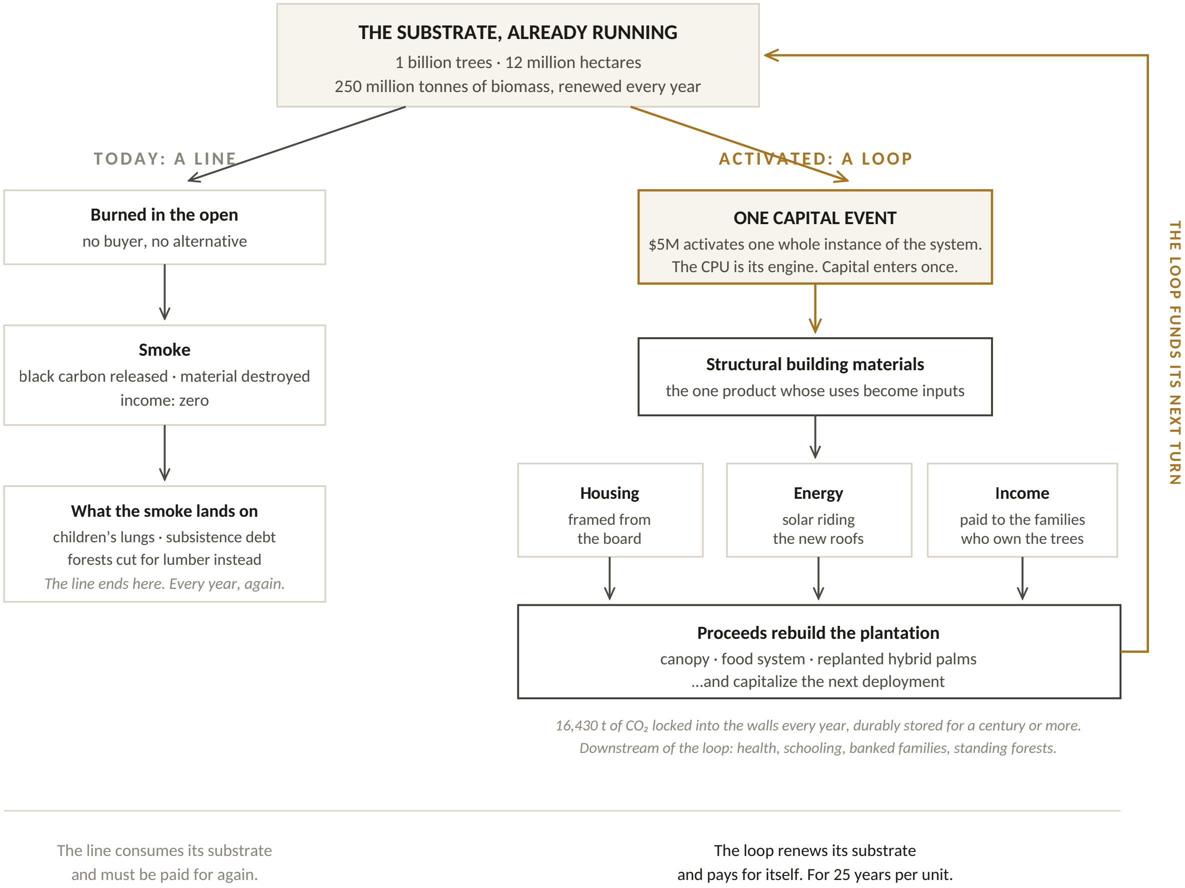
GLOBE-ECO

Technical Briefing

Coconut country is one of the largest underperforming assets on Earth: a billion trees on twelve million hectares, already capturing carbon, currently burning the proof as waste. The burning is not a neutral loss; the same fire feeds the smoke in children's lungs, the debt that holds families, and the pressure on the forests beyond the plantation. Globe-Eco built the key that turns the same asset the other way: building materials, housing, energy, and farmer income, and downstream of them, health, schooling, and restored land. This will not file neatly under climate, housing, or livelihoods, and that is the finding: one capital event sets a cascade of reinforcing loops in motion, where each outcome feeds the next and the whole compounds beyond the sum of its parts. The system pays for itself after that one event. This briefing documents it, its unit economics, and the $10M that capitalizes its first two deployments.

Prepared for analyst review. This document is self-contained. Mandate entry points: climate, sections 10–11; housing and materials, sections 5 and 10; livelihoods, section 8; why one system answers all three, section 6.

One Capital Event. A Generation of Abundance.



The capital event is one-time. Everything downstream of it is revenue-funded. What the system makes is what makes the cascade possible: building materials are the one conversion whose outputs, housing, energy, and income, become the inputs of the next loop. The pages that follow are this picture, argued and priced.

1 Deal Parameters

$10M capitalizes two complete deployments.

Each deployment is a whole instance of the cascade: one Coconut Processing Unit (the engine), the plantation program, and first-turn working capital. Two units convert "it works" into "it replicates," the proof the Phase 2 institutional raise requires.

Unit economics, per deployment, lumber only

The printed pro forma stands on structural building materials at market price. Nothing else. Carbon revenue and housing fabrication are documented upside, excluded from the model by design (sections 10 and 11).

Output, full capacity	10,000 m^3/yr structural board, classified to ISO 16893
Price	$350/$m^3$, below the $363–545/$m^3$ engineered-panel substitution range by design
Cost basis	$200/$m^3$, two independent models converge at $190–198
Revenue / EBITDA	$3.5M / **$1.5M (~43% margin)**
Capitalization per deployment	$5M
Payback from capital close	~4.5 years; ~3.3 at full capacity
Breakevens	$200/$m^3$ price floor; ~27% utilization at $350
Asset life / lifetime EBITDA	20+ years / ~$29M ≈ 5.9× capitalization
Verified carbon removal	16,430 t CO_2eq/yr per deployment, third-party LCA; unpriced in this model

Timeline from capital close

First revenue at commissioning. Full capacity inside 18 months. Capital returned in cascade revenue in ~4.5 years on the lumber-only model. The asset then runs 20+ years.

Status

Round open; structure in discussion with anchor partners. The structure is flexible by design, able to accommodate a range of capital allocation mechanics on terms fitted to each partner’s mandate; return capacity is documented in section 10. The production system is operational today at the Innovation Center in the Philippines MEASURED; the figures above describe its first full-scale deployments MODELED.

2 The Frame

Scarcity has been the engine of human conflict for as long as civilizations have existed. It is not always real scarcity. It is sometimes manufactured, sometimes inherited, sometimes simply the consequence of a system that could not see the abundance it was standing on. But the belief that there is not enough, and that someone else is taking what remains, produces a predictable sequence regardless of whether the scarcity is real or constructed: bad outcomes first, conflict second, and then more scarcity as the conflict destroys the conditions that might have produced abundance. The loop is ancient. It is not inevitable.

The loop runs on allocation. When resources are perceived as scarce, the power to allocate them becomes the most valuable power an institution can hold, and corruption follows as structurally as water finding low ground. The energy contract, the building permit, the aid disbursement, the water right: whoever controls the allocation of scarce things controls the leverage that turns institutions from instruments of the common good into instruments of private capture. This is not a moral failure of the individuals inside those institutions. It is the predictable behavior of rational actors inside a system organized around scarcity. Distrust accumulates. Cooperation fractures. The fracture produces the conditions for the conflict that follows, and the conflict destroys more of what might have relieved it. The system generates more of what it cannot solve.

The world's response to these crises has converged on a diagnosis: the economic system has an accounting problem. It externalizes costs onto communities and ecosystems that never consented to bear them. It prices the transaction and ignores the consequence. This diagnosis is correct. But it leads most people to the wrong door.

If the problem is bad accounting, the solution is better accounting. Price the carbon. Mandate extended producer responsibility. Force the market to internalize what it has been externalizing. These interventions are real and worth pursuing. They are also slow, politically contested, and structurally fragile. And they share a critical limitation: **fixing the accounting does not activate anything.** It redistributes existing economic pain. It does not produce lumber that did not exist before, or sequester carbon into walls, or turn a farming family's liability into an income stream.

> One distinction carries the full weight of this document: **the difference between a potential that exists and a potential that has been activated.**

Right now, in a coconut plantation in the Philippines, a farmer is burning the husks and fronds from his own trees, not because he wants to, but because the economic system offers him no alternative. That fire is consuming structural fiber strong enough to frame a house. It is releasing carbon that took years of sunlight to fix into biological form. It is producing smoke that will enter the lungs of the children who live thirty meters away. And it is generating, for the farmer, exactly zero economic value. The potential is extraordinary. The activation is missing. That gap, between what exists and what the market can see, is where Globe-Eco operates.

Fixing the accounting would not have closed that gap. Pricing the carbon externality would not have produced the lumber. Mandating producer responsibility would not have created the income stream that changes the economic trajectory of an 800-family farming community. These are not failures of will or policy. They are the consequences of a category error: treating an activation problem as though it were an accounting problem, and therefore reaching for accounting solutions that leave the potential exactly where it was, latent, unactivated, and burning.

Two images carry the frame, and the rest of this document is the evidence for both.

The lens change. When the optometrist changes the lens, the world does not change. What changes is what becomes visible. And when what becomes visible is abundance, real, physical, measurable abundance that was always present but invisible to the economic system, the leverage of scarcity begins to dissolve. Not because anyone legislated it away. Not because a revolution transferred power from one set of hands to another. But because the key that makes the abundance legible turns it into something the economy can build on, and a market that can see abundance reorganizes around different incentives than a market that can only see scarcity.

The pencil on its tip. The balance among profit, people, and planet is a real equilibrium, but an unstable one, a pencil balanced on its point. Industrial-era economics knocked it over into the only stable state its accounting could see: profit at all costs. The key does not push the pencil back by force of regulation or subsidy. It restores the broken symmetry, making the balanced state economically stable, so that the system stands because standing pays.

Both images say the same thing. The abundance was always present. The system could not see it. What follows is the asset itself, the reason capital has not already activated it, the key that does, and the economics of turning it: a description of something operational today, in the ground, in the Philippines.

3 The Asset

Coconut country is one of the largest underperforming assets on Earth: approximately one billion mature trees across roughly twelve million hectares, a belt stretching from the Philippines and Indonesia through India, Sri Lanka, Papua New Guinea, Vietnam, and across to the Pacific, the Caribbean, and Latin America. Tens of millions of smallholder farming families tend it. It is already capturing carbon at industrial scale. And it is currently burning the proof as waste.

A mature coconut tree is unlike almost any other large tree on Earth. Its roots are small. Its height is fixed. Once it reaches maturity, it stops adding carbon to its own structure: virtually 100% of the carbon it captures each year is shed as biomass, in the form of fronds, husks, and shells, onto the plantation floor. Of that flow, approximately 85% is harvestable. It does this on a moon-cycle: every 28 days a mature tree grows a new frond and sheds an old one, roughly fourteen harvest cycles of biomass a year, for sixty to ninety years, powered entirely by sunlight.

Summed across the belt, the substrate produces approximately **250 million tonnes of harvestable biomass every year** MODELED. Roughly 80% of it is burned in the open and the rest rots. That split is a Globe-Eco field estimate. It rests on fifteen years of direct presence on Philippine plantations, on the agricultural-residue literature that finds open field-burning the dominant disposal route for crop residue across South and Southeast Asia, and on the Philippine Department of Energy's own coconut-residue tonnages, which fix the scale of the material in question. No coconut-specific national burn-rate has been published. This is the one place in the document where a headline input rests on direct observation rather than third-party measurement, and it is labeled as such rather than dressed as a cited statistic. In the Philippines alone, the harvestable figure is approximately 15.2 million tonnes per year. The majority of the trees producing it are underperforming, yielding less than half their potential. This system was not built and does not need to be built. The biological carbon-capture engine is already running, on existing trees, on existing land.

The same fire

The hidden cost and the hidden value are the same physical object. The husk burning at the plantation edge is simultaneously the unpriced liability and the unactivated asset. As liability: open burning releases black carbon, the second most powerful human-caused climate forcer on Earth, directly into the lungs of the communities doing the burning, the farmer who lights the fire is the farmer whose child inhales the smoke. As asset: the material being destroyed in that fire is structural fiber that, processed correctly, becomes century-rated board, sequestered carbon, and an income stream that changes the economic trajectory of an entire community. These are not two problems in two places. They are the same fire.

An economic system that cannot see what things actually cost will systematically overproduce harm. An economic system that cannot see what things are actually worth will systematically underproduce value. The coconut belt is where both blindnesses land on the same hectares: the burning continues because the market sees neither.

Scope

The opportunity is the coconut-producing economy as a whole, not one country. The Philippines is where Globe-Eco has fifteen years of direct experience, where the Innovation Center operates today, and where the data in this briefing is most defensible; it is the concrete instance, not the scope. The patterns this document describes, the burning, the underperformance, the missing market for biomass, are documented in every coconut-producing economy from Indonesia to Brazil, in figures of similar magnitude. What has kept capital from activating this asset is the subject of the next section.

4 The Capital Gap

Over the last decade, foundations, family offices, sovereign development funds, corporate philanthropy, and the rising pool of impact-aligned institutional capital have deployed roughly **$2.5 trillion** against exactly the problems described above. The capital is not hidden. It is not insufficient. By any defensible measure, it is abundant. And the problems remain.

The abundance of capital is not the failure mode. The failure mode is the mechanism. The capital flows in mandate-specialized silos: carbon dollars fund carbon outcomes, housing dollars fund housing outcomes, energy dollars fund energy outcomes. Each silo is rational on its own terms and accountable to its own metric, and each, viewed alone, is incomplete in a way no amount of additional silo-specialized capital can resolve.

The clearest illustration is the carbon dioxide removal credit market. A buyer purchases a credit for a defined tonnage at a defined price. The transaction retires the tonnage and ends. The dollar did its one job and bought no schooling, no clinic, no income for the family on the land the carbon came from, and it touched none of the climate cascade driving all four. One thing, one metric, one fiscal year. Then it is gone. Across $2.5 trillion deployed over ten years, the same pattern repeats. Each dollar produces one thing.

What funders have been trying to produce for a generation is not housing, or energy, or carbon, or jobs, taken individually. It is what those outputs make possible when they arrive together. Communities that flourish rather than survive. Equity that is structural rather than petitionary. Well-being that is rooted in the local economy rather than imported from outside it. Populations less vulnerable to the resource competition that has historically been the substrate of conflict.

These are *system* outcomes. They emerge from housing, energy, nutrition, restored land, and income *together*, compounded across mandates and across decades. No single mandate produces them alone. No additive sum of single-mandate dollars produces them either, because the additive sum is not the same operation as the compounding.

The silo is what the category error of section 2 looks like inside a foundation. A diagnosis shaped by accounting sorts capital into accounting categories, and capital sorted into categories cannot produce systems, because a thriving community is a system, not the additive sum of single-mandate outputs.

This is the gap. The capital exists. The single-mandate outputs exist. What is missing is the mechanism that lets the outputs compound into the system outcomes funders are actually deploying capital for. The dollars were always there. The mechanism was missing.

5 The Key Is a System

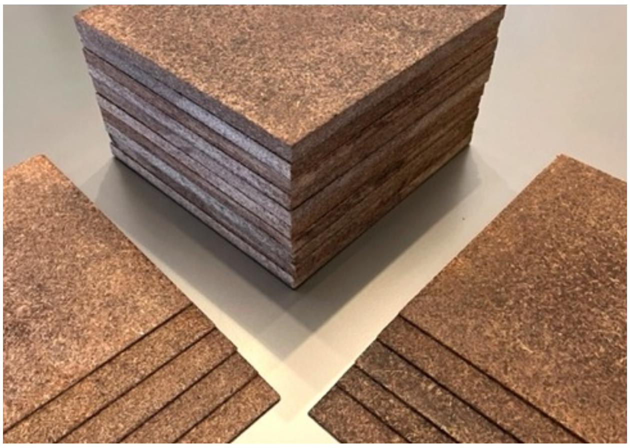
What was missing was never the resource. It was the key that turns the resource into yield, and Globe-Eco built it. The key is a system, not a machine: waste becomes structural material, that material frames housing, the housing carries energy, and the proceeds rebuild the plantation and capitalize the next turn. The key spans the whole architecture. No single piece of equipment is the key, and mistaking the equipment for the key is the central error this section exists to prevent.

The engine

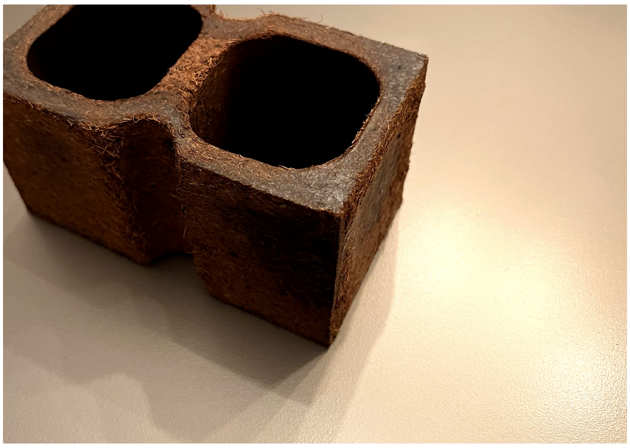
The Coconut Processing Unit is the engine that runs the system. Ten to fifteen forty-foot shipping containers, arrayed as a constellation, deployed directly into a remote plantation. No grid connection. No paved roads. No centralized infrastructure. It generates the power it needs from the same biomass it processes. The CPU is precisely fitted to the substrate: it goes to where the abundance is. It does not ask the abundance to come to it.

The conversion at the engine's core is binderless. Heat and pressure activate the lignin already present in the coconut fiber, which bonds the board without the synthetic adhesives that dominate the cost structure of conventional fiberboard. The output is structural board, tested for fire, load, and moisture against international construction standards and tuned by recipe and density to the structural demand of each application. Independent testing puts internal bond at roughly three times the load-bearing minimum and thickness swell inside the tropical service class, with a clean single-flame ignitability pass. Two structural absences follow from this architecture and carry through every number in sections 1 and 10: zero binder cost, and zero purchased energy.

The proof



Structural board, Innovation Center production
MEASURED



Hollow-core block, same feedstock, same line
MEASURED

The production system is operational today at Globe-Eco's Innovation Center in the Philippines. The boards and blocks photographed above are real output of the real line MEASURED. The full-scale deployment figures in this briefing, 10,000 m^3 per year per unit, describe the first commercial CPUs, scaled from the operating system MODELED, and independently confirmed by press-line throughput arithmetic (section 10). The distinction between what is measured at the Innovation Center and what is modeled for deployment is maintained throughout this document, and every figure carries its label.

The CPU proves the system is real. It is not itself the thesis. What the capital in section 1 buys is not a box; it is one whole instance of the cascade, with the CPU as its engine, the plantation program as its substrate, and the first turn of working capital as its ignition. The fifteen years of development behind the engine, and the binderless materials science at its core, are what make the system durable against imitation. But the system, the loop from waste to material to housing to energy to plantation to the next turn, is the key. The next section describes what that one system does to three different kinds of abundance.

6 Three Operations

The same system performs three distinct operations on three kinds of abundance. The verbs differ because the operations differ: it **activates** coconut biomass, it **binds** waste plastic, and it **integrates** mandate-siloed capital. Only the first is a material conversion, which is why the system, and not "one conversion," is the actor.

Activate

The first operation runs on the biomass the accounting system was never built to see. The husks and fronds that were burning in the open are now feedstock. The CPU converts them into structural board, built to last a century and recyclable back to virgin properties through at least five service cycles MEASURED. The farming family earns income from material that previously generated only smoke. The carbon that would have entered the atmosphere is locked into the walls of a building. The burning stops, not because of regulation, not because of a carbon price, but because the biomass now has a buyer who pays more for it than the cost of burning it. No one changed the rules, disrupted a supply chain, or legislated an industry into obsolescence. The system simply made it more rational to activate the abundance than to keep burning it.

This is what activate means, precisely. The abundance was always present in the plantation. The system makes it legible to the market that could not see it. Nothing was created from nothing. Something that already existed became visible to the market that prices things.

Bind

The plastic the world produces faster than it can recover is not hidden. The market sees it perfectly clearly. Governments legislate against it. Consumers demand its reduction. And it continues to accumulate at planetary scale because the alternative, eliminating its production at source, depends on a destination that does not yet exist for the plastic already in the world.

The CPU is that destination. Waste plastic is incorporated into the same board at meaningful mass fractions MEASURED, where the lignin in the coconut fiber and the polymers in the plastic form a molecular bond that makes the composite stronger than either material alone. At full deployment across the coconut-producing economies, the second operation binds approximately **18 million tonnes** of waste plastic into structural board every year MODELED, roughly twice what currently enters the world's oceans annually.

The geography compounds the logic. The Philippines is simultaneously the world's largest contributor of ocean plastic and its second-largest coconut producer; four of the five largest ocean-plastic source countries are major coconut producers. The plastic problem and the coconut substrate occupy the same coastlines, which is why one deployment intercepts both.

The dependency runs in one direction. The coconut operation works on its own. The plastic operation does not: plastic alone does not produce a load-bearing board; it requires the coconut substrate. The system does not *activate* plastic, because plastic abundance was never inactive. It *binds* it.

Integrate

The third operation runs on capital itself. The mandate-specialized dollars section 4 diagnosed do not need to be activated and cannot be bound. They are abundant and visible and arrive in the world already sorted into the silos that prevent them from compounding. The system runs a third operation on that abundance. A single deployment produces structural board, distributed rooftop solar, sequestered carbon, plastic interception, farmer income, restored land, and food security in one transaction, in the same place, with the same CPU. The dollar stops being a housing dollar or a carbon dollar or an energy dollar. It becomes an ecosystem-activation dollar, and its consequences propagate across every mandate the silos had previously kept separated.

What the system produces for capital, that it does not produce for coconut or plastic alone, is compounding over decades. The board becomes housing. The housing carries rooftop solar that reduces demand for imported fossil fuels. Plantation revitalization restores biodiversity, creates new food systems that reduce childhood stunting, and increases productivity, with more raw material and biomass per hectare. Each loop reinforces every other loop. The system *integrates* mandate-specialized capital into compounding ecosystem impact. One deployment. Every mandate. Compounding for decades.

The two sections that follow trace that compounding where it actually happens: on the land, and in the lives of the people who live on it.

7 The Land Cascade

A cascade is what loops do when they close into each other. Economists call it a positive feedback loop. Engineers call it a virtuous circle. The system's three operations do not produce seven separate outputs that arrive in the same place by coincidence. They produce outputs that feed one another, so that what one operation builds the next operation rests on, and what the third operation funds is what the first operation needs. The cascade is not a chain that runs once. It is a set of loops that compound on every subsequent pass. This is what one deployment produces, running.

The first deployment lands

A constellation of containers arrives in a coconut-producing community. Within 30 days the first cycle is running. The speed is structural, not aspirational: the unit is fully off-grid, generating its own power and producing no waste stream that requires disposal infrastructure; it qualifies for expedited permitting as a temporary structure; and it lands on an active plantation already surrounded by its raw material. Harvested biomass that was burning in the open is now structural board, built to last a century. The farming family that owns the trees receives income for the same material that previously generated only smoke. Waste plastic the community had no destination for is bound into the same board. The accounting system that priced none of this now prices all of it.

In that first year the deployment also produces a building. The board is graded for, and locally consumed by, the housing the community has waited decades to build, and the first roofs go on within the first harvest cycle. On those roofs sits rooftop solar, its surplus pushing into a community microgrid the grid never reached. The household that now has shelter from the board also has electricity from the roof of that shelter. The two outputs arrive together and reinforce each other because they land in the same place at the same time. That is the first loop closing.

The proceeds from the first year's board, housing, and plastic sales begin to fund what does not yet exist on the plantation: a second tier of canopy underneath the coconut trees, a third tier at ground level, and a hybrid-tree replanting program that will, over five years, rebuild the plantation itself.

The five-year horizon

By the time the same community has run for five years, the loops that the first beat named in their first turning have closed once each. What the closures produced is now visible, and the plantation the CPU sits on is no longer the plantation it was.

The canopy. The proceeds from the first deployment funded the planting of a middle tier of cacao, mango, and coffee on the same hectares the coconut tree already occupies. The mature coconut tree, with its small roots and fixed height, leaves room beneath itself that a mono-crop plantation does not use. The intercrop fills it. Cacao, mango, and coffee are not subsistence crops. They are high-value global commodities, and across the coconut-producing economies the intercrop opens potentially millions of hectares of new high-value crop land, unlocking coconut country's natural endowment of rich biological resources that the existing accounting system never priced. This is a revenue stream that moves national GDP, not just family income, on land that already exists.

The middle canopy also captures carbon the coconut tier could not. Published agroforestry literature reports above-ground carbon uplift in intercropped coconut systems ranging from roughly **19 to 70 percent** per hectare relative to mono-crop plantation, depending on the species combination MODELED. The variation is not noise. It is the cascade argument made literal: the carbon a hectare carries scales with the number of species cooperating on it.

The proceeds from the middle canopy then funded a *third* tier: an organic food layer at ground level, the cover crop the mono-crop plantation never had. This is the food system, and it is why the childhood-stunting indicator begins to move at the five-year mark and not before. Stunting falls only when a cohort of children grows up eating from it, and by year five the cover crop has been producing long enough for that to begin. Section 8 follows what that does to the children.

The trees. Most coconut plantations are sparsely planted relative to their carrying capacity, and many of their palms are senile, past peak yield, harder to harvest each year. The same revenue funded a replanting program: hybrid coconut trees that produce far more biomass per palm with easier harvest, planted into the gaps and into the spaces the senile trees vacate. The senile trees, when removed, are themselves milled into lumber, a one-time pulse of timber that reduces short-run pressure on old-growth tropical forest because the market is supplied from salvage rather than forest concessions. Per-hectare productivity rises across every output, and because the new palms take five years to mature, the canopy and the food system both reach full operation on the same five-year horizon.

The forest beyond the plantation. The structural board the CPU produces, together with the senile-tree salvage milled into lumber, displaces wood from intact forest at the same grade. Every cubic meter that enters a building is a cubic meter that no logging concession produced. The Philippine Eagle is the second-largest eagle in the world, critically endangered, with fewer than four hundred breeding pairs left on Earth. The Philippine Tarsier is one of the smallest primates alive, with a lineage forty-five million years old, endangered, with a population in continuous decline. Both species exist nowhere else. These islands are the only habitat on Earth where they live. The cascade preserves both as a byproduct of doing something else. It produces lumber the building market needs from a source the building market did not previously have, and the forest the species live in does not have to be taken down to supply it.

The carbon beyond the lumber. The direct sequestration is only the first of three carbon pools. The tropical hardwood tree the building market did not have to cut keeps sequestering, on its own, for the next twenty to twenty-five years; the discounted value of that ongoing sequestration, net of the product pool and replacement-tree growth that the cut-and-replant counterfactual would have produced, is a separate carbon term, modeled at approximately **50,000 additional tonnes of CO_2 per CPU per year** in the base case (range 10,000–90,000 across assumption bundles) MODELED. The rebuilt plantation is a third pool: the new canopy, the hybrid palms that produce roughly twice the biomass of the senile trees they replace, and densification toward carrying capacity together add approximately **56,000 additional tonnes of CO_2 per CPU per year** at the year-ten steady state (range 15,000–170,000) MODELED. Three different pools, three different mechanisms: the direct-removal carbon sits in board inside finished buildings; the standing-forest carbon sits in tropical hardwood the building market did not need to cut; the plantation-uplift carbon sits in living biomass on the plantation. They are accounted separately, held to their own assumption sets, and never summed into a single headline. Section 11 carries the full methodology, reference systems, discount rates, and sensitivities for both modeled pools.

The decade horizon

A decade in, the loops have closed and reopened multiple times. The plantation is at its rehabilitated peak. The food system is mature. The intercrop is at full production. The housing carries its own electricity. The plastic that was on its way to the sea is in the walls. The carbon that was on its way to the atmosphere is in the board. And the community that received the first deployment is no longer the community it was.

A second CPU, in the same community, is now warranted. Capital and operating record alone would justify it; those are both demonstrably defensible after a decade. But the actual warrant is larger. The upgraded plantation is now producing several times its prior output, and a new national-GDP-scale revenue stream has come into existence from the intercrop tier that the original deployment funded. The first CPU did not just produce its outputs. It produced the substrate for the next CPU.

This is what the loops produce on their closings. Board that becomes housing. Housing that carries solar. Solar that fuels the microgrid that processes what the cover crop grows. Cover crop that the intercrop's revenue planted. Intercrop that the board and housing revenue planted. Replanted hybrid coconut that the intercrop revenue sustains. Each output is the input to at least one other. The intervention is minimal. The cascade is not.

The land cascade and the human cascade are one cascade. The next section names what it produces when the same operation lands on the lives of the people the land sustains.

8 The Human Cascade

The same loops, observed at the time scale of human lives, produce a second cascade. The food that the cover crop grows feeds children whose bodies have been measurably shorter than their genetic potential for generations. The income that the intercrop pays moves the family out of the debt that makes a child a commodity. The air that no longer carries open-burning smoke is the air a child breathes for the eighteen years between birth and adulthood. The bank account that the new income makes possible is the first one anyone in that family has ever owned. The land cascade runs in crop cycles and operating years. The human cascade runs in the lifetimes of the people the land cascade lands on.

The specifics that follow are documented in the Philippines, where Globe-Eco has fifteen years of direct experience and where the data is most defensible. The patterns they describe, including biomass-smoke exposure on rural plantations, child labor driven by family subsistence needs, and financial exclusion of agricultural households, are documented in every coconut-producing economy from Indonesia to Brazil, in figures of similar magnitude. The Philippine numbers below are the concrete instance, not the cascade's scope.

The first year, in the body

The air. The first thing that changes is the air. The harvested coconut biomass that, for decades, was burned in the open at the plantation no longer burns. A child raised on a coconut plantation breathes that smoke for the eighteen years between birth and adulthood, twenty-four hours a day, seven days a week, because the plantation is not somewhere the family goes to work. It is where they live. The Philippines is an archipelago of 7,641 islands; the trade winds, sea breezes, and ocean salt that surround every coconut plantation in the maritime tropics deliver a baseline air quality that should be among the cleanest on Earth, the kind people in the Western world pay to live near. The open-air burning of plantation waste takes that abundance and turns it, daily, into smoke. Lung cancer rates in rural coconut-producing communities run far above national averages; the cause is multi-factor, and the daily, continuous, decades-long exposure to plantation-waste smoke is one of those factors. The cascade does not invent clean air, and it does not eliminate every source of air-quality damage a rural family faces. It eliminates the one source the plantation itself was previously creating, and the children who would otherwise have grown up breathing it do not.

The income. The second thing that changes is income, and what income lets a family stop doing. Approximately **500,000** Filipino children are engaged in hazardous work. Sixty percent of child laborers never reach sixth grade. The mechanism is not mysterious. When a family cannot meet subsistence on its current income, the children work. The cascade begins the moment a family sells, for the first time, what they were previously burning as waste. The fronds and husks that produced only smoke become board and plastic-board that produce income. The child labor does not end in the first year. The household income source that drove it does: the income line that forced the children into the harvest moves on the first sale.

The bank account. The third thing that changes is who the family owes. **Seventy-three percent** of Filipino farmers have no bank account, the highest unbanked rate of any occupation in the country. Forty-five percent of the unbanked cite lack of funds as the reason. The first year of cascade income does two things at once: it creates the funds the unbanked rate cites as the missing precondition, and it makes the family financially legible to the institutions that have, until now, treated the rural plantation as outside the formal economy. Until a family has a bank account, the financial system can neither see them nor protect them; what cannot see them can only exploit them. The cascade does not promise a bank account in the first year. It produces the income and the legibility that make the bank account, when it arrives, the first one anyone in that family has ever owned.

The five-year horizon

By the time the same community has been running the cascade for five years, the loops section 7 walked at the land scale have closed once each, and the cohort of children born around the first deployment has reached school age inside a system the previous generation did not have.

The food. Childhood stunting measures whether children got enough nutrition during the developmental windows that matter. Roughly **29 percent** of Filipino children under five are stunted, and in the rural regions where coconut production concentrates that reaches 40 to 45 percent. The indicator does not move in a quarter; it moves when a cohort grows up eating from a food system that did not exist before on their plantation. The cover crop is that food system, and because the plantation has never carried industrial chemistry, the food is organic by inheritance, not by certification. The cascade restores what extractive monoculture took from the ground a generation ago, giving the organic food most Western families cannot afford to the children who had no food at all.

The school. Sixty percent of child laborers never reach sixth grade because the family needs the child's work to subsist. Removing that income pressure removes the largest single barrier between a rural child and a classroom: the requirement that the child work first. The cascade does not fix every rural-school constraint on its own, but the same revenue that funds the canopy and cover crop funds the schools themselves, the books and facilities and connectivity rural classrooms lack. It returns the schools to a condition where the children the income frees from labor can actually learn.

The debt. This one is hard to talk about, and it should be. Impoverished rural communities carry among the highest rates of child trafficking and online child sexual exploitation in the world. In the Philippines, one in one hundred children was a victim of online sexual exploitation in 2022, and between sixty thousand and one hundred thousand are impacted annually by labor or sex trafficking. Eighty-three percent of the traffickers in case data are not strangers; they are the child's own parents, uncles, or older siblings. The State Department calls the mechanism debt-based coercion: when a family is in debt to a trader who controls every income source they have, a child becomes the family's last unit of value. The cascade does not address trafficking directly. It addresses the debt the trafficking grows from, and frees the family from the leverage the trader holds. The promise is not the end of an evil. It is the removal of the mechanism that produces it.

The decade horizon

A decade into the cascade, the community that received the first deployment is no longer the community it was, and the children of that community are no longer the children they would have been.

The cohort that entered school inside the cascade reaches working age inside an economy that did not previously exist on their plantation. The intercrop is now a global commodity stream. The board is now an established building material. The food system is mature. The air is one they have spent the entire decade breathing. The cancer-and-respiratory-disease mortality that the biomass burning produced shifts cohort by cohort, in the same way stunting did, on the same long-arc timeline. Adult metabolic disease, including the diabetes and cardiovascular outcomes that rural populations across coconut-producing countries carry at elevated rates, moves with sustained nutrition and the activity patterns that come with steady employment on the plantation rather than seasonal subsistence labor. The shifts are not promised by the cascade in any single year. They are produced by the cascade running for long enough that the body that grew up inside it is a different body than the body that would have grown up outside it. The cascade does not heal individuals. It *mends* the conditions a generation grew up needing healing from.

A decade in, the silos that diagnostic capital had separately funded, including the nutrition silo, the education silo, the public-health silo, the anti-trafficking silo, and the financial inclusion silo, have been moved by an operation pointed at none of them and at all of them. The carbon credit dollar bought nutrition. The housing dollar bought literacy. The energy dollar bought cleaner air for generations. The intercrop dollar bought banking. No single silo paid for the human cascade; the cascade is what the unsorted dollar produced.

One more thing follows from the human cascade, and it closes the loop this document opened with. Externalized costs do not distribute randomly; they flow downhill, toward the communities with the least economic and political power to refuse them, and the resentment that produces is not irrational. It is the entirely rational response of communities told that their environment, their health, and their children's futures are the acceptable cost of someone else's convenience. That resentment, accumulated across generations and borders, is a primary driver of the instability and zero-sum conflict section 2 named. The human cascade is therefore not only the emotional payload of the system. It is structural justice, delivered economically rather than judicially, and structural justice removes a substrate of conflict. The community that had been the passive recipient of other people's externalized costs becomes the active producer of value from its own natural resources. The injustice does not require a tribunal to correct it. The economics now point in a different direction.

9 Capitalize, Not Fund

What five million dollars buys is not a fraction of someone else's program. It is one whole instance of the cascade. The capital partner who writes the check capitalizes a CPU, a plantation, a cohort of eight hundred families, and a generation of children growing up inside conditions the generation before did not have. The plantation, the canopy, the carbon, the board, the houses, the solar annuity, the income, the cohort: one capital partner, one capital event, one cascade.

The distinction is categorical, and it is worth stating in its plainest form. *Philanthropy funds. The cascade capitalizes.* A funded program runs as long as the funding runs. A capitalized cascade runs from its own outputs after the capital event closes. The capital partner who funds a school continues funding the school every year the school operates. The capital partner who capitalizes a CPU is finished after the wire transfer clears. The school the CPU funds, the housing the CPU produces, the air the CPU stops poisoning, the income the CPU pays, and the children growing up inside all of it continue without the original capital being replenished. The cascade pays for its own maintenance from its own output.

This is not a marginal-efficiency claim against philanthropy. It is a categorical claim about what kind of intervention the cascade is. The capital partner who writes the check at the deployment level is not choosing a more efficient charity. They are choosing a different kind of act: planting the seed of a system that runs from its own substrate after the seed is in the ground.

The anti-patterns that haunt development capital are absent here by construction, not by discipline. There is no annual re-funding cycle, because the revenue line replaces it. There is no dependency on the capital partner's continued attention, because the buyer of the board, not the goodwill of the giver, sustains the operation. There is no program that quietly winds down when the grant cycle turns over, because the cascade's outputs are one another's inputs, and a system whose outputs feed its inputs does not need a benefactor to keep the loop turning. The discipline is in the architecture. The architecture was the hard part, and it is built.

The $10M structure in section 1 is this argument, doubled, with a proof attached. The first deployment demonstrates the cascade; the second demonstrates that the cascade replicates, which is the fact the Phase 2 institutional raise turns on. And the pair converts the categorical point into bankability: with commercial operation proven, scale capital arrives through the instruments built for it, infrastructure capital, project finance, and green bonds, rather than through another philanthropic ask. A funded program would, at this point in its life, be submitting its renewal application. The capitalized system is graduating into the capital stack.

What that capital buys, in numbers an analyst can take apart, is the next section.

10 Unit Economics and the Ceiling

Section 1 stated the parameters. This section derives them. Every figure below is modeled unless tagged measured, inherits from a single version-controlled source document, and is presented with its breakevens and stress cases so the model can be taken apart rather than taken on faith.

What one deployment produces, per year

Each year at full capacity, one CPU produces, on the same hectares, from the same trees: **16,430 tonnes of CO_2** removed from the atmosphere and locked into structural building material (10,000 m^3 × 1,643 kg CO_2eq/m^3, third-party LCA structured along ISO 14040 phases); **10,000 m^3** of that structural board, century-rated, entering the local building economy in the same year, the carbon and the building material being the same product counted twice because two markets need it; approximately **4,000 tonnes** of waste plastic bound into the board instead of burned, dumped, or carried to the sea; and **800 farming families** inside the cascade, each family's income rising on average by 250 percent, from below the national poverty line to roughly $1,250 a year, approximately 30 percent above it. The CPU powers itself from the same biomass it processes, requiring no grid connection, no fuel logistics, no centralized infrastructure, which is what makes deployment possible in the archipelago geographies where the resource is and the grid is not.

What one deployment produces, over its life

One CPU runs for 25 or more years; the asset life matches the operational life of the rooftop solar on every house its board frames. Across that window: **410,000 tonnes of CO_2** locked into structural board, roughly what 120,000 average American passenger vehicles emit in a single year, from one unit on one plantation. A **quarter-million cubic meters** of structural board, enough at typical specifications to frame approximately 25,000 houses, each carrying a 3 kW rooftop solar system generating roughly 5,000 kWh and $500 of energy revenue annually for 25 years past the year the house is built. **100,000 tonnes** of waste plastic bound into board, roughly the mass the entire Pasig River carries to the sea in two years. **20,000 family-years** of cascade income, approximately $25M cumulative, paid to the smallholder farmers who own the trees. And one full childhood cohort raised inside the cascade conditions: a child born the day the CPU arrives is a working adult when its operational window closes.

The pro forma

The printed model stands on structural building materials at market price. Nothing else. Its revenue endpoint is the board at the plantation gate; housing fabrication and carbon monetization are documented upside, excluded by design (section 11 quantifies both exclusions).

Per deployment, per year, full capacity	Value
Output	10,000 m³ structural board, classified to ISO 16893
Price	$350/m³
Revenue	$3.5M
Cost basis	$200/m³ ($2.0M)
EBITDA	**$1.5M (~43%)**
Capitalization	$5M
Payback from capital close / at full capacity	~4.5 yrs / ~3.3 yrs
Lifetime EBITDA (20+ yrs, lumber only)	~$29M ≈ 5.9× capitalization

The throughput figure is independently confirmed. An analyst model built from press-line arithmetic alone, 192 planks per press per day at a five-minute cycle across a 25-press line, yields 30.2 m³/day, or 9,100–10,000 m³/yr at 300–330 operating days, against the 10,000 m³ capacity figure derived separately from the corpus engineering basis. The plank geometry implies a board density of 953 kg/m³, consistent with the 900–1,000 kg/m³ product specification.

The cost stack, and why it is credible

Line ($/m³ output)	Corpus model	Analyst BOE	Printed
Feedstock / biomass (delivered, incl. gasifier fuel)	125.00	124.41	125
Direct labor	10.00	21.45	22
Site overhead / G&A / QA	35.00	16.09	25
Maintenance & spares (4% of capex)	20.00	–	20
Logistics in/out	8.00	embedded	8
Total	**198**	**~190 like-for-like**	**200**

Two models, built years apart from different primitives, agree within roughly four percent: a corpus first-principles stack at $198/m³, and an independent analyst back-of-the-envelope built from current small-lot market input prices at ~$190/m³ like-for-like (the verbatim model and its normalization are preserved in the source document). The printed basis is locked at $200, the top of the band, absorbing FX drift and estimate risk. On the feedstock line the convergence is sharper still: the co-op framework price ($125/m³ output basis, CCFOP, MOU in process) and the analyst's independent retail derivation (₱4/kg wet delivered at locked FX = $124.41) agree to within fifty cents, from a negotiated wholesale relationship on one side and spot retail purchasing with transport on the other. That the retail price still lands at the co-op price suggests the co-op number is conservative; the deployed CPU sits inside a 2,000-hectare catchment and does not pay retail.

Two structural absences make a $200 cost against a $350 commodity price credible rather than optimistic, and they are architecture, not assumptions. **Zero binder cost:** the board is binderless, bonded by the lignin in the fiber itself; conventional fiberboard binders exceed 40 percent of finished cost. **Zero purchased energy:** the CPU self-powers via biomass gasification from the same feedstock stream. Direct labor is printed at the analyst's higher 30-person-crew line rather than the corpus automation claim, the more believable of the two.

Price positioning

Comparable (PH retail, 2026, ₱61.75/USD)	$/m³
Marine plywood 18mm	363–454
Phenolic board 18mm	~462
Fiber cement board 12mm	363–545
Global coconut-lumber trading range	300–600
Globe-Eco board	**350**

$350/m³ is below the entire engineered-panel substitution range, by design. Raw coco lumber (scaffolding and formwork grade, $172–343/m³) is the wrong comparable for a binderless, fire-, water-, and pest-resistant engineered board tested per ASTM D 1037 and classified to ISO 16893; the product's actual substitution set is the table above. The price is set to guarantee offtake into cost-capped public-housing channels: underpricing as strategy, stated as such. An analyst who builds the comp table independently should conclude the claim is understated.

Sensitivities and breakevens

Scenario (per unit, full capacity)	EBITDA	Margin	Payback (yrs on $5M)
Base: $350/m³, $200 cost	$1.50M	42.9%	3.3
Price stress: $280/m³	$0.80M	~29%	6.3
Engineered-panel pricing: $450/m³	$2.50M	55.6%	2.0
Utilization 80%	~$1.1M	~40%	~4.5
Feedstock reverts to $140 market	$1.35M	~39%	3.7

Breakeven price is $200/m³, 43 percent below target and below the bottom of the global coconut-lumber trading range. Breakeven utilization is roughly 27 percent at $350. The model survives any single stress and degrades gracefully; no stress case reaches breakeven.

The ceiling

One CPU is the unit. The cascade is not designed to stop at one. **300 CPUs** is the near-term deployment target: $1.5B of capital producing roughly five million tonnes of CO_2 removed every year, three million cubic meters of structural board every year, on the order of one billion dollars of new GDP annually in the rural communities where the CPUs operate, and more than a million people in farming families lifted above the national poverty line MODELED. **4,875 CPUs** is the initial deployment that rejuvenates the underperforming plantation base across the major coconut-producing economies. **10,000 CPUs**, built and deployed across ten years, is what the existing global coconut substrate supports: gigatonne-scale annual carbon impact, on the order of $200B of new GDP every year across the five largest coconut-producing economies, approximately **150 gigawatts** of distributed rooftop solar capacity across the housing the CPUs supply, and roughly forty million families housed inside structures the CPUs produced MODELED.

The substrate that holds these numbers is real. Twelve million hectares of coconut plantation. One billion mature trees. Ten million smallholder farming families. 250 million tonnes of harvestable biomass produced every year, most of it currently burned, the rest unused. The numbers above are not a forecast of an economy that does not yet exist. They are the modeled output of activating an economy that already exists and is currently burning itself in front of the world.

11 Methodology and Disclosures

Direct removal: LCA basis

The 16,430 t CO_2eq per deployment per year figure is 10,000 m^3 × 1,643 kg CO_2eq/m^3, the sequestration factor established by third-party life-cycle assessment structured along ISO 14040 phases. The carbon is held in load-bearing board built to last at least a century, recyclable back to virgin properties through up to five service cycles. The audit mechanism for the carbon is that the carbon is in a building. The building has an address. The board carries a tag, the tag matches a ledger entry, and the ledger entry resolves to a physical structure that a reporter, a registry methodologist, or a board member can walk through. Every other credible carbon dioxide removal pathway stores its carbon in a geological formation, a soil column, or an ocean chemistry that the buyer cannot independently verify. Globe-Eco stores it in a wall. The audit is not a system bolted onto the pathway. The audit is the pathway.

Standing-forest displacement (second carbon pool)

Net present value of foregone-harvest sequestration over a twenty-year claim window at a two-percent discount rate. The displacement coefficient is decomposed by supply tier (legal selective logging vs. illegal logging) because the two behave differently under leakage and replacement-tree assumptions; the illegal-supply tier carries the larger carbon stock per tree and the weaker replacement trajectory, and dominates the headline number. The regional illegal-supply share is the largest single sensitivity. The base case assumes one-hundred-percent public-housing offtake for years one through ten transitioning to a mixed channel, an illegal-supply share of sixty percent, and a fifteen-percent permanence buffer for standing-tree reversal risk. Central case: ~50,000 t CO_2 per CPU per year; conservative-to-optimistic range 10,000–90,000. Methodology drawn from Stephenson et al. 2014 (Nature 507:90–93) on large-tree carbon accumulation and regional dipterocarp forestry literature. This is an offset-type claim, accounted separately from the direct removal and held to its own assumption set. Framework and order-of-magnitude brief available on request.

Plantation uplift (third carbon pool)

Plantation-level annual sequestration aggregated across three terms: intercrop canopy sequestration (cacao, mango, coffee mid-canopy at ~2.5 t C/ha/yr central, range 1.3–3.8 per published agroforestry literature); hybrid coconut biomass uplift (~2× biomass per palm vs. senile tall varieties, range 1.5–3× per industry data); and densification of sparse plantations toward carrying capacity (~100 to ~160 palms/ha, a 1.6× multiplier). All three terms ramp across a five-year canopy and replanting maturation window, then continue at steady state for the productive life of each tier (60–90 years for coconut palms). Per-CPU footprint estimated at 1,500 hectares central, range 800–2,400 (largest single sensitivity). Permanence buffer of fifteen percent, matching the standing-forest treatment. Year-ten steady state central case: ~56,000 t CO_2 per CPU per year; range 15,000–170,000. Sources: Philippine Coconut Authority baseline data, published cacao agroforestry studies in Brazil and Central America, coconut industry hybrid yield data, FAO/Coconut Handbook plantation density standards. The three pools (lumber, standing forest, plantation) sit in different places, move by different mechanisms, and are never summed into a single headline figure in this document.

Carbon market status and treatment

The pro forma is lumber-only; the model does not depend on a carbon price. Carbon removal credits are meaningful upside. They are not the foundation. The tonnage and permanence are bankable today; the price is not yet, and the documents are explicit about why: no registry methodology currently exists for the structural-materials pathway. This is a registry maturity gap, not a science gap. Globe-Eco has made no registry pre-commitment by design; the working structure is buyer-nominated verification, with MOU commitment contingent on third-party certification. Globe-Eco is not currently generating credits. For market context only: premium engineered CDR currently transacts at roughly **$400–750 per tonne**. At that range, one deployment's 16,430 t/yr corresponds to $6.6–12.3M per year, documented upside exceeding the entire printed revenue line, deliberately excluded from the model.

Housing endpoint boundary

The pro forma's revenue endpoint is structural building materials at market price, full stop. Downstream fabrication into housing kits for the public-housing channel is a margin-expansion path under existing discussions, not assumed in these numbers. The analyst model quantifies it: a kit house realizes ₱800K–1M over ~15.2 m³ of board, equivalent to **$851–1,063/m³, roughly 3× the raw-material price on identical production cost**. It stays out of the model because it imports counterparty risk (sovereign housing-agency execution and timeline) that the commodity-lumber endpoint does not carry. The demand context is real: the Philippine housing backlog runs to roughly 11 million units, on the order of 1.4 billion cubic meters of structural-material demand against a 10,000 m³ annual unit output.

Standing assumptions

FX is locked at ₱61.75/USD (June 2026). Feedstock is the one peso-denominated line at origin; a stronger peso raises USD cost, and the model discloses this rather than leaving it to be discovered. Feedstock is priced at the co-op framework rate ($125/m³ output basis; MOU in process; subject to FX and prevailing commodity prices). The $5M capitalization per deployment is a verified, rounded anchor. The wet-husk-to-board mass yield implied by the analyst throughput model (~72%) is a checkable physical claim under verification against Innovation Center measured yield and is not printed as established `VERIFICATION IN PROGRESS`. Corporate and HQ overhead are excluded: these are site-level operating economics; fleet-level G&A is a Phase 2 question. This document is versioned (v1.0, June 2026) so a stale forward self-identifies; figures inherit from a single working source document and change there first.

12 The Decision

Three layers carry everything this document has described. The first is the natural substrate: a billion trees, twelve million hectares, already running, already capturing carbon, currently burning the proof. The second is the engineered system: the key, with the CPU as its engine, real and operating today at the Innovation Center. The first two layers exist. The third layer is the activating decision to capitalize the system at scale, and that layer is not Globe-Eco's to supply. It is yours.

Five million dollars per CPU. Sixteen thousand tonnes of carbon every year, ten thousand cubic meters of structural board every year, four thousand tonnes of plastic bound every year, eight hundred families above the poverty line every year, for twenty-five years per unit, with a carbon tail of one hundred years and a solar tail of one generation past the operating window. One cohort of children raised inside conditions the cohort before did not have. The plantation the CPU sits on, restored. The forest beyond it, preserved. The air, cleared. The bank account, open