Laminated bamboo panels have been prohibitively expensive, so conventional plywood and drywall finish were used to stay cost competitive. Seeing the large amount of plywood and unsustainable engineered wood products used in each building, David, our founder and head of product, was determined to change his industry's impact on forests and the climate. The key: make bamboo into standard dimensional building products at price parity with wood.

That was 2012. Eight years later, after extensive technical and manufacturing development, regulatory wins, and sourcing the largest bamboo in the world, we finally began production. In 2019 we launched our first manufacturing facility in Mindanao, Philippines, to process giant bamboo (*Dendrocalamus asper*) culms into slats. Now in Q2 2020 we are shipping containers to customers in North America and Asia, expanding our manufacturing, and looking to scale globally.



2020 Product Specifications

STRENGTH • **FIRE RESISTANCE** • **DURABILITY**

Rick Sands, Independent Director
Veneers

RIZOME 1/4" (4' x8') veneers are the ultimate solution for adding fire resistance, structural integrity, and a durable finished surface to nearly any application. They can be seamlessly glued to any conventional or engineered lumber with 100% adhesion integrity. Our pressurized borate treatment and natural product density gives bamboo lumber a ASTM-e84 Class A Fire rating, and can improve the fire testing of nearly any lumber surface. With an MOE of 3.7 million (vs. 1.4- 1.7 million for Douglas fir) our veneers can be added as an exterior layer for CLT or LVL and provide significant structural benefit where it matters most. With an average Janka hardness of greater than 1,600 LB/ft (vs 660 LB/ft for Douglas fir) RIZOME veneers are durable enough for commercial flooring, concrete forms and other high-performance uses. Adding a 3-5% bamboo layer in LVL can transform low-strength sapwood into a structural-grade hybrid panel for higher log yield.

Net 25 lbs CO2 drawdown per unit.



2020 Product Specifications (Continued)

Custom Panels

1/4", 1/2", 3/4", 1" (4x8ft)

1-ply, 2-ply, 3-ply, 4ply

RIZOME custom face-glued panels are appropriate for high-performance CLT, potentially requiring fewer CLT layers for cost and weight savings and providing a durable, fire-resistant architectural surface for flooring or ceiling.

Slats

Dimensions: 8mm x 38mm x 3.2m

RIZOME slats are the largest in the world, sourced from a robust global supply chain of exclusive giant bamboo. Slats are the building block for our veneers and laminate products, and are sold individually as well as inputs for finished goods including furniture, flooring, and custom products.

Custom Boards and Dimensions

RIZOME dimensional lumber is perfect for high-rise and commercial structures that can fully utilize the structural properties, fire resistance, and aesthetic value of the material.

We can provide custom sizing for your specific project requirements.

All products are available in a wide range of color and texture finishes.

Technical Specifications

Dendrocalamus asper (Mindanao)			
Compression: 7,000-9,600 psi	vs.	3,000-6,000 psi	for concrete
MOE: 3.7 million psi	vs.	1.4- 1.7 million psi	for Douglas fir
MOR: 22,000 psi	vs.	12,500 psi	for Douglas fir
Tensile, Ultimate: 14,000- 49,000 psi	vs.	15,600 psi	for Douglas fir
Shear: 1,600-2,200 psi	vs.	910 psi	for Douglas fir
Janka Hardness: 1,600 LB/ft	vs.	660 LB/ft	for Douglas fir
ASTM-e84 Fire Test: 25 (Class A)	vs.	90 (Class C)	for Douglas fir
CARB2 Compliant			
100% Glue Bond Adhesion for hybrid softwood laminated lumber.			
100% Sustainably-Harvested Dendrocalamus asper (Giant bamboo)			

Market and Growth: Building Materials

REPLACE EXPENSIVE HARDWOOD LUMBER. SCALE. REPLACE CHEAP SOFTWOOD LUMBER. REVOLUTIONIZE CONSTRUCTION.

Phase 1

Our current products, bamboo slats, veneers, and panels, are precision inputs for hardwood-alternative finished goods like flooring (\$141.bn), cabinets (\$55bn), furniture (\$74bn), pre-fab wall sections and trusses. These are high-value uses with great margins and a large enough market for a decade of growth. We already make the largest slat in the world due to our superior bamboo sourcing and processing technology. Yet our ambition is bigger. To make the climate impact are pursuing, dimensional bamboo needs to become a global commodity.

Long-Term Addressable Market: \$1+ trillion

At scale, we believe bamboo can replace concrete, steel, and wood for most commercial structural applications. The potential market size for structural engineered bamboo lumber is massive once it gets to cost parity with precast concrete (\$168bn), lumber (\$275bn), and structural steel (\$140bn), with strong long-term growth as the world's building stock is expected to double by 2060. We anticipate that in 2023 our production efficiency will make bamboo price competitive with these materials for most uses, in particular mass timber high-rise and large commercial structures where bamboo's high strength/weight ratio can be fully utilized.

Phase 2

Q1 2021: Scale Production 10x

We will build our next-generation 240,000 veneer/year processing facility in the Philippines to meet more than \$100,000,000 in initial US customer demand.

Phase 3

2022-2024: Scale Manufacturing

Our primary production goal in the first three years is to decrease cost of harvesting, manufacturing, and transportation to reach a level of efficiency that makes bamboo cheaper than wood, steel, and concrete. We will build at least 2 additional processing facilities in the Philippines and expand planting operations globally for carbon offset credits and product supply.

Phase 4

2024-2034: Scale Globally

The 2020s will be the decade when bamboo became a major global construction material. Replicating the Philippines model, we will initiate planting and manufacturing operations in more than 20 countries including the USA, India, Vietnam, Indonesia, Kenya, Ethiopia, Ghana, Brazil, and Mexico.

Product: Carbon Sequestration and Offsets

BAMBOO IS THE FASTEST CARBON DRAWDOWN TECHNOLOGY ON EARTH

The Bottom Line

*Bamboo is truly regenerative. The more we harvest, the more carbon we sequester. The cities and communities of the future will be built with climate-positive materials. Farmers and indigenous groups are rewarded for reforestation. **Earth wins.***

Overview

Carbon offsets credits are earned by planting bamboo, verified by a third-party auditor, and sold to governments and industrial customers through the compliance-based UN Clean Development Mechanism (CDM) market and through the voluntary market to companies and individuals.

We are planting one of the largest CO2 drawdown projects on the planet with the aim of planting 10,000,000 clumps of Bamboo by 2025 and sequestering 10 gigatons of CO2 by 2050. In 2020 we are initiating a pilot project of 650 hectares (130,000 clumps) near our processing facility in Mindanao. **Bamboo sequesters 10x the carbon** vs. conventional tree reforestation, so it has both a major climate impact and is profitable. We are also working with climate finance institutions and carbon brokers like ClimateCare to finance planting operations up front.



Current indigenous Mindanao planting site

Product: Carbon Sequestration and Offsets (Continued)

Carbon Drawdown

Giant bamboo has a unique geometric growth curve that makes it 10x faster than tree-based CO₂ drawdown. Our forestry partnership with the University of Science and Technology of the Philippines (USTP) produced a biomass study that proves the viability of bamboo carbon sequestration at an order of magnitude greater than previous literature. Our bamboo can sequester over 1100 tonnes CO₂/hectare in the first decade, maintaining a tremendous growth rate throughout its 80-year life in an optimally harvested plantation. We see an additional ~40% benefit as bamboo replaces a portfolio of concrete and steel building materials.

Regenerative Harvesting

Unlike trees, which die after cutting, bamboo requires harvesting 1/3 of the clump each year to stay at its maximum growth rate. Thus carbon drawdown is perfectly synergistic with scaling bamboo engineered lumber.

Tracking

We deploy an RFID tag and collect remote sensing data on every clump for unprecedented clump-to-credit traceability. We believe this data-oriented approach to reforestation will be critical over the coming decades. We can measure culm count and weight at harvest, identify the highest-growth cultivars for propagation, see ongoing viability of plantings, and ensure single-counting of final carbon credits through blockchain/tokenization.

Verification

Pre-VCU Carbon credits are currently available through ClimateCare, and we are participating in RFPs for major industry partners for offtake contracts 2021-2030.



Market: Carbon Offsets

CLIMATE CHANGE AND THE CARBON ECONOMY IS THE BIGGEST THEME OF THE DECADE

Market

We are implementing a phased approach to carbon offsets. The voluntary carbon offset market for industrial emitters and consumers is approaching \$1bn, largely driven by growth in reforestation projects at 342% annually, which are strongly preferred for social and ecological impact. The number of individuals and companies buying carbon offsets is exploding at 4-10x growth in 2019 over 2018.

We have signed an exclusive partnership with ClimateCare, the leading broker for carbon offsets, to resell the majority of our credits, with pre-verified pricing at ~\$4.50/tonne. We are also working with organizations including CarbonFund to diversify our customer base.

The overall market for compliance-based carbon offsets and allowances is significantly larger at \$160bn. Our initial launch in the voluntary market with industrial customers (tech, oil & gas, banks, airlines) will allow us to expand into compliance-based markets as we complete additional governmental compliance requirements.

Future

We believe that human civilization can become climate-positive by 2050.

In order for this to happen, we must draw down 1 Trillion tonnes of CO₂ from the atmosphere. Conventional carbon offsets are often “avoided emissions”, rather than actual CO₂ taken from the atmosphere and stored in forests, soil, and the built environment. The carbon market is currently maturing into prioritizing carbon removal, and particularly nature-based solutions with holistic ecosystem and social benefits.

RIZOME is undertaking the highest quality carbon development: native reforestation supported by bamboo agroforestry, with long-term storage as building materials. We believe this will command a price premium, with regulatory markets targeting at least \$15-20 in the next decade.

Our goal is to sequester 10 gigatons of CO₂ by 2050, or 1% of anthropogenic carbon emissions. To do this, we'll plant more than 1 million hectares of bamboo globally, operate 1,000 processing facilities, and manufacture more than 500 million panels per year in material with billions in revenue.

Why Now?

IF BAMBOO IS SO SUPERIOR TO WOOD, WHY HASN'T IT ALREADY BECOME A MAJOR BUILDING MATERIAL?

History

Bamboo has been a low-tech industry of \$70bn in toothpicks, skewers, paper pulp, chopsticks, cutting boards, and only recently flooring and veneers. While there are huge areas of bamboo forest throughout SE Asia, China, Japan, Central and South America, and Sub-Saharan Africa, nearly all species have small diameter, so the product mix is limited. There has never been an accessible supply of bamboo with the dimensions of culms necessary to make slats large enough to service the global construction market.

RIZOME is the first to change this paradigm.



Supply

About 20 years ago, the Philippines government and NGOs planted tens of thousands of hectares of giant *Dendrocalamus asper* alongside roads and rivers in order to mitigate catastrophic flooding and erosion from deforestation and increasing typhoon severity. We are the first to access this new resource as the jumpstart needed for the first decade of harvesting.

Supply Chain Reliability

Bamboo has not been implemented structurally as a wood amendment or replacement because lumber companies require huge volumes, strict quality control, and a consistent supply. Though Chinese suppliers have tried in the past to introduce structural products, their smaller slats, higher prices and low reliability have not reached the scale needed.

Why Now? (Continued)

Price

Existing bamboo 4x8' panels cost up to \$200/sheet retail. Ours will be far cheaper at launch to produce (\$14.16 COGS), and long-term down to \$7.67 (COGS). This is revolutionary. When bamboo reaches cost parity with wood, the world changes.

Technology

We are the first to bring modern western lumber manufacturing processes, adhesives, data collection, and automation to bamboo.

Regulation

Wood Skyscrapers/Mass timber buildings are newly IBC compliant since 2018 (up to 18 stories in 2021).



Embodied Carbon

Read any architectural newsletter recently, and low embodied carbon, along with mass timber, is the new face of construction. Bamboo is the most climate-positive structural scalable building material.

Decreasing global timber supply

Logging moratoriums around the world are increasing timber prices and demand for alternative materials.

Carbon Offset Market

Carbon removal credits from reforestation projects is at an inflection point and growing at 342%/year. Major industry leaders are dramatically increasing demand and pricing.

Traction

WE'VE ESTABLISHED STRONG PRODUCT-MARKET FIT AND ARE READY TO RAPIDLY SCALE

We've spent three years securing Philippines government and local support, sourcing the right bamboo, and contracting with local harvest and manufacturing partners.

In 2019 we built and commissioned our first manufacturing facility with a production capacity of 100,000 slats/month, and are installing new equipment to double production in Q4 2020, and increase to 1,000,000 slats/month in 2021. We established the world's first large-scale supply chain of giant bamboo, identified the first 160,000 hectares for planting. We started shipping product in February 2020 to customers in SE Asia and the US, and have stated customer demand of at least 70 million slats/year.

In Q1 2020 we completed our initial survey with CarbonFund, a 3rd-party consultancy, to finalize the carbon credit VCS verification methodology. We have partnered with the University of Science and Technology of Southern Philippines to lead a rigorous biomass and carbon sequestration study. We have also partnered with indigenous tribes, leading international reforestation groups and local NGOs to support a large-scale nursery, planting, and harvest operation.

Launch and Timeline

We launched our planting initiative in the region of Bukidnon (Mindanao, Philippines) in June 2020 with an initial 650-hectare test plot (130,000 bamboo plants) near our factory. We were awarded an \$80,000 grant by One Tree Planted to help fund this pilot, and start a long-term partnership to fund bamboo planting in Mindanao and globally. By Q2 2021, we will increase slat production at our main facility to 1,000,000 slats/month, start laminate manufacturing in Cagayan de Oro, and prepare expansion for additional harvest and processing sites in Mindanao.

2021-2022 will see the expansion of proof of concept planting to 3000-5000 hectares planted per year, so that we can reach our strategic objective of planting 10 million clumps by 2025 and 50 million by 2030. We will expand to three additional processing facilities to produce 70 million slats/year by 2024.



Risk Factors

OUR LONG-TERM INVESTMENT THESIS IS SOLID: BAMBOO WILL BE A MAJOR GLOBAL BUILDING MATERIAL. A TEMPORARY PANDEMIC OR EVEN MULTI-YEAR RECESSION DOES NOT CHANGE THE INVESTMENT FUNDAMENTALS.

In the face of global pandemic, our operations and customer base remain strong. As of June 2020 we have increased production in the Philippines every month and shipments to the US and SE Asia continue. We see multiple significant business opportunities to actually accelerate through this crisis, and our core launch customers have actually increased demand as their other suppliers are unable to fulfill orders.

COVID-19, Recession, and Geopolitical Risks

Operations

The most significant short-term risk would be a mandatory government shutdown of operations in response to COVID-19. However, our manufacturing and harvest operations are deemed essential services by the Philippines government and have continued throughout the quarantine restrictions.

Long-Term Construction Slowdown

If new construction drastically falls worldwide, there may be less demand for new bamboo products in the market. Lumber could also see a price decrease if demand falls low enough, making the opportunity cost for a new material greater. However, our climate-positive focus should still allow us to

Demand Decrease for Carbon Credits

While we see a long-term trend of increasing prices and demand for carbon credits in the voluntary market as well as by government mandate, a serious demand shock could lower the price of offset credits significantly. However, we are in an excellent position to weather any downturn in prices: once the bamboo is planted, they are rapidly storing carbon and we can choose when to verify and sell offset credits. Bamboo grows just as fast in an economic downturn.

Conflict and War

Mindanao has a history of protest and conflict, although today this risk has been reduced with economic development and the establishment of Muslim autonomous regions. We cannot predict if this social disruption will re-emerge in the future. Our 10-year plan is geographically focused in Bukidnon and nearby provinces, a distinct religious (Christian) and indigenous region located on the other side of Mindanao from prior conflict-ridden areas.

Political

The Philippines has a history of political upheavals, though we anticipate government stability and ongoing project support. We have cultivated relationships at every level of government, and have received support from the National Greening Initiative, Land Bank, influential NGOs including the Red Cross, and other economic development initiatives of Mindanao.

We are actively expanding our future supply in the US by initiating a large-scale giant bamboo planting project in Florida.

Impact

RIZOME ADDRESSES EVERY ASPECT OF SDG17 UN SUSTAINABLE DEVELOPMENT GOALS



Our reforestation and employment initiatives in the Philippines have deep support from indigenous groups, farmers, and government. Regional NGOs and national banks have offered to facilitate large-scale planting of giant bamboo and the associated emergence of a fundamental shift in the environmental, economic and social reality of Mindanao. We plan on being one of the first SDVista SDG17 verified reforestation projects. With a strong regenerative presence in the Philippines, we hope to expand the bamboo carbon economy globally.

Scale

We chose the Philippines because of its potential for large-scale planting. Mindanao was dramatically deforested through legal and illegal logging over several decades, until logging was banned 5 years ago. Today, Mindanao's landmass includes over 300,000 hectares (750,000 acres) of barren, deforested land. Much of this land is owned by Indigenous Populations (IP) and impoverished communities that remain economically and socially marginalized.

Economy

Our bamboo processing facility has dramatically benefitted the local community. Farmers can now generate additional revenue from their existing bamboo stands and have access to stable fair employment in a region where people rely on wages far below global poverty levels. We anticipate further stabilizing effects as the bamboo and carbon economy expands. RIZOME pays living wages to all employees.

Ecology and Fire Resistance

Giant bamboo is the fastest growing plant on earth. Regular harvest increases growth. Bamboo also does not die in the grass fires that have devastated other reforestation attempts with native hardwoods in the area. We only plant clumping bamboo to not compete with native species. We plan on increasing biodiversity with native forest interplanting in future years.

Water

Water is a major issue worldwide. Bamboo helps restore the water cycle. The unique rhizome mat of the plant reduces catastrophic flooding and erosion, and also recharges aquifers to mitigate drought.

Impact (Continued)

Social

We have already begun to see the early social impact of a thriving bamboo economy. Anecdotal evidence: former rebels underemployed since the armistice with the government 3 years ago have become bamboo harvesters.

Gender equality

Unlike the lumber industry which is both machine-heavy and male-centric, the lightweight of bamboo enables women to participate in the bamboo economy, as well as the community's decisions to favor women for the nursery portion of the program.

Indigenous Populations

We have deep support among local indigenous groups in our launch region of Mindanao. There are 7 hill tribes divided into 2 ethnolinguistic groups. Our project is one of the first to offer economic opportunity to this disenfranchised community. They benefit at every level from nursery development, carbon offset revenue sharing, harvesting of current native bamboo forests, and ecological restoration and reforestation.



Competition

RIZOME HAS AT LEAST A 5-YEAR TECHNICAL AND DEVELOPMENT LEAD

RIZOME is working on a complex problem: modernize the bamboo supply chain by vertically integrating planting, harvesting, manufacturing, and sales. If we succeed, there will be a massive impact on climate, building materials, and marginalized regions that benefit from emerging bamboo economies. Our team is bringing the best western manufacturing technology and processes to what has traditionally been a cottage industry, and we've persevered through the technical and regulatory setbacks that any other company will have to face.

Numerous Chinese and SE Asian manufacturing companies have created bamboo panels and veneers. However, their typical bamboo species (moso and luong) make slats that are 70% smaller, increasing the cost and decreasing the strength profile for structural uses. It would take at least 7-10 years before adequate giant bamboo becomes mature for new operations.

Teragren, BamCore, Lamboo and PlyBoo each make gorgeous dimensional and pre-fab bamboo products, though rely on expensive contract manufacturers. Their prices are still far too high to compete with conventional construction methods. Our vertically integrated approach and giant bamboo species is essential to get the cost structure lower than wood.

Advantages

Proven Harvestable Supply

There is no other comparable bamboo source in the world. We are producing now without having to wait 7 years for the first harvest.

Technology and IP

After twenty years of materials science and processing research, we have the essential patents, manufacturing and engineering expertise, and relationships and political network to successfully pull off the ambitious scale of this company. We are gathering the largest dataset to select the best bamboo genetics for planting, and are working with US labs to implement CRISPR for patentability. We are actively pursuing strategic patent opportunities and proprietary code approvals.

Team

RIZOME has the most experienced and diverse team in the industry with two decades of residential bamboo construction and materials research. Our team brings deep experience with the bamboo supply chain and technology, industrial manufacturing, and a lifelong ecological commitment, a unique combination that few existing building material companies can match. We are in this for the long haul to change the ecological impact of global construction for good.