BUSINESS PLAN: TRIVALDECHÉTS S.A. (TVD)

Integrated Circular Economy Platform: production of granular and liquid organomineral fertilizers from organic residues; conversion of non-organic residues into industrial feedstocks and energy; and advanced precision-agriculture services.

TVD operates an integral circular-economy model in which 100% of its feedstock (residues) is converted into marketable products or process energy. The portfolio is divided into Core Business (granular and liquid organomineral fertilizers) and Non-Core High-Margin Products (industrial feedstocks, energy and construction components), alongside advanced precision-agriculture services (farm digital twin) — ensuring revenue diversification and a natural currency hedge.

October 2026 | Version 2.2.16 | EN Edition (fully synchronized with the PT version) — SCENARIO 750 — 750 t/day of MSW (600 base + redundancy utilization, Annex 5) — revenue = volume × price, EBITDA = revenue − OPEX, all indicators calculated on explicit cash flows (4-year grace, 8-year amortization, KD 8.63% = SOFR 3.63% + 5.00%).

Base FX: US$ 1.00 = BRL 5.30 | EUR 1.00 = BRL 5.72

COMPLIANCE AND METHODOLOGY NOTE

TVD is a fertilizer manufacturer. It does not collect, transport or manage waste. Residues are strictly industrial feedstock procured under B2B supply contracts; TVD converts them into fertilizers, industrial inputs and energy through circular-economy processes.

INTEGRITY AND INDEPENDENCE: TVD neither receives nor solicits municipal public resources of any kind — no gate fees and no municipal contracts in revenue. The thesis is financed exclusively by private B2B revenue: circular feedstock (residue fractions) is purchased from consortia and private operators. This removes integrity risk — central to ESG fund compliance under ISO 37001 — and eliminates the fiscal and political exposure of small municipalities. It also means that 100% of feedstock fractions have an industrial end use: roughly 62% of mass becomes products (fertilizers, polymers, metals, glass, construction components) and the remaining 38% is valorized as energy and process losses — external discarding is zero tonnes per year. TVD is a fertilizer manufacturer with proprietary circular feedstock; residue is feedstock, not the business.

GATE FEE — ZERO BASE AND B2B CAPACITY (SENSITIVITY): this entire plan is presented on a ZERO GATE FEE base, in both directions — TVD receives no public tariff of any kind (no municipal resources per tonne in revenue) and likewise pays no gate fee to any counterparty in the model base: no published indicator (revenue BRL 780.8 mn, EBITDA BRL 337.5 mn, project IRR 20.2% p.a., minimum DSCR 1.22x, NPV BRL 1,021 mn) depends on gate fees received or paid. The anti-corruption integrity covenant (ISO 37001, ESG layer) applies to 100% of the volume on both faces: (i) revenue — zero public revenue per tonne; (ii) cost — zero payments to public entities. Strictly commercial payments between private companies — such as any eventual remuneration to the private landfill operator, which holds the final-disposal contracts with the municipalities — involve no public funds, create no integrity risk and therefore do not breach the covenant; even so, they are not embedded in the base. As a negotiation sensitivity — outside the base, with no effect on the indicators — the financial engineering shows that, if TVD chooses to remunerate the private landfill operator to lock in RSU supply, the project absorbs up to BRL 28/t (BRL 7.3 mn/yr = US$

1.38 mn/yr, 2.2% of EBITDA) with a calculated minimum DSCR of 1.19x (Y6) — just below the floor —, IRR ~19.7% p.a. and NPV ~BRL 970 mn; IRR would only retreat to 18% p.a. above BRL 130/t (BRL 33.8 mn/yr). B2B GATE-FEE RANGE COMPATIBLE WITH ESG FUNDS: from BRL 0 to BRL 14.8/t (US$ 0 to US$ 2.80/t at BRL 5.30/US$) — maximum cost of BRL 3.9 mn/yr (US$ 0.73 mn/yr), ~1.1% of EBITDA — paid by TVD, under private B2B contracts (no public funds), for the reception of MSW and other compostable residues, keeping minimum DSCR ≥ 1.20x (exactly at the floor in Y6), project IRR ≥ 19.9% p.a. and NPV ≥ BRL 994 mn per plant. EXPANDED NEGOTIATION RANGE WITH THE FINANCIER (conditional on the financier accepting a DSCR ≥ 1.15x covenant in lieu of the strict 1.20x floor): up to BRL 59/t (US$ 11.13/t — cost BRL 15.3 mn/yr = US$ 2.89 mn/yr), keeping calculated minimum DSCR of 1.15x (Y6), project IRR ≥ 19.2% p.a. and NPV ≥ BRL 913 mn per plant; above BRL 59/t the debt structure would require covenant renegotiation (1.10x DSCR only at ~BRL 103/t; 18% IRR only at ~BRL 130/t with DSCR ~1.07x — outside the ESG project-debt standard). The thesis needs no gate fee — the FINANCIAL MODEL remains fully at GATE FEE ZERO (BRL 0/US$ 0); the range is commercial negotiation headroom, not a plan premise.

TABLE — B2B GATE-FEE RANGE FOR NEGOTIATION WITH THE FUNDER (MSW and other compostable residues; private B2B payment with no public funds; values calculated on the plan cash flows — the financial model remains at gate fee BRL 0/US$ 0):

Gate fee paid by TVD (BRL/t)	US$/t (at BRL 5.30)	Annual cost (BRL mn / US$ mn)	Minimum DSCR (calculated)	Project IRR	NPV @10% (BRL mn)
BRL 0 — base model	US$ 0	BRL 0 / US$ 0	1.22x (Y6)	20.2% p.a.	1,021
BRL 10	US$ 1.89	BRL 2.6 / US$ 0.49	1.21x (Y6)	20.0% p.a.	1,002
BRL 14.84 — limit preserving the 1.20x floor	US$ 2.80	BRL 3.9 / US$ 0.73	1.20x exact (Y6)	19.9% p.a.	994
BRL 20	US$ 3.77	BRL 5.2 / US$ 0.98	1.19x (Y6)	19.9% p.a.	984
BRL 28 —	US$ 5.28	BRL 7.3 /	1.19x (Y6)	19.7% p.a.	970

maximum calculated absorption		US$ 1.38			
BRL 40 — expanded range (DSCR ≥1.15x)	US$ 7.55	BRL 10.4 / US$ 1.96	1.17x (Y6)	19.4% p.a.	935
BRL 59 — expanded range cap (DSCR 1.15x)	US$ 11.13	BRL 15.3 / US$ 2.89	1.15x exact (Y6)	19.2% p.a.	913

BRL 0 — PLAN BASE	0.0	337.5	43.2%	20.2% p.a.	1,021	1.22x (Y6)
BRL 15	3.9	333.6	42.7%	19.9% p.a.	993	1.20x exact (Y6)
BRL 28 — maximum absorption	7.3	330.2	42.3%	19.7% p.a.	970	1.19x (Y6)
BRL 42	10.9	326.6	41.8%	19.5% p.a.	944	1.17x (Y6)
BRL 42 — full tax shield	10.9	326.6	41.8%	~19.5% p.a.	~944	1.20x (floor)

TECHNOLOGICAL DIFFERENTIATOR NO. 1 — FEEDSTOCK DECONTAMINATION (THE BARRIER NO MSW COMPETITOR HAS CROSSED): TVD is the only platform in the MSW → fertilizer cycle operating complete, continuous decontamination of BOTH streams of the organic fraction of household MSW, within MAPA contamination limits (Decree 4.955/2004), with per-batch analytical certificates and IN 63/2021 traceability on 100% of the volume: (i) SOLID STREAM — the pressed organic-fraction mass (the dewatered cake from the ANDRITZ press at UN2, feedstock of the hygienized compost and of the UN3 granulates): 40-day thermophilic composting at 55–70°C, MENART SP-60 turners, PID aeration, temperature probes on every windrow, quarantine curing, backup pasteurization at 70°C/1h and a pathogenicity laboratory (PCR for Salmonella/helminths/thermotolerant coliforms + MALDI-TOF) releasing batch by batch; (ii) LIQUID STREAM — the press liquor (the stream any

other operator discards, rejects or sends to effluent treatment): a nine-stage train — equalization, humic extraction, chemical precipitation + electrocoagulation of metals, micro/ultrafiltration, reverse osmosis, reverse electrodialysis, UV-C + ozone, activated carbon and enrichment — with online ICP-MS per batch, reducing pathogens by > 99.99% and heavy metals to MAPA limits. For any other company using MSW as feedstock, MAPA contamination limits are the barrier that kills the product; for TVD, they are an engineering specification. It is this differentiator — not scale, price or registration — that underpins the platform's margin premium. The pre-operational phase (BRL 42.6 mn of pre-operational CAPEX and OPEX inside the investment) exists precisely for this: to validate, at real scale and before go-live, the decontamination and quality of the composting and of the liquid feedstock — the membrane pilot (container, MF/UF/RO/EDR efficiency under real operation), the accelerated-composting pilot reactor (curing time and microbiological activity) and the MAPA registration trials — so that no commercial tonne is produced before quality is commissioned and proven. The differentiator is CAPEX, not a promise: the nine-stage train, the hygienized composting, the pathogenicity laboratory and the online ICP-MS are already budgeted in Annex 5, and the operating OPEX (reagents, membranes, energy, analytics) is already included in the UN2 and UN4 cost lines — no decontamination cost was left out of the plan.

CHAPTER 1: EXECUTIVE SUMMARY

1.1 The Macro Opportunity: The Double Shock Facing Global Agribusiness

Brazil, the world's breadbasket, faces an unacceptable strategic vulnerability: it imports 85% of the NPK fertilizers it consumes (US$ 18 billion/yr). The sector is exposed to a double shock:

1. 1. Geopolitical and supply-chain risk: dependence on Russia, China and volatile maritime freight (Red Sea crisis, Panama Canal restrictions).
2. 2. Climate and physical risk: soil degradation, extreme events (El Niño/La Niña) and new non-tariff barriers (EU CBAM, EUDR).

The TVD solution: substitution of imported inputs with locally sourced circular-based inputs that raise productivity and regenerate the soil with LESS fertilizer each season — 280 kg/ha of organomineral instead of 400 kg/ha of mineral NPK, at equal or higher yield and with progressive build-up of soil organic matter. A natural, operational hedge for agriculture: it shields productivity from exogenous shocks, cuts cost per hectare by ~50% and improves the soil every cycle — the only fertilizer that becomes more efficient the more it is used.

1.2 The TVD Solution: Deep Tech & Integral Circular Economy

TVD is not a residue-management company; it is a technology-based industry producing, at each plant, approximately 108,625 tonnes/yr of special organomineral fertilizers and 20,578 tonnes/yr of liquid fertilizers from 750 t/day of circular feedstock (600 t/day base with redundancy utilization; residues purchased under B2B contracts), creating a high-value-added ecosystem. Each plant is subdivided into 10 integrated business units (mapping in Annex 2).

THE No.1 SALES DRIVER — MORE PRODUCTIVITY WITH LESS FERTILIZER: the central argument to the grower is not the price per tonne; it is the cost per hectare and per bag produced. Brazilian field studies prove that 200–280 kg/ha of TVD organomineral delivers the same result as 400 kg/ha of mineral NPK — and, because each application builds soil organic matter (water retention, CEC, microbiome), efficiency rises season after season: the grower applies less year after year to produce the same or more, while the soil regenerates. No imported mineral fertilizer offers this curve — with them, the dose only goes up. And the sales driver is reinforced by the payment term: season-cycle financing — 70% of sales at 210 days, covering the ~9 months of the soybean/corn crop and marketing cycle, at 9% p.a. indexed to SOFR via an international trade-finance facility (commercial section) — aligns the due date with the grower's cash: he first harvests the organomineral productivity gain and

only pays the financed portion after marketing the crop. Proven productivity + post-harvest payment is the complete commercial argument.

The ten business units — integrated within the same plant and organized into five business lines — are:

• LINE 1 — CORE FERTILIZERS: • UN3 — Special organomineral fertilizers, client-formulated (NPK 06-14-16 proxy; 108,625 t/yr; BRL 408.1 mn/yr); • UN4 — Premium liquid fertilizers 04-14-08 + polyphosphate, with natural chelation and slow release (20,578 t/yr; BRL 136.1 mn/yr).

• LINE 2 — MATERIALS & SECONDARY RAW MATERIALS: • UN1 — Feedstock segregation, industrial inputs and decontamination: ferrous and non-ferrous metals and glass (BRL 20.9 mn/yr); • UN5 — Polymers converted to fiber grade for packaging (big bags, bags and bottles, via outsourced converters; currency hedge; BRL 164.6 mn/yr).

• LINE 3 — ENERGY & MATERIALS: • UN6 — Energy: closed-loop pyrolysis (pyrolytic oil → boiler; biochar → reactor; gas → turbine) + 5.0 MWp rooftop solar; 70.9 GWh/yr generated (36.9 GWh surplus to the free market — ACL, i.e. 36,915 MWh) (BRL 8.6 mn/yr); • UN7 — Concrete artifacts and aggregate from inert fractions (BRL 12.3 mn/yr; zero to landfill).

• LINE 4 — INTELLIGENCE & SERVICES: • UN8 — Twin Farm (SaaS and precision agriculture): drones, ground robots, IoT sensors and AI. INITIALLY NOT A REVENUE UNIT: it is TVD's TECHNICAL MARKETING AND FIELD-INTELLIGENCE CENTER — the sales engine for fertilizer and the scientific validator of the reduced dose; its operation (OPEX BRL 10.8 mn/yr) is fully carried as technical-marketing cost of UN3/UN4 — own revenue is NOT booked in the underwriting base. IN THE FUTURE it may become a high-margin recurring-revenue unit — an option, not a promise.

• LINE 5 — CORPORATE PLATFORM (cost centers): • UN2 — Composting (375 t/day in the 750 scenario — 50% organics of 750 t/day; internal input to the granular line; surplus granulated and sold at BRL 800/t); • UN9 — Corporate SP + Plant Corporate: governance, occupational health and coordination of the TVD CORPORATE UNIVERSITY (BRL 29.3 mn/yr); • UN10 — MAPA pre-operational: pilot-container product validation (BRL 3.1 mn/yr).

The first four industrial plants will be located in the states of Espírito Santo (ES), Bahia (BA), Minas Gerais (MG) and Tocantins (TO), Brazil, close to circular feedstock supply (residue fractions) and to agricultural regions demanding fertilizers and services.

1.2A. Product Typification and Commercial De-risking — why offtake is NOT a credit condition

REGULATORY TYPIFICATION BY PRODUCT (every plant output has a defined classification): (i) UN3 — granulated organomineral fertilizer (NPK 06-14-16, declared organic matter), governed by Law 6,894/1980, Decree 4,955/2004 and IN SDA/MAPA — sold directly to distributors, cooperatives and farm-input retailers; (ii) UN4 — liquid/foliar fertilizers (04-14-08 and polyphosphate) and sub-lines B1/B2 (phosphite, amino acids, seaweed extract), classified as liquid organomineral fertilizers with regulated names (e.g., 'Seaweed Extract', IN SDA/MAPA 61/2020), with MAPA registration as a schedule assumption (M0-M6), already covered in the ESG supervision note; (iii) UN2 — compost as organic composted fertilizer (same legal framework), with maturity control, pathogen-free status and metals within CONAMA 498/2020 limits; (iv) UN7 — certified recycled aggregate for civil construction and paving (technical dossier and laboratory approval, use per NBR 15116/DNIT); (v) UN5 — post-consumer fiber-grade resins, qualified by grade and traceability; (vi) UN1 — recyclables marketed as secondary raw material (ferrous/non-ferrous scrap and glass); (vii) UN6 — renewable energy for self-consumption (5.0 MWp distributed solar) and certified CBIO decarbonization credits (RenovaBio); (viii) UN8 — digital service (SaaS), no physical product typification.

OFFTAKE IS NOT A CONDITION PRECEDENT — HARVEST-PROVEN COMMERCIAL EXPERIENCE: the credit thesis does not depend on offtake contracts because commercial off-take of the typified products has already been exercised in the field: the sponsor holds harvest-proven commercial experience accumulated at Campo Forte Fertilizantes (fertilizer distribution and sales in the Brazilian market) and a track record with Rizobacter (a global reference in inoculants and bioregulation, with harvest-by-harvest agronomic validation) — channels, product acceptance and price calibration already tested in practice. Commercial offers to traders, cooperatives and distributors are treated as UPSIDE and a ramp-up accelerator, not as revenue guarantee. The financing rests on the plant's diversified cash flow (fertilizers ~70% of revenue, plus resins, energy, recyclables and services), with offtake contracts as an additional mitigant when signed. (Track record to be documented in the data room: contracts, invoices and agronomic reports from the harvests.)

1.3 Financial Highlights and Capital Structure

The model demonstrates resilience, with a portfolio of 10 business units and diversified revenue (fertilizers ~70%, resins, energy, recyclables and services) and an EBITDA margin of 43.2% on revenue of BRL 780.8 mn/yr (US$ 147.3 mn; definitive 750 t/day scenario — price-and-efficiency standard per unit, section 7.7.5, plus the per-unit margin levers of section 7.7.4; IRRs calculated on explicit revenue and OPEX lines — EBITDA = revenue − OPEX).

• Total investment: BRL 5.44 bn (US$ 1,026 mn) in four standard plants, each processing 750 t/day of RSU (600 with redundancy utilization — Annex 5). Each plant requires BRL 1,359.4 mn (US$ 256.5 mn): CAPEX BRL 998.0 mn (US$ 188.3 mn; optimized, including technical supervision) + working capital BRL 250.8 mn (US$ 47.3 mn — 9/12 of cash OPEX ex-payroll of BRL 334.4 mn; item-by-item bridge in the OPEX composition (section 7.7.6)) + pre-operational OPEX BRL 42.6 mn (US$ 8.0 mn — commissioning of decontamination and quality: membrane pilot, composting pilot reactor and MAPA trials) + a 5% arrangement fee (3% international + 2% domestic) BRL 68.0 mn (US$ 12.8 mn). INVESTMENT COMPOSITION (contractual definition — closes with no

residual): industrial CAPEX BRL 998.0 mn + working capital — 9 months of operating OPEX — BRL 250.8 mn + pre-operational CAPEX and OPEX BRL 42.6 mn = subtotal BRL 1,291.4 mn + arrangement fee of 5% (3% international + 2% domestic) LEVIED ON THE TOTAL INVESTMENT VALUE — circular fee equation: total T = 1,291.4 + 0.05×T ⇒ T = BRL 1,359.4 mn, fee = BRL 68.0 mn. Structure: equity 20% = BRL 271.9 mn + debt at SOFR + 5.00% = 8.63% p.a. (contracted ceiling BRL 1,084.7 mn = 79.8% of the total investment; the remaining BRL 2.8 mn/plant (0.2%) is covered by ramp-up working capital — FIDC and 9-month cycle — with no additional capital required). Consistency note: the fee of BRL 68.0 mn (5% on the total investment value) is the contractual definition; the fee is expensed in the Year-1 income statement and treated once in the cash flows, with no double-counting. Working capital covers the 9-month OPEX cycle during ramp-up and the FIDC anticipates customer receivables — which is why grace-period interest coverage is calculated at 1.90x/2.06x/2.86x across the grace period (Y2-Y4).

FINANCING REQUEST SCOPE: this financing request covers the FIRST pioneer industrial unit, to be built in Colatina (ES), whose indicators (revenue, EBITDA, IRRs, DSCR) are those presented in this chapter. The financing project, however, covers the replication pipeline of THREE further identical industrial units — Patos de Minas (MG), Barreiras (BA) and Porto Nacional (TO) — all on the same standardized engineering as this plan. Replication is facilitated by TVD's industrial DIGITAL TWIN (BIM 3D twin integrated with SCADA/IoT/DCS/MES): it reduces the operational risk of the subsequent plants by enabling remotely assisted operation, predictive maintenance and the transfer of the learning curve accumulated at the pioneer plant — the economic indicators of the replicated plants follow the same unit matrix as this BP, with no undemonstrated synergy assumption.

• The Ask, per plant: BRL 1,084.7 mn (US$ 204.7 mn) of Debt (80%) at SOFR+5.00% = 8.63% p.a. at close, against Equity (20%) of BRL 271.9 mn (US$ 51.3 mn).

• One industrial plant (standard, replicable): BRL 1,084.7 mn (US$ 204.7 mn) in Debt at 8.63% p.a. (SOFR 3.63% + 5.00%), backed by BRL 271.9 mn (US$ 51.3 mn) in Equity (20%).

• Project IRR: 20.2% p.a. in real terms (calculated on the explicit cash flows, Cap. 7.5 — 4-year grace, 8-year amortization Y5-Y12 with 50% cash sweep, loss-carryforward corporate tax, margin levers from Y4), with Phase 2 incorporated exactly once. The unlevered reference is kept in the data room. NOTE: the arrangement fee and pre-operational OPEX — both already inside the BRL 1,359.4 mn investment — are not double-counted in FCFF; the project IRR sits well above the WACC.

• Equity IRR: ≈20.7% p.a. (at KD 8.63% (SOFR 3.63% + 5.00% spread))*: calculated on equity cash-flow capacity (FCFE), with full cash retention (*retention does not change capacity — only the distribution calendar; parameterization documented in the data room). Reading note: the proximity of equity IRR (≈20.7%) to project IRR (20.2%) stems from accelerated amortization (8 years) plus the 50% cash sweep — the debt balance falls fast and financial leverage declines over the project life, pulling equity returns toward asset returns.

• Steady-state EBITDA (per plant): BRL 337.5 mn (US$ 63.7 mn; definitive 750 t/day scenario — Phase 2 incorporated exactly once + price-and-efficiency standard + per-unit margin levers, sections 7.7.4/7.7.5) | margin 43.2% (convention: US$ = BRL ÷ 5.30).

• Exit strategy: IPO on B3 (Novo Mercado/ESG segment) or M&A with global majors (Yara, Mosaic, Sinofert) in Year 7.

Valuation reference (two complementary methods, with no projected distributions): (i) FLOOR BY EXPLICIT DCF — discounting the project free cash flows (FCFF, Cap. 7.5) at a 10% real WACC with zero terminal growth: in the definitive 750 t/day scenario, the calculated project IRR (20.2% real) sits well ABOVE the WACC — NPV calculated on the published FCFF series (Cap. 7.5): ≈BRL 1,021 mn at 10% real, per plant (Y5-Y12 series by straight-line interpolation, methodology in the data room) (no double-count of arrangement fee and pre-operational OPEX) (execution of the 7.7.4 levers and OPEX review); (ii) MULTIPLE REFERENCE — detailed in the data room. The equity return (≈20.7% at 8.63%, calculated) is generated by the 20/80 structure with 8-year amortization (Y5–Y12, increasing principal).

1.3A. Winning indicators for financing approval and scalable replication

FINANCIAL (calculated on explicit revenue and OPEX lines — EBITDA always = revenue − OPEX): EBITDA BRL 337.5 mn/yr (43.2% margin) per plant; project IRR 20.2% p.a. real; equity IRR ≈20.7% p.a. at KD 8.63% p.a. = SOFR 3.63% + 5.00% spread (cost of debt: BRL 93.6 mn/yr of interest during the grace period = US$ 17.7 mn/yr at BRL 5.30/US$); calculated DSCR minimum 1.22x (Y6), series Y5-Y12: 1.23/1.22/1.26/1.30/1.35/1.40/1.46/48.7 (repaid Y12 by the sweep); request per plant: BRL 1,084.7 mn debt (80%) + BRL 271.9 mn equity (20%); 5% CFADS dividend floor in all years (purely indicative — to be defined with the funder); diversified revenue (~70% fertilizers). Debt capacity at 1.20 CALCULATED (≈BRL 1,100 mn) is ABOVE contracted debt (BRL 1,084.7 mn); project IRR (20.2%) is well above the WACC (10%), with positive NPV.

COST-OF-CAPITAL BENCHMARK — TRANSPARENCY ON THE ORIGIN OF RATES: the 8.63% p.a. KD is a CONTRACTUAL financing premise, structured as US-dollar debt indexed to the risk-free rate — SOFR 3.63% + 5.00% spread — and is NOT derived from a CAPM model (unlevered beta of fertilizer comparables); the spread remunerates single-project ramp-up

risk, country risk and liquidity, per the terms of the structure. The 10% real WACC is the NPV discount-rate premise, and the equity return (≈20.7% p.a.) is the CALCULATED IRR of the equity cash flows — none of the three parameters is sculpted as an outcome. For independent corroboration, a CAPM analysis (unlevered beta of fertilizer and waste companies, releveraging to the 20/80 structure, risk premium and country risk) is available in the data room as a cross-reference of the cost of capital — with no effect on the numbers in this plan.

ESG (sustainable-loan eligibility criteria): ZERO gate fee on the plan base, in both directions — no public revenue per tonne and no gate fee paid to anyone; anti-corruption integrity covenant (ISO 37001) applied to 100% of volume (strictly B2B payments to private operators, such as the landfill concessionaire, are admitted outside the base in the strict range of BRL 0 to BRL 14.8/t (US$ 0 to US$ 2.80/t — minimum DSCR ≥ 1.20x, project IRR ≥ 19.9%, NPV ≥ BRL 994 mn), extendable in negotiation with the financier up to BRL 59/t (US$ 11.13/t — DSCR ≥ 1.15x, project IRR ≥ 19.2%, NPV ≥ BRL 913 mn); maximum calculated spot absorption up to BRL 28/t with DSCR ~1.19x — sensitivities and table in the executive summary, paid by TVD for the reception of MSW and other compostable residues under private B2B contracts, as they involve no public funds and no public counterparty; the model remains at gate fee BRL 0/US$ 0); differentiator no. 1 — complete decontamination of the solid stream (pressed organic fraction → hygienized composting → granulates) and liquid stream (press liquor → membrane train) within MAPA contamination limits, with per-batch certificates on 100% of the volume; 100% MSW utilization with zero landfill disposal; full circular economy (10 integrated business units in 5 lines); renewable energy (5.0 MWp distributed solar + 70.9 GWh/yr); CBIO decarbonization credits (BRL 7.5 mn/yr); biochar and compost that regenerate the soil (less fertilizer per harvest); alignment with eight priority SDGs; 933 direct jobs per plant; governance with ESG supervision notes and transparent model calibration. guarantee of feedstock decontamination (per-batch analytical certificate within Decree 4.955/2004 limits and IN 63/2021 traceability on 100% of the volume — the criterion that supports the asset's eligibility as sustainable credit).

SCALABLE REPLICATION — 4 PLANTS, PIONEER IN ESPÍRITO SANTO: standardized, replicable, modular industrial platform: 4 plants (pioneer ES — Colatina; BA — Barreiras; MG — Patos de Minas; TO — Porto Nacional), total investment BRL 5.44 bn (US$ 1,026 mn), each processing 750 t/d of MSW with steady-state EBITDA of BRL 337.5 mn/yr — combined scale of BRL 1.35 bn/yr of EBITDA and ~BRL 15.6 bn of cumulative 20-year revenue per plant, with exit via B3 IPO (Novo Mercado/ESG) or M&A (Yara, Mosaic, Sinofert) in Year 7. The pioneer plant, in Espírito Santo, anchors the proof of concept, the audited data room and the replication playbook.

1.3B. CONSOLIDATED SUMMARY — UN SDG TARGETS, INVESTMENT, REVENUES, EBITDA MARGIN, ROI AND DSCR (BRL AND US$)

Consolidated indicator	Per plant (750 t/day)	4 plants (ES+BA+MG+TO)
Total investment	BRL 1,359.4 mn (US$ 256.5 mn)	BRL 5,437.6 mn (US$ 1,025.9 mn)
— Industrial CAPEX (UN1–UN10 plants)	BRL 998.0 mn (US$ 188.3 mn)	BRL 3,992.0 mn (US$ 753.2 mn)
— Working capital (9	BRL 250.8 mn (US$ 47.3	BRL 1,003.2 mn (US$

months of Year-5 OPEX)	mn)	189.3 mn)
— Pre-operational CAPEX and OPEX	BRL 42.6 mn (US$ 8.0 mn)	BRL 170.4 mn (US$ 32.2 mn)
— Subtotal (excl. commission)	BRL 1,291.4 mn (US$ 243.7 mn)	BRL 5,165.6 mn (US$ 974.6 mn)
— Structuring commission (5% of the total)	BRL 68.0 mn (US$ 12.8 mn)	BRL 272.0 mn (US$ 51.3 mn)
— Debt (79.8% of total) at SOFR+5% = 8.63% p.a.	BRL 1,084.7 mn (US$ 204.7 mn)	BRL 4,338.8 mn (US$ 818.6 mn)
— Equity (20%)	BRL 271.9 mn (US$ 51.3 mn)	BRL 1,087.6 mn (US$ 205.2 mn)
Steady-state revenue	BRL 780.8 mn/yr (US$ 147.3 mn)	BRL 3,123.2 mn/yr (US$ 589.3 mn)
EBITDA (revenue − OPEX + levers)	BRL 337.5 mn/yr (US$ 63.7 mn)	BRL 1,350.0 mn/yr (US$ 254.7 mn)
EBITDA margin	43.2%	43.2%
Project IRR (ROI, real)	20.2% p.a. (~25.7% p.a. nominal at 4.5% IPCA)	same per plant
Equity IRR	≈20.7% p.a.	same per plant
NPV at 10% real p.a.	BRL 1,021 mn (US$ 192.6 mn) per plant	BRL 4,083.6 mn (US$ 770.5 mn)
Payback	6.4 years (~Y7)	same per plant
Minimum DSCR (Y5)	1.22x (Y5–Y11 series: 1.22x–1.46x)	same per plant
Average DSCR Y5–Y11	1.31x	same per plant
Debt capacity at 1.20x	BRL 1,100 mn ≥ BRL 1,084.7 mn contracted	—

UN SDG TARGETS ACHIEVED/COMMITTED (8 priority SDGs, auditable KPIs — section 1.4):

• SDG 2 (Zero Hunger) and SDG 15 (Life on Land) — sequestration of 2.5 tCO2/ha/yr × 1.6 Mha = 4.0 mn tCO2/yr (80 mn tCO2 over 20 years); ~46% cut in fertilization cost per hectare (BRL 1,052/ha vs BRL 1,960/ha NPK) with field-proven yield gains (10–16% soy, 8–12% sugarcane ATR).

• SDG 7 (Clean Energy) — 70,872 MWh/yr generated (pyrolysis + solar), plant self-sufficiency and 36,915 MWh/yr sold to the ACL; carbon neutrality Scopes 1–2 by Year 5 (VCS/REDD+).

• SDG 8 (Decent Work) — 933 direct jobs per plant (sum of the 10 HR tables in Annex 4: UN1 179, UN2 76, UN3 225, UN4 90, UN5 84, UN6 49, UN7 38, UN8 37, UN9 138, UN10 17), + 8 additional posts in the 750 Scenario (Annex

5, 5.4) = 941, including a formal inclusion program for waste pickers and workers of the waste chain.

• SDG 9 (Industry and Innovation) — replicable industrial platform with an industrial Digital Twin (BIM 3D + SCADA/IoT/DCS/MES), reducing operational risk of the 3 replicated plants (Patos de Minas/MG, Barreiras/BA, Porto Nacional/TO).

• SDG 11 (Sustainable Cities) — 750 t/day of MSW industrialized per plant (260,062.5 t/yr), ZERO inert landfill: 100% valorization, 0 t/yr to landfill.

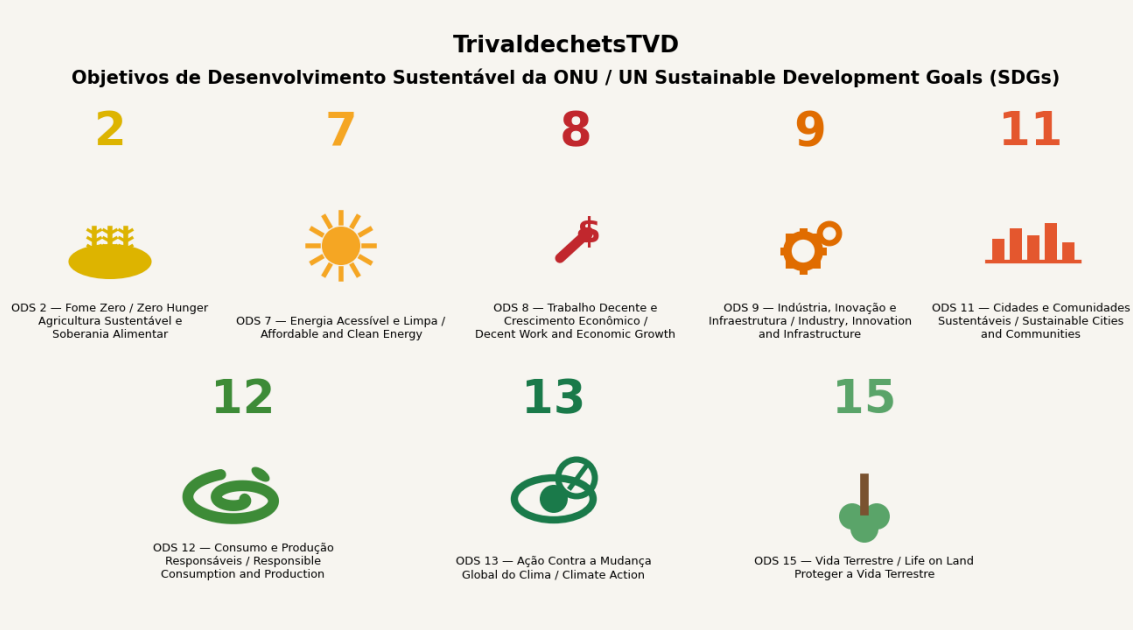
• SDG 12 (Responsible Consumption) — 65.7% mass recovery rate (228,334 t/yr of marketable products) and integral circular economy; zero gate fee on 100% of volume (anticorruption covenant).

• SDG 13 (Climate Action) — 131,000–160,000 tCO2eq/yr certifiable (CBIO, BRL 7.5 mn/yr at BRL 50/tCO2eq); carbon intensity <50 kgCO2eq/t of product vs ~350 kgCO2eq/t for virgin NPK (−85%); third-party MRV from Year 2 (IPCC Tier 2).

CURRENCY: fixed planning rate BRL 5.30/US$ (Sep/2026). All figures computed by the financial model — revenue = volume × price, EBITDA = revenue − OPEX.

1.4 ESG Impact and Alignment with the UN SDGs

TVD was designed to deliver measurable systemic impact, attracting impact capital and climate funds. The project aligns with eight priority SDGs, with quantified targets and key performance indicators (KPIs), to be certified shortly after operations begin:



SDG 2 — Zero Hunger and SDG 15 — Life on Land: input sovereignty and soil regeneration

TVD replaces virgin NPK imports with locally sourced circular-based fertilizers, reducing the geopolitical dependence of Brazilian agriculture. Stabilized organic matter acts as a natural chelating agent, protecting phosphorus from fixation in tropical soils, increasing cation-exchange capacity (CEC) and sequestering carbon in the soil through higher soil organic matter (SOM).

Quantified targets:

- 434,500 tonnes per year of special organomineral fertilizers and 82,312 tonnes per year of liquid fertilizers across the 4 plants by Year 5 (108,625 t and 20,578 t per plant), serving 1,600,000 hectares of cropland (average dose of ~323 kg/ha (1.6 Mha with 516,812 t/yr)).
- Raise SOM by 0.3% per year in client areas monitored by the Twin Farm program.
- Sequester 2.5 tCO2/ha/yr through organomineral application, totaling 4,000,000 tCO2/yr in the served areas (80,000,000 tCO2 accumulated over 20 years). This is an impact KPI only: the soil-carbon pool is not monetized in the financial model; any future monetization will require a separate methodology, registration and safeguards to prevent double counting with the waste-sector avoided-methane CBIO program (SDG 13).

KPIs:

- Volume of fertilizer sold (tonnes/yr).
- Area served by the TVD product (hectares/yr).

- Percentage variation of SOM in monitored fields (%/yr).
- KPIs: fertilizer volume sold (t/yr); area served by TVD product (ha/yr); % change in SOM in monitored plots (%/yr); average client yield (% gain vs pure mineral NPK).

SDG 7 — Affordable and Clean Energy: renewable self-sufficiency and distributed generation

The TVD unit consumes no fossil grid energy for its industrial operation. Pyrolysis of fractions not mechanically convertible produces syngas that feeds generator engines, while rooftop photovoltaics complement the matrix. The energy surplus is sold on the free market (ACL), turning residues into an energy commodity.

Quantified targets:

- Meet 100% of the four plants' energy demand from renewable sources (syngas + solar + biogas) by Year 3.
- Install 50.8 MW of consolidated capacity (12.7 MW per plant: 7.7 MWe of pyrolysis + 5.0 MWp solar).
- Sell the energy surplus on the ACL (41,964 MWh/yr on the 600 base = generation of 70,872 MWh − internal consumption of 28,908 MWh; 36,915 MWh/yr in the 750 Scenario = generation of 70,872 MWh − internal consumption of 33,957 MWh per the effective KPI of 130.6 kWh/t (cap ≤132 kWh/t)) from Year 3 onwards, generating predictable, inflation-linked revenue.
- Reduce external fossil natural-gas consumption by 65% by burning syngas and biochar in the reactors.

KPIs:

- Share of renewable energy in the operating mix (%).
- MWh generated and MWh sold on the ACL (annual).
- CO2 emissions avoided in power generation (tCO2/yr).
- Specific energy consumption (kWh/tonne processed).

SDG 8 — Decent Work and Economic Growth: high-inclusion employment

TVD operations generate direct jobs on a 5×2 roster (40-hour week, per PEC 27/05/2026), with remuneration above the regional average and active diversity policies. Support infrastructure includes changing facilities, lactation rooms and a 24-hour occupational infirmary, recognizing that industrial productivity correlates directly with quality of life at work.

Quantified targets:

- Create and sustain 933 direct jobs per plant in the TVD ecosystem (operations, logistics and precision agriculture) across the 4 plants.
- Ensure a minimum 30% share of women in leadership positions (coordinator, manager and officer levels).
- Reserve 10% of operational positions for Persons with Disabilities (PwD), with full accessibility per NBR 9050.
- Keep the Total Recordable Injury Frequency Rate (TRIFR) below 2.5 per million hours worked.

KPIs:

- KPIs: total direct and indirect jobs (units); gender-diversity index in leadership (%); PwD employment rate (% of headcount); half-yearly employee net promoter score (eNPS); monthly AFR and safety non-conformance cost (BRL).
- Gender-diversity index in leadership (%).
- PwD employment rate (% of workforce).
- Half-yearly employee eNPS (Employee Net Promoter Score).
- Monthly TRIF and safety non-conformance cost (BRL).

SDG 9 — Industry, Innovation and Infrastructure: Industry 4.0 and technology transfer

TVD operates as a deep-tech platform applied to the circular economy. The plant incorporates quadruped inspection robots, automated guided vehicles (AGVs), a 3D BIM digital twin, and a SCADA system with an IoT sensor network integrated with DCS/SCADA/MES and the IoT digital twin.

Quantified targets:

- Apply at least 0.5% of gross revenue to Research, Development and Innovation (R&D) from Year 3 onwards.
- Maintain Overall Equipment Effectiveness (OEE) ≥85% from Year 3 onwards.
- Reduce specific energy consumption by 15% by Year 5 through predictive-maintenance algorithms.

KPIs:

- R&D investment (% of gross revenue).
- Average plant OEE (Overall Equipment Effectiveness) (%).
- Operating-cost reduction per tonne via automation (%/yr).
- Mechanical-availability rate (%).

SDG 11 — Sustainable Cities and Communities: industrialization of circular feedstock

Each TVD plant industrializes 219,000 t/yr of circular feedstock (residue fractions) that would otherwise be discarded, eliminating methane generation and leachate percolation. Inert fractions are converted into concrete artifacts (blocks, pavers), replacing sand and aggregate at up to 30% of cost. The unit is designed to operate as a regularly licensed private industry — no concession, no PPP, no public service provision.

Quantified targets:

- Divert 876,000 t/yr of MSW (219,000 t/plant) from landfills (consolidated across the 4 plants).
- Produce 40,297 tonnes/yr of concrete artifacts and concrete aggregate for municipal and state public works.
- Maintain a Circular-Economy index >92% (Zero Waste to Landfill).
- Run 4 environmental-education programs/yr per plant, reaching 2,000 students and residents of adjacent communities.

KPIs:

- Tonnes of circular feedstock industrialized (t/yr).
- Volume of concrete artifacts sold (m^3/yr).
- Circular-Economy index (%).
- Number of participants in environmental-education programs (annual).
- Local-community satisfaction index (annual survey).

SDG 12 — Responsible Consumption and Production: integral circular economy

The TVD platform operates on the principle that there is no such thing as waste — only feedstock being discarded. Organic fractions become fertilizer; polymers are hygienized and extruded to fiber grade; inert materials become concrete artifacts; residual fractions become energy. The result is an industrial system in which more than 92% of incoming mass is converted into final industrial products or feedstock for other industries.

Quantified targets:

- Convert 62% of incoming mass into industrialized products and valorize the remaining 38% as energy and process losses — landfill: 0 t/yr (mass balance CAPEX v7.3.9).
- Landfill: 0 t/yr — 100% of fractions valorized industrially or energetically.
- Eliminate industrial-waste generation at the plant (Zero Waste to Landfill) by Year 2 of operation.

KPIs:

- Non-valorized rate across the production chain (%).
- Volume of MSW industrialized per year (t/yr).
- Plant circularity index (%).
- Avoided virgin-feedstock purchasing cost (BRL/yr).

SDG 13 — Climate Action: mitigation and carbon neutrality

TVD avoids emissions on three fronts: (i) methane from anaerobic decomposition of residues; (ii) GHG emissions from virgin NPK production (Haber-Bosch process; phosphate and potash mining); and (iii) open burning of plastic residues. The balance is positive and measurable, enabling high-integrity carbon credits.

Quantified targets:

- Generate BRL 7.5 mn/yr of CBIO revenue (Phase 1) at the conservative planning price of R$ 50/tCO2eq (range BRL 6.6–8.0 mn/yr at 131,000–160,000 tCO2eq/plant), under an avoided-methane methodology, third-party verified from Year 2. The line equals 1.2% of revenue and is excluded in the strict floor (7.7.2), so the thesis does not depend on it.
- Achieve carbon neutrality in Scope 1 and 2 emissions by Year 5 via forestry offsets (VCS/REDD+) and renewable generation.
- Carbon-intensity target <50 kgCO2eq/tonne of organomineral by Year 5 (to be validated by an ISO 14040/44 LCA study at commissioning) (virgin NPK benchmark: ~350 kgCO2eq/t).

KPIs:

- Emissions avoided (tCO2eq/yr) — IPCC Tier 2 methodology.
- Product carbon intensity (kgCO2eq/tonne).
- Share of renewable energy in the mix (%).
- Volume of carbon credits generated and traded (tCO2eq/yr).

MRV AND ALIGNMENT WITH INTERNATIONAL STANDARDS: impact indicators will be measured under an MRV plan (monitoring, reporting and verification) with third-party verification from Year 2; carbon follows the IPCC Tier 2 methodology, with a CBIO program (BRL 10 mn/yr already in the financial plan). The project declares alignment with the IFC Performance Standards (PS1–PS8). ISO 9001, ISO 14001 and ISO 45001 certifications and the B3 ESG Seal are certification targets for Years 1–3 of operation — not current conditions. The ISO 14040/44 life-cycle assessment will be commissioned at validation of the product's carbon-intensity target (<50 kgCO2eq/t vs ~350 kgCO2eq/t for virgin NPK).

1.5 Strategic Risk Mitigation: The Pre-Operational Advantage

Unlike traditional greenfield projects, TVD eliminates the sector's biggest bottleneck (regulatory bureaucracy) before go-live:

- Technological and regulatory validation (MAPA): pilot containers are imported in Month 1. Agronomic trials run in parallel with the civil works. The plant starts operating in Month 25 with MAPA registration in hand and a validated commercial pipeline.
- • Twin Farm trailer: mapping of 5,000+ ha and conversion of pilot farms into paying SaaS clients before plant inauguration.
- • Market-risk reduction: the product does not compete on price per tonne but on cost per hectare (30–50% lower application rate at equal or higher yield).

1.6 Tier-1 Governance and "Dream Team"

A shareholder structure designed for global compliance, ready for blue-chip fund due diligence:

- • Dream Team architecture: 9 founders with zero overlap of competencies. Proven track record in industrial-scale fertilizer production, global commodity and feedstock logistics, and institutional governance (former CEO of JBS Campo Forte, former Councillor of the TCE-MG state audit court, European experts in closed-loop industrial conversion).
- • Frameworks adopted: COSO ERM (risks), ISO 37001 (anti-bribery), GRI/SASB (reporting), TCFD (climate).

• 100% private revenue (zero gate fee): no public counterparties — a governance, compliance and debt-pricing asset. The plan base also pays no gate fee; the B2B capacity to absorb up to BRL 14.84/t keeping minimum DSCR at 1.20x (exact in Y6) and up to BRL 59/t at 1.15x DSCR is a documented negotiation sensitivity in the summary, not a premise.

- • Professionalization: a skin-in-the-game remuneration model (fixed pro-labore + equity appreciation), with a transition plan to a professional market-hired CEO between Years 5 and 7.

1.7 Conclusion and Call to Action

TRIVALDECHÉTS S.A. offers international ESG funds a rare opportunity: to combine the security of infrastructure assets with the scalability and margins of agribusiness and technology (SaaS/AgTech).

We are not merely selling fertilizers; we are selling climate resilience, input sovereignty and soil regeneration for the “world’s farm”.

1.8. The investor's point of view: de-risking conditions agreed with the committee — and how each one is met

Reading the project through the lens of an ESG investment committee converged with TVD's own risk architecture and resulted in six de-risking conditions. All six are met — four of them purely structural, at no additional cost to the project — as detailed below.

Condition 1 — Circular feedstock (MSW supply contracts ≥70% of Years 1–3 volume). The institutional environment is fully favorable to signing MSW feedstock supply agreements with TVD. The host-state governments and the Public Prosecutor’s Offices — including the Public Prosecutor’s Office for Public Accounts — have expressed support for the project and for the execution of these agreements, because TVD is the concrete instrument enabling states and municipalities to meet the targets and obligations of the National Solid Waste Policy (Federal Law 12,305/2010) and of state solid-waste legislation: environmentally sound disposal, elimination of open dumps, recycling and waste valorization. The project is one of the very few solutions presented — if not the only one — that resolves, as a consequence of the operation rather than as its purpose, a local, state and national environmental liability that legislation has sought to address for years. It is this alignment — a legal obligation of public entities, support from state governments and favorable oversight by the Public Prosecutor’s Offices — that backs the MSW supply agreements (with gravimetric specification and an auditable quality regime): supplying feedstock to TVD is not a commercial favor; it is the path to compliance with waste legislation. The legal basis and the correspondence with the state governments and the Public Prosecutor’s Offices are filed in the data room (legal annex) and are available for verification in due diligence.

Condition 2 — Commercial agronomic validation (280 kg/ha equivalent target). The thesis is not a bet on innovation: organomineral fertilizer is consolidated commercial technology in Brazil, tested in the laboratory and in the field, harvest after harvest — including at industrial scale, as at Campo Forte (JBS, Guaiçara/SP, the largest organomineral unit in operation in the country) and Geociclo (GO, expanding to 100 thousand t/yr). The evidence for the reduced dose is documented and convergent: (i) Alane (2015) — with only 40% of the mineral-fertilizer P dose, the organomineral matched or exceeded soybean productivity; (ii) Almeida Júnior et al. (2016/17, Mineiros/GO) — all organomineral doses outperformed the standard 300 kg/ha mineral fertilization; (iii) Xavier (2018, Anápolis/GO) — 192 kg/ha of organomineral 07-18-00 matched 400 kg/ha of mineral 13-33-00 in corn (12.9 t/ha); (iv) EXES+ technology (2025) — organomineral at 70% of the dose with performance equivalent to the full

mineral dose and a 147% AEU at the full dose; (v) Levrero (2010) — organomineral nutrient uptake of 70% (N), 50% (P) and 80% (K), versus 50%, 5–20% and 60% for mineral, with an equivalence factor of 18–50% (Franco, 2019; Teixeira, 2010); (vi) Cruz et al. (2017) — uptake of ~70% (N), 40% (P) and 75% (K); (vii) Korndörfer (2013, Tupaciguara/MG) — +2.4 to +7.6 bags/ha of soybean over mineral; (viii) IF Goiano/Rio Verde (2020) — the 04-14-08 formulation, the same NPK base as UN4, evaluated from mineral and organomineral sources; (ix) UFU (2024) — 75% dose in coffee; and (x) the continuous commercial case of the Stefanello Group, with reapplication every 3–4 years. The literature itself warns that manufacturers' equivalence tables are empirical (UFFS, 2019) — which is why the condition was converted from a binary trigger into a monitored protocol: per-harvest dose targets measured by Twin Farm (measured, not assumed, dose-response), with an acceptance band — full confirmation keeps the base case; performance between 280 and 320 kg/ha equivalent triggers a price review, not termination.

Condition 3 — FX risk on debt service (hedged by the financing itself). Met within the structure itself, without third-party hedge contracts: the facility will be split into a dollar tranche (SOFR + spread) and a real tranche (CDI + spread), the latter sized to cover at least 50% of debt service in Years 3–6 — the window of greatest exposure. The BRL-denominated portion of debt service is matched to revenue, predominantly in BRL, and the FX hedge becomes structural rather than contractual.

Condition 4 — Milestone-based disbursement, with staged equity. Equity (20%) comes in on a staged basis and always ahead of debt, in a first-loss position: 40% at closing, 30% at the regulatory milestone and 30% at completion of the works. Debt (80%) is released in three objective tranches: 30% upon issuance of MAPA registration for the pilot products (UN10), 40% upon completion of the civil works and 30% at commissioning, with performance equal to or above 90% of nameplate capacity. Each debt tranche is preceded by the corresponding equity: the lender never comes in before the shareholder.

Condition 5 — Demand evidence for UN4 premium. Two independent and auditable tracks. (a) A commercial-evidence program over the 24 pre-operational months, led personally by the Strategic Agribusiness Board Advisor — former leader of Rizobacter Brazil and Profarm (Bioceres group), the world reference in inoculants and biological specialties, who built and scaled premium product portfolios in Brazil: technical validation on pilot farms, value-per-hectare pricing (not per-tonne) and staged cooperative conversion. Concrete execution: named LOIs with the GTM target cooperatives (Coamo, Cocamar, C.Vale, Cooxupé) and conversion of the Twin Farm pilot farms. The 40% of UN4 volume target equals 8,231 t/yr — BRL 49.4 to 57.6 mn/yr against the documented market reference of R$ 6,000–7,000/t (Ruralphos Premium) — under 0.3% of the Brazilian fluid-fertilizer segment (BRL 14.24 bn in 2025; specialties and biofertilizer market of

BRL 25.4 bn/yr — Abisolo Yearbook 2026). No patent promise: the barrier is registration and field validation, the team's core competence. (b) Conservative floors (section 7.7.2) on the definitive scenario — UN4 carried once (R$ 6,615/t), revenue BRL 780.8 mn/yr, EBITDA BRL 337.5 mn (margin 43.2%), IRRs calculated on the explicit cash flows: project 20.2% p.a. real; equity ≈20.7% — both well above the cost of debt, with calculated minimum DSCR 1.22x (Y6) and debt repaid in Y12. Reverting UN4 to the standard formulation (Phase 1, R$ 4,200/t): EBITDA BRL 328.8 mn (45.0%); excluding all complementary revenues (BRL 16.4 mn): EBITDA floor BRL 321.1 mn (42.0%). The thesis holds in every calculated scenario: the specialty mix is pursued as a strategic goal (Sec. 3.8.4.2), not a financial dependency.

Condition 6 — Closing of the staffing-sizing gaps (UN3 and UN9). UN3 is sized at 225 positions at all three verification levels — the shift-table title, the sum of the 5×2 headcounts and the Annex-4 consolidated table — and the UN9 position table is closed at 138 positions, including the 2 receivables-origination analysts (trade finance) and the 8 PJ shareholders (the model cost contemplates 8 × BRL 42,400/month). The consolidated total is 933 direct jobs per plant, verifiable line by line in Annex 4.

CHAPTER 2: THE FERTILIZER SUPPLY CHAIN IN BRAZIL — STRUCTURAL BOTTLENECK ANALYSIS

2.1 Brazil's Strategic Vulnerability

Brazil is the world's breadbasket but depends on external inputs to plant. The country imports approximately 85% of the NPK it consumes. In 2025, imports exceeded 49.1 million tonnes, draining more than US$ 18 billion in hard currency.

2.2 Geopolitical and Supply-Chain Risks

This dependence exposes Brazilian growers to severe exogenous shocks:

1. 1. Russian risk (war and sanctions): Russia and Belarus account for ~25% of global potash (KCl) and 15% of nitrogen. Sanctions, logistics blockages and the "moral hazard" of buying from sanctioned countries raise insurance premiums and freight.
2. 2. Chinese risk (export controls): China, the largest producer of phosphate (MAP/DAP) and urea, frequently imposes export taxes or

quotas to prioritize its domestic market (aligned with its 15th Five-Year Plan).

3. 3. Red Sea and Panama Canal crises: Middle East conflicts and Panama droughts raise maritime freight (Baltic Dry Index) and transit times, inflating the Brazil CIF.
4. 4. Protectionism and “green tariffs”: the EU and the US discuss carbon tariffs on commodities. High-carbon fertilizers (virgin NPK) will be taxed, while organominerals (low carbon) gain competitiveness.

2.3 Climate and Environmental (Physical) Risks

Brazilian agriculture is highly dependent on rainfall regimes, making it vulnerable to climate anomalies:

1. El Niño and La Niña: La Niña historically causes severe droughts in southern Brazil and Argentina (affecting soybean and second-crop corn), while El Niño can bring drought to the Cerrado/MATOPIBA or excess rain in the South, harming the harvest and grain quality.
2. 2. Shifting rainfall regimes and “savannization”: studies point to a shorter rainy season and possible savannization of parts of the Amazon and Cerrado. This threatens the economics of consolidated agricultural frontiers and forces migration to regions such as MATOPIBA, raising greenfield capex.
3. 3. Point extreme events: off-season frosts (which have wiped out coffee and sugarcane crops in the past) and increasingly frequent hailstorms cause total crop losses, with direct negative impact on insurers’ cash flow.

2.4 Regulatory, ESG and Non-Tariff Barrier Risks

International sustainability pressure has created new trade barriers that do not depend on WTO agreements:

1. 1. EU Deforestation Regulation (EUDR): the EU requires proof that commodities (soy, coffee, meat, timber) were not produced on land deforested after 2020. The absence of a unified, infallible government database in Brazil can stall billion-dollar exports through micro-traceability failures.
2. 2. Rural-credit restrictions (Plano Safra): the Central Bank and the Ministry of Agriculture have increasingly tied rural credit (working capital and investment) to the environmental regularity of the property (CAR — Rural Environmental Registry). Environmental liabilities can block access to cheap capital.

3. 3. Greenwashing risk and ESG capital flight: global funds and private equities operate under intense scrutiny. An agricultural asset in Brazil with labor liabilities (e.g., slave-like labor) or environmental liabilities can suffer sudden divestment and brand-value loss.
4. 4. European Green Deal (COM/2019/640 final): sets the EU's climate-neutrality target for 2050 and a 55% net-emissions cut by 2030 (Fit for 55). For Brazilian agribusiness the impact is not limited to EUDR or CBAM in isolation: the Green Deal creates a cumulative compliance architecture in which producers and traders must demonstrate, auditably, that the entire value chain — from input to final commodity — aligns with EU Taxonomy criteria (Regulation (EU) 2020/852). Producers and traders unable to certify low-carbon input origins will be gradually displaced into lower-value segments or secondary markets. Dependence on mineral NPK becomes a growing liability under this framework.

2.5 Biological and Phytosanitary Risks

Brazil's tropicality favors the accelerated proliferation of pests and diseases:

1. 1. Pesticide resistance: intensive and sometimes incorrect agrochemical use has produced super-resistant pests (e.g., fall armyworm, nematodes, weeds such as Sida rhombifolia). This requires rotation of technologies (including more expensive transgenic seeds) and raises cost per hectare.
2. 2. Pollinator collapse: drastic reductions in bee and other pollinator populations from pesticide use directly hit the productivity of soy, coffee and fruit crops.

2.6 The TVD Solution: Input Sovereignty

Brazil's dependence on imported fertilizer is not merely an economic or industrial bottleneck — it is a strategic vulnerability that directly affects national food security. Brazil, the world's second-largest grain producer and largest exporter of several agricultural commodities, consumes approximately 49 million tonnes of fertilizer per year, of which about 85% is imported, draining over US$ 18 billion in hard currency annually and subjecting crop production to geopolitical, logistics and currency risks outside domestic control.

Recognizing the severity of this exposure, the Brazilian state has structured a long-term institutional response. The National Fertilizer Plan 2050 (PNF 2050) set the target of reducing external dependence from 85% to 50% by 2050, with an increment of approximately 30 million tonnes of national production over the plan horizon. The PNF identifies five strategic emerging chains for this transition: organic and organomineral inputs; by-products with agricultural use

potential; bioinputs and bioproducts; nanotechnology and precision agriculture; and remineralizers. Among these, organomineral fertilizers are explicitly identified as a vector capable of diversifying the nutrient matrix, leveraging low-cost residues and reducing the currency volatility associated with virgin NPK imports.

To accelerate execution, the National Congress advanced the bill instituting the Fertilizer Industry Development Program (PROFERT). The program grants robust tax reliefs for projects implementing, expanding or modernizing fertilizer and input plants, subject to PNF 2050 guidelines. Benefits include: suspension of federal taxes on machinery, equipment and civil-construction services in Brazil; tax relief on imported goods without national equivalent; and fiscal benefits on inputs acquired for fertilizer manufacturing.

TVD mitigates the sector's structural risks by sourcing 40% of fertilizer feedstock domestically (the organic fraction of residues — local, effectively unlimited and cheap) and diversifying the nutrient matrix, positioning itself precisely in the PNF 2050 priority chains and eligible for PROFERT fiscal and financial incentives. While pure NPK is tied to the US dollar, maritime freight and geopolitical volatility, the TVD organomineral has its cost tied to local land logistics and process efficiency. Moreover, by converting urban solid residues into high-value-added agricultural inputs, TVD directly contributes to the input-sovereignty target without demanding new mineral mines or dependence on imported natural gas for ammonia synthesis.

In this context TVD does not merely compete as a lower-cost alternative or an operational currency hedge. It operates as critical food-security infrastructure, aligned with the state strategy to reduce external dependence, capturing regulatory incentives already in motion and offering institutional investors an asset whose upside is reinforced by long-term public policy — not merely by market dynamics.

2.7 The TVD Solution: "Natural Hedge and Operational Resilience"

While the financial market offers expensive currency hedges to protect the crop, TVD offers a natural and operational hedge, assisting growers, cooperatives and traders against geopolitical, climate and regulatory shocks through the circular economy and data intelligence.

2.7.1 Solutions for geopolitical and supply-chain risks (2.1 and 2.2)

TVD products/services: organomineral fertilizers (granular and liquid) and industrial inputs.

- • The solution (import substitution and logistics immunity): TVD produces locally sourced fertilizers using organic residues and converted industrial

inputs. This drastically reduces dependence on virgin NPK imported from Russia, Belarus and China.

- • Freight and green-tariff mitigation: by using local sources and circular-economy processes, the carbon footprint of the TVD fertilizer is drastically lower. This shields the grower from future “green tariffs” (EU CBAM) and eliminates exposure to Baltic Dry Index volatility (maritime freight).
- • For traders: traders can create “low-carbon commodity lines” (Low-Carbon Soy/Corn), selling to Europe and Asia at a premium (green premium), using the origin seal of TVD inputs as a guarantee of low-carbon traceability.

2.7.2 Solutions for climate and physical risks (2.3)

TVD products/services: organomineral fertilizers + advanced precision-agriculture services (multispectral imagery, drones and AI).

- • The solution (hydric resilience via organic matter): purely mineral fertilizers (virgin NPK) do not improve soil structure. TVD organominerals increase soil organic matter (SOM). Each 1% increase in SOM allows the soil to retain tens of thousands of liters of water per hectare. This is the “insurance” against El Niño droughts and shorter rainy seasons.
- • The solution (predictive monitoring): TVD precision services use multispectral imagery and sensors to map crop water stress before it is visible to the naked eye. AI cross-references this data with climate forecasts, allowing the grower to anticipate liquid-organomineral applications (via fertigation or foliar spray) to strengthen the plant before thermal or hydric shock.

2.7.3 Solutions for regulatory, ESG and barrier risks (2.4)

TVD products/services: integrated circular-economy platform (circular supply and traceability).

- • The solution (EUDR and rural-credit compliance): TVD does not merely sell the product; it sells certified origin. By using organic residues (e.g., partnerships with wholesale horticultural hubs, per their prior interest) and converted industrial inputs, TVD issues a “Carbon & Circularity Passport” for each fertilizer batch.
- • Divestment-risk mitigation: cooperatives and large funds operating with growers can use the TVD platform to prove to global investors that the farm not only avoids deforestation but regenerates soil and uses circular-based inputs. This secures access to the lowest Plano Safra rates (sustainable credit) and shields the asset against ESG capital flight.

2.7.4. Solutions for Biological and Phytosanitary Risks (2.6)

TVD products/services: localized precision application (gamma sensors, drones and AI) + organominerals.

- • The solution (end of flat-rate application): excessive chemical NPK acidifies the soil and destroys the microbiome, weakening the plant and making it more pest-susceptible. TVD organominerals feed the soil biology. Plants in biologically active soil produce natural defense metabolites.
- • The solution (localized application technology): through sensors (IoT soil mapping of NPK, moisture, pH in real time) and drones, TVD maps the spatial variability of the farm. AI prescribes variable-rate application of liquid and granular fertilizers.
- • Pollinator-collapse and resistance mitigation: by applying the exact input where the plant needs it (rather than flat rate across the whole plot), chemical leaching and environmental toxicity are reduced, preserving bees and breaking pest-resistance cycles, as the plant reaches true nutritional balance.

CHAPTER 3: THE NEXT STEP IN AGRICULTURE — RESULTS AND ADVANTAGES OF THE TVD SOLUTION

3.1 The TVD Solution: Input Sovereignty

TVD mitigates these risks by sourcing 40% of fertilizer feedstock domestically (the organic fraction of residues — local, effectively unlimited and cheap) and diversifying the nutrient matrix. While pure NPK is tied to the US dollar and maritime freight, the TVD organomineral has its cost tied to local land logistics and process efficiency.

3.2 The TVD Solution: “Natural Hedge and Operational Resilience”

While the financial market offers expensive currency hedges to protect the crop, TVD offers a natural and operational hedge, assisting growers, cooperatives and traders against geopolitical, climate and regulatory shocks through the circular economy and data intelligence.

3.3 Solutions for Geopolitical and Supply-Chain Risks (2.1 and 2.2)

TVD products/services: organomineral fertilizers (granular and liquid) and sustainable industrial inputs.

- • The solution (import substitution and logistics immunity): TVD operates two technological fronts: it develops industrial inputs from non-organic residues and manufactures locally sourced fertilizers using organic residues as feedstock. With local production, TVD fertilizers drastically reduce Brazilian agriculture's vulnerability to virgin-NPK imports from Russia, Belarus and China.
- • Freight and green-tariff mitigation: by using local sources and circular-economy processes, the carbon footprint of the TVD fertilizer is drastically lower. This shields the grower from future "green tariffs" (EU CBAM) and eliminates exposure to Baltic Dry Index volatility (maritime freight).
- • For traders: traders can create "low-carbon commodity lines" (Low-Carbon Soy/Corn), selling to Europe and Asia at a premium (green premium), using the origin seal of TVD inputs as a guarantee of low-carbon traceability.

3.4 Solutions for Climate and Physical Risks (2.3)

TVD products/services: organomineral fertilizers + advanced precision-agriculture services (multispectral imagery, drones and AI).

- **The Solution (Water Resilience via Organic Matter): Purely mineral fertilizers (virgin NPK) do not improve soil structure. TVD organominerals increase Soil Organic Matter (SOM). Each 1% increase in SOM allows the soil to retain tens of thousands of liters of water per hectare. It works as a true biological insurance against El Niño droughts and climate irregularity.**
- • The solution (predictive monitoring): TVD precision services use multispectral imagery and sensors to map crop water stress before it is visible to the naked eye. AI cross-references this data with climate forecasts, allowing the grower to anticipate liquid-organomineral applications (via fertigation or foliar spray) to strengthen the plant before thermal or hydric shock.

3.5 Solutions for Regulatory, ESG and Barrier Risks (2.4)

The TVD Product/Service: Integrated Circular-Economy Platform (Circular Feedstock Management and Traceability).

- • The solution (EUDR and rural-credit compliance): TVD does not merely sell the product; it sells certified origin. By using organic residues (e.g.,

partnerships with wholesale horticultural hubs, per their prior interest) and converted industrial inputs, TVD issues a “Carbon & Circularity Passport” for each fertilizer batch.

- • Divestment-risk mitigation: cooperatives and large funds operating with growers can use the TVD platform to prove to global investors that the farm not only avoids deforestation but regenerates soil and uses circular-based inputs. This secures access to the lowest Plano Safra rates (sustainable credit) and shields the asset against ESG capital flight.

HIGHLIGHT — REGULATORY RISK MITIGATION NO. 1 (MAPA contamination limits): the main regulatory risk in the MSW → fertilizer chain is meeting the contaminant limits of Decree 4.955/2004 — the barrier that kills most competing projects. TVD's mitigation is structural, not procedural: complete decontamination of both organic-fraction streams (hygienized composting + the liquid nine-stage train), per-batch analytical certificates, quarantine of non-conforming batches and IN 63/2021 traceability on 100% of the volume — with the train's CAPEX already budgeted in the plan and the pre-operational pilot validating efficiency before go-live. Residual risk: rejection of a non-conforming batch (mitigated by quarantine; loss limited to the batch, with no contamination of annual revenue).

3.6. Solutions for Biological and Phytosanitary Risks (2.6)

TVD products/services: localized precision application (gamma sensors, drones and AI) + organominerals.

- • The solution (end of flat-rate application): excessive chemical NPK acidifies the soil and destroys the microbiome, weakening the plant and making it more pest-susceptible. TVD organominerals feed the soil biology. Plants in biologically active soil produce natural defense metabolites.
- **The Solution (Variable-Rate Application Technology):**Through sensors (such as IoT sensors for real-time soil mapping (NPK, moisture, pH)) and drones, TVD maps the farm’s spatial variability. AI prescribes variable-rate application of liquid and granular fertilizers.
- • Pollinator-collapse and resistance mitigation: by applying the exact input where the plant needs it (rather than flat rate across the whole plot), chemical leaching and environmental toxicity are reduced, preserving bees and breaking pest-resistance cycles, as the plant reaches true nutritional balance.

3.7 Feedstock

After analyzing the various feedstocks available for manufacturing granular and liquid organomineral fertilizers -- their supply and the logistics costs of transporting them to the plants -- it was found that: livestock residues have low availability because they are used in natura at or near the farm; agro-industrial residues also have low availability because they are committed to energy generation.

In this scenario, TVD chose to evaluate the organic fraction of municipal solid waste, which is abundantly available and almost entirely discarded. Beyond its large supply, collection and transport infrastructure already exists in more than 93% of Brazilian municipalities — funded by the municipalities themselves.

Compostable feedstocks in Brazil (2025)

Residue category	Herd/Production	Volume (mn t/yr, dry basis)	% of total	Origem
LIVESTOCK				
Cattle manure	238.2 mn head (IBGE/AGPM 2024)	220	31%	Cattle herd
Poultry litter (broilers)	6.69 bn head slaughtered (IBGE 2025)	5	1%	Poultry flock
Swine manure	60.69 mn head slaughtered (IBGE 2025)	9	1%	Swine herd
Layer-hen manure	~100 mn head (IBGE)	1	0%	Layer hens
Livestock subtotal		235	34%	
AGRO-INDUSTRIAL				
Sugarcane bagasse	673.2 mn t cane (CONAB 2025/26)	190	27%	Cane milling
Sugarcane straw	8.97 mn ha (CONAB)	80	11%	Mechanized harvest
Other agro-industrial	Various	15	2%	Coffee, fruit, vegetables, oils
Agro-industrial subtotal		285	40%	
URBAN — organic fraction of municipal solid waste	81.6 mn t residues (ABRELPE 2024)	37	5%	Residues — TVD feedstock
Other compostable feedstocks	Forestry, agroforestry	145	21%	
GRAND TOTAL		702	100%	

3.7.1 Routing of the residue fractions — from feedstock to products

Fraction	% TVD	t/day	t/yr	Sub-category / Resin Type	TVD routing
Moist organic matter	50%	375	130,031	Total organic fraction	Aerobic digestion + composting + MAPA/EU-compliant decontaminatio n
Polymers	15%	112.5	39,009	PET / HDPE / PP — fiber grade (recyclables)	Optical NIR sorting + density and color separation
				Films and laminates — not convertible	Optical NIR sorting → pyrolysis (energy recovery)
Paper/ cardboard	12%	90	31,208	Total cellulosic fraction	Separation — commercial destination to be detailed
Metals	3%	22.5	7,802	Non-ferrous (Al, Cu, brass)	Magnetic separation + eddy current
Glass	3%	22.5	7,802	Clear / green / amber	Optical/density separation → color-sorted cullet
Inert reject	12%	90	31,208	Total inert fraction	Mechanical processing → concrete artifacts
Hazardous residues	0.5%	3.75	1,300	Total hazardous fraction	Manual segregation + licensed specialized handling
Process losses	4.5%	33.75	11,703	Process losses	Return to process or inertization
TOTAL	100%	750	260,063	t/yr = % × 260,062.5 t (361 operating days); t/day = % × 750 (nominal)	Scenario 750 — definitive gravimetric basis

Note: this table is the origin → process → product routing matrix for each MSW fraction (mass routing). It connects the feedstock (section 3.7) to the products described in sections 3.8 to 3.10 and is the matrix that feeds the Annex 3 mass balance (section 12). The physical-chemical characteristics of the local MSW (moisture, calorific value, contaminants) feed into the FEED (Class 3 estimate).

3.8 CORE BUSINESS: Organomineral fertilizers (granular and liquid)

Feedstock transformation: organic fraction — 50% of residues.

3.8.1 The Science of Soil: Organomineral vs Conventional NPK

Mineral NPK is highly soluble and reactive. Applied to tropical soils (acidic, with high iron and aluminum content), phosphorus fixation occurs: up to 80% of applied phosphorus (P) becomes unavailable to the plant. Continuous NPK use also acidifies the soil and reduces soil organic matter (SOM), degrading physical structure.

The TVD difference (chelation and microbiome): TVD's stabilized organic matter acts as a natural chelating agent. It "hugs" phosphorus, potassium and micronutrient ions, protecting them from soil fixation and releasing them gradually (slow-release effect). In addition, organic carbon feeds the soil microbiota (mycorrhizal fungi and nitrogen-fixing bacteria), creating a living ecosystem that raises cation-exchange capacity (CEC).

THE VIRTUOUS CYCLE PER SEASON: in the first season, the grower saves ~30% on dose (280 kg vs 400 kg/ha) through the chelating slow-release effect. In subsequent seasons, the build-up of organic matter raises water and nutrient retention — the soil works together with the fertilizer — and the effective dose tends to fall further, as recorded in field cases with re-applications every 3–4 years at full productivity. TVD fertilizer is the only one whose efficiency grows with use — a complete inversion of mineral-NPK logic, whose dependence is ever-rising and whose cost is tied to the US dollar and maritime freight.

3.8.2 Resilience to Water Stress (The Climate Factor)

With intensifying El Niño and La Niña events, water stress is the greatest productivity risk.

- • Sponge effect: each 1% increase in soil organic matter raises water retention by 170,000 liters per hectare.
- • TVD delivers this: continuous TVD organomineral application raises SOM, allowing the crop to withstand 15–20-day dry spells without drastic productivity loss. Pure NPK offers no such protection.

And the gain compounds: each additional 1% of organic matter retains ~170,000 liters of water per hectare — hydric capital that accrues season after season, simultaneously reducing irrigation and fertilizer needs. Less water, less input, more productivity: soil regeneration is also a structural cost-reduction strategy.

3.8.3 Special organomineral fertilizer (40% organic + 60% NPK; client-formulated, proxy 06-14-16)

A high-technology product whose feedstock is the organic fraction of MSW AFTER PRESSING (the dewatered cake from the ANDRITZ press at UN2), hygienized by monitored thermophilic composting (MENART SP-60) and released batch by batch by the pathogenicity laboratory within MAPA limits — combined with mineral fertilizers (NPK). The organic matter acts as a chelating agent, protecting phosphorus from fixation in the soil and releasing nutrients gradually (slow release).

FORMULATION NOTE (PROXY): the UN3/UN4 fertilizers are special organomineral fertilizers, formulated on demand according to soil analysis and each client's crop needs; the generic 06-14-16 (granular) and 04-14-08 (liquid) formulations used in this business plan and in the calculations are a PROXY of one of the most-used formulations in the target market, adopted to price revenue, OPEX and margins — actual client-specific formulations do not change the modeled volumes, revenues or margins (same tonnes of organic matter and NPK per tonne of product).

Agronomic and soil advantages by crop:

- • Soy: 10–16% yield increase; +2.5 g on 100-grain weight; greater drought resistance via water retention.
- • Corn: 30% more robust root system; lodging resistance; higher water-use efficiency (WUE).
- • Sugarcane: 8–12% increase in total recoverable sugar (TRS); cane-stand life extended by two cuts; natural soil decompaction.
- • Cotton: 10–18% lint gain; micronaire improvement (premium textile fiber); reduced leaching.
- • Coffee: drastic reduction of negative bienniality; better cup classification (fewer defects); 12–20% gain.
- • Cacao: higher butter content; stronger immunity against witches'-broom disease.

3.8.3.1 Productivity and terms of trade

Terms of trade measure how many bags of commodity the grower must sell to pay for the fertilizer applied per hectare. The calculation must be made not by tonne price but by cost per hectare — where the organomineral shows its advantage.

Reference data (CFR Brazilian port, September 2026):

- **NPK CFR Brazilian port: BRL 3,350.00/t**
- NPK formulated by blenders: **BRL 4,900.00/t**

Price references in this document (all September 2026, distinct products — not comparable among themselves): basic NPK 06-14-16 at BRL 2,115.94/t (basis of the TVD price — derived from August 2026 international quotes: urea US$ 409/t, MAP US$ 865/t, KCl US$ 400/t, per Annex 2). The plan retains the contracted price of BRL 3,756.89/t (Annex 2); the September 2026 references above are updated market data and do not change the plan price; standard-formula NPK CFR port BRL 3,350.00/t; average port quotations BRL 3,520.00/t; blended NPK delivered inland (MT reference) BRL 4,900.00/t.

- OM 40/60 — market reference (premium +4.7%): BRL 5,130.00/t; TVD selling price adopted in the plan (Prices v7.3.8): BRL 3,756.89/t
- Soybean price: BRL 135–148/bag (market variation)

Scenario 1 — Pure Mineral NPK (standard dose):

- Dose: 400 kg/ha
- Cost: BRL 1,960.00
- Barter ratio: BRL 145/bag = 13.5 bags/ha
- (or 12.3 bags/ha, with soybean at BRL 160)

Scenario 2 — Organomineral 40/60 (reduced dose):

- Dose: 280 kg/ha (**70% of the dose** of NPK, field-proven data)
- Cost: BRL 974.00
- Barter ratio: BRL 145/bag = 6.7 bags (50% less)

The main argument for the grower is not yield increase but the reduction of cost per hectare — real, immediate savings in the same season. And payment follows the season: with 70% of billings financed at 210 days (~9 months of the soybean/corn cycle), the grower pays for the fertilizer after harvesting and

selling — the very productivity gain finances the switch from mineral NPK to organomineral.

3.8.4 Liquid organomineral fertilizer

Press liquor from the organic fraction of municipal solid waste is vastly superior to landfill leachate as feedstock for liquid fertilizer. The principal advantage is higher nutrient concentration (N, P, K) with far fewer contaminants, drastically reducing membrane-treatment cost and the need for complex pre-treatment.

HIGHLIGHT — TECHNOLOGICAL DIFFERENTIATOR NO. 1 IN PRODUCT (decontamination that enables registration): the liquid fertilizers are produced from press liquor — the stream any other operator discards or sends to effluent treatment — purified in a nine-stage train to MAPA fertilizer limits with per-batch analytical certificates (ICP-MS) and IN 63/2021 traceability. This is the technical barrier that turns a residue into a registered, bankable product and supports the margin premium and the ESG eligibility of the credit.

It undergoes complete decontamination in a nine-stage treatment train (equipment in UN4 CAPEX, Annex 3): (1) equalization and neutralization; (2) humic extraction with 8% KOH; (3) chemical precipitation of heavy metals (NaOH/Na_2S) followed by electrocoagulation (Al/Fe electrodes); (4) microfiltration and ultrafiltration; (5) reverse osmosis; (6) reverse electrodialysis (salt removal); (7) UV-C + ozone disinfection; (8) activated-carbon polishing; (9) dosing and enrichment with soluble nutrients — with online ICP-MS analyzing metals in every batch. EXAMPLE INPUT → OUTPUT (typical project ranges, Class 3 FEED): raw press liquor arrives with thermotolerant coliforms on the order of 10^5–10^6 MPN/mL, heavy metals (Cd, Pb, Cr, Ni) above fertilizer limits and high salinity (conductivity > 20 mS/cm); at the train outlet, the liquid stream shows > 99.99% pathogen reduction (UV-C + ozone), metals reduced to the maximum limits of Decree 4.955/2004, conductivity adjusted to product specification (< 2 mS/cm) and a per-batch analytical certificate (IN 63/2021 traceability). Dedicated OPEX: chemical reagents (NaOH, Na_2S, KOH, HCl — BRL 2.4 mn/yr), MF/UF/RO membranes and CIP (BRL 1.8 mn/yr), electrocoagulation/EDR (BRL 0.95 mn/yr) and UV-C/ozone (BRL 0.32 mn/yr).

THE SAME LOGIC IN THE SOLID FRACTION — HYGIENIZED COMPOSTING (UN2): the organic fraction of MSW arrives at composting carrying the residue's pathogens — thermotolerant coliforms, Salmonella spp., helminth eggs and protozoa — besides inert fragments and metals. Decontamination is the very physics of the process: accelerated thermophilic composting in 34 windrows with two MENART SP-60 turners

and PID-controlled forced aeration, holding 55–70°C throughout the 40-day cycle (temperature probes on every windrow, LoRaWAN IoT); final curing in a quarantine shed stabilizes the material, and a backup pasteurization oven (70°C/1h) guarantees hygienization even on process deviation. EXAMPLE INPUT → OUTPUT: raw windrow compost reaches 60–70°C in the first weeks (thermal elimination of pathogens and seeds); at product release, the pathogenicity laboratory (PCR for Salmonella, thermotolerant coliforms and helminths, with automated MALDI-TOF reading) releases batch by batch — output: hygienized, stable, odor-free compost, within the pathogen and heavy-metal limits of Decree 4.955/2004, with per-batch IN 63/2021 certificate. Dedicated OPEX: process reagents and biofilter (BRL 0.18 mn/yr) and preventive MENART/ANDRITZ maintenance (2% of UN2 CAPEX).

QUALITY ASSURANCE AND STANDARDIZATION (platform differentiator): the four plants (Colatina/ES, Patos de Minas/MG, Barreiras/BA, Porto Nacional/TO) are twins — the same sorting park (Stadler + TOMRA STT 5000 + AUTOSORT NIR/XRF), the same composting reactor (MENART), the same membrane train (SUEZ/Vontron), the same laboratories (GC-MS, HPLC, ICP-OES, online ICP-MS) and the same written operating procedures — so that TVD fertilizer has the SAME specification regardless of the plant of origin, with batch→certificate→client traceability per IN 63/2021. Release rule: no batch leaves the plant without laboratory approval — quality is not final inspection, it is process architecture. For the ESG fund, this converts decontamination into a due-diligence asset: contaminated residue feedstock enters and leaves as registered, auditable, standardized agricultural input on 100% of the volume.

- • Application: fertigation (center pivot and drip), precision agriculture and foliar spray.
- • Advantage: immediate plant uptake, zero waste and full compatibility with modern farm machinery.

The development logic of the liquid premium: the starting point is a real technical problem in the market — liquid fertilizers formulated with MAP (orthophosphate) precipitate calcium phosphate in hard water (Ca > 100 mg/L, pH > 6.5), clogging drippers and blocking fertigation in most Brazilian irrigated regions (Embrapa reference). TVD’s technological solution replaces MAP with APP 10-34-0 (ammonium polyphosphate), which sequesters calcium and prevents precipitation, penetrates the leaf cuticle ~3× faster, operates in a

stable tank buffer of pH 5.5–6.0, and releases 30% of phosphorus in polyphosphate form (nutrition extended over 15–20 days). On this base, the premium formulation adds chelated micronutrients (Zn 0.5%, B 0.3%, Mn 0.2% — EDTA), 2% seaweed extract, Azospirillum brasilense inoculant (10^8 CFU/mL guaranteed and batch-verified) and 3% humic + fulvic acids, at 1.35–1.40 kg/L density.

3.8.4.1 Phase 1 vs Phase 2 — the mix leverage of UN4

The liquid-fertilizer unit operates in two value phases over the same volume (20,578 t/yr) and the same plant. Phase 1 (standard) is the conservative market floor: NPK 04-14-08 with MAP at BRL 4,200/t — the product TVD could sell without any speciality premium, whose sole technical barrier (precipitation in hard water) is also Phase 2's opportunity. Phase 2 (specialty mix) replaces MAP with ammonium polyphosphate (APP 10-34-0) and adds chelated micronutrients, seaweed extract, inoculant and humic acids — sold at BRL 6,615/t against an established market reference (Ruralphos Premium, BRL 180/L).

Parameter (17,328 t/yr)	Phase 1 — Standard	Phase 2 — Specialty mix
Phosphorus source	MAP (orthophosphate) — precipitates in hard water	APP 10-34-0 (polyphosphate) — sequesters Ca, no precipitation
Enrichment	None	Zn/B/Mn EDTA + 2% seaweed + Azospirillum + 3% humic/fulvic acids
Selling price	BRL 4,200/t	BRL 6,615/t
Production cost	BRL 1,589/t	BRL 3,579/t nominal (seaweed extract purchased externally at BRL 8,000/t — no in-house production assumed; remaining UN3 inoculant and UN2 compost synergies not priced into the base)
Gross margin	62.2%	45.9% nominal (no synergies priced in)
Annual revenue	BRL 86.4 mn	BRL 136.1 mn (+57.5%)
Role in the plan	Conservative comparison floor	Price ADOPTED in the plan (Annex 2) — base case

The Phase 1 → Phase 2 mix transition (standard → specialty mix) carries the BRL 49.7 mn/yr revenue uplift (86.4 → 136.1 = 20,578 t × BRL 4,200/t → × BRL 6,615/t) EXACTLY ONCE in consolidated EBITDA — inside the Σ-units subtotal (BRL 158.5 mn), which already bears full

additive cost (BRL 40.9 mn/yr = BRL 1,990/t × 20,578 t). The remaining net contribution is +BRL 8.8 mn/yr (after full-price premium additives; partial captures of transfer-priced internal synergies remain unpriced upside). Full vertical synergies (in-house UN3 inoculant, UN2 compound at transfer cost) remain unpriced upside (Annex 2, item 3.6). Consolidated base with UN4 in Phase 1: EBITDA BRL 328.8 mn/yr (45.0% margin on revenue of BRL 731.1 mn).

3.8.4.2 Why premium liquid is the strategic meta

Premium liquid is not a niche option within the plan — it is the TVD meta. The liquid-fertilizer front, driven by fertigation, precision agriculture and specialty crop nutrition, is the fastest-growing consumer segment in the market studied by TVD, and it is where value per tonne concentrates: the same plant, the same volume and the same logistics deliver a product quoted at specialty references rather than commodity references.

The structural reason is a trump card that no competitor can replicate: the premium line is the outlet that valorizes, at the highest unit value, the press liquor from the platform's own feedstock — a fully decontaminated liquid stream (complete train: precipitation, electrocoagulation, micro/ultrafiltration, reverse osmosis, reverse electrodialysis and UV-C/ozone — section 3.8.4) that stand-alone blenders must purchase or synthesize, and that TVD simply maximizes from its own process. Every tonne of premium liquid converts a residue fraction that would otherwise be a disposal cost into the platform's highest-value product, closing the loop of the circular thesis inside the product with the best margin.

The decontaminated organomineral base is a neutral, agronomically stable carrier, directly integrable into any premium mix — and this matters because the specialty frontier moves daily: new chelates, biostimulants, inoculants and micronutrient combinations are discovered and launched every season. TVD's platform economics — organomineral compound produced in-house by UN2 and inoculants by UN3 at transfer cost, with seaweed extract and other additives purchased externally at market price — let it absorb and commercialize each new mix faster than any stand-alone formulator, keeping the UN4 portfolio permanently at the frontier without structural redesign. Premium expansion is driven by R&D agreements with global public and private research institutions and by the leadership's commercial track record — with no patent dependency.

The R&D program backs this meta: TVD maintains agreements with global public and private research institutions — agronomic research centers, universities and biologicals laboratories — for pipeline access, co-development of new formulations and independent field validation, keeping the UN4 portfolio permanently at the micronutrient frontier.

Execution risk on this meta is low for a structural reason: the Strategic Agribusiness Advisor who anchors the commercial ramp-up (Sec. 6) led Rizobacter do Brasil and Profarm (Bioceres group) as Brazil Country Manager — the world reference in inoculants and foliar/microgranular biological specialties — after conceiving, building and operating Campo Forte Fertilizantes, the largest organomineral unit in Brazilian agribusiness. Premium liquid specialties are not new territory for TVD's leadership: they are the segment in which it has already built portfolios and scaled products.

3.9 NON-CORE BUSINESS: valorizing feedstock fractions not used in fertilizer manufacturing

3.9.1 Segregated dry materials

The segregation system (NIR, X-ray, XRF and color sensors) separates dry materials with better than 98% purity.

3.9.1.1 Metals, paper, glass and beverage cartons

These are baled and sold directly into the conversion chain as secondary raw materials.

- • Ferrous and non-ferrous metals (aluminum/copper): direct sale to steelworks and foundries. High market value.
- • Paper and cardboard: sale to paper and packaging mills (kraftliner, testliner).
- • Glass and beverage cartons (Tetra Pak): sale to specialized converters (abrasives, thermal insulators; aluminum/polyethylene recovery).

Value proposition: fast cash flow (days of inventory) and 100% clean revenue, without complex industrial conversion costs.

3.9.1.2 Fiber-grade polymers

Feedstock transformation: segregated PET, PP and PEAD.

TVD does not merely produce “ground plastic”. Through multi-stage washing (Wuxi Beihai system) and extrusion with a high-efficiency continuous filter, TVD produces polymers converted to fiber grade, suitable for food-contact and textile applications.

- • Fiber-grade PET: destined to the textile industry (polyester fibers), food-contact packaging (trays, bottles) and strapping.
- • Fiber-grade PP and PEAD: destined to flexible packaging, films, pipes and injection-molded automotive parts.

Value proposition: priced 15–20% below virgin polymer with equal technical quality. Revenue tied to the US dollar (currency hedge) and serving the ESG demand of major brands (Unilever, Nestlé, Ambev) that mandate recycled content in their packaging.

3.9.2 Energy and by-products

3.9.2.1 Energy

Feedstock transformation: non-mechanically convertible plastics (PEBD, PS, PVC, multilayers), leather and rubber.

Through continuous pyrolysis reactors, TVD thermally converts materials without mechanical-conversion value into energy and inputs, guaranteeing the plant's energy self-sufficiency.

- • Syngas: electricity generation via a dedicated turbine, or return to the reactor to maintain process temperature (500–600°C), reducing external natural-gas consumption.
- **• Pyrolytic oil: burned in the heat-recovery boiler (steam for the condensing turbine and thermal processes) and in generators, closing the energy loop.**
- **• Char (biochar/carbon black): the energy fraction returns to the reactor as process fuel (500–600°C), closing the loop; higher-purity fractions may be activated for filters, sold as asphalt additive or applied as soil conditioner (carbon sequestration).**

Value proposition: drastic reduction of the plant's electricity and gas OPEX; carbon credits from replacing open burning and landfilling of these materials.

3.9.3 By-products for civil construction

Feedstock transformation: inerts (off-specification glass, rubble, minerals).

Inert materials are crushed and replace sand and aggregate in the manufacture of concrete artifacts.

- • Products: concrete blocks for partition and structural use; interlocking pavers for sidewalks and yards.
- • Value proposition: production cost up to 30% lower than conventional concrete (free feedstock). Sales to the local construction market and municipalities (public works), strengthening the regional circular economy, with an index above 92%.

3.10 ADVANCED PRECISION-AGRICULTURE SERVICES: Twin Farm (SaaS)

TVD does not merely produce and sell fertilizers; TVD provides the intelligence to maximize the grower's ROI. The Twin Farm platform uses IoT soil sensors (NPK, moisture, pH), multispectral drones and predictive AI modeling.

- • Soil characterization: mapping of the farm's spatial variability.

- • Data engineering and AI: algorithms cross-referencing soil, climate and crop-input history to predict fertilization needs and detect water stress or pests in advance.
- • Variable-rate application maps: the system generates the file for the tractor/drone/irrigation rig to apply TVD fertilizer exactly where it is needed, at the exact rate.

Value proposition (future potential — an option, not a premise): a recurring-revenue SaaS model with high margin (80%+). Initially, the platform operates as a technical-marketing cost center for UN3 and UN4: it reduces grower risk, raises productivity and creates a data-driven lock-in that makes the client stick to the TVD brand.

3.10.1 The full survey: drones and ground robots feeding the farm digital twin

The Twin Farm architecture rests on three acquisition layers that cross-validate each other, per the UN8 installed base (CAPEX v7.3.9): (i) AERIAL SURVEY — three DJI Matrice 300 RTK drones with RGB, multispectral (MicaSense RedEdge-P) and LiDAR (Zenmuse L1) cameras, producing orthomosaics and vigour, moisture and biomass maps with centimeter-level RTK precision; (ii) GROUND VERIFICATION — three autonomous ground robots (Naïo Oz V4 UGVs) measuring soil NPK, pH, moisture and compaction in real time, providing the “ground truth” of zones flagged anomalous by vegetation indices — without the robots, the aerial map shows stress but cannot explain its cause; (iii) CONTINUOUS MONITORING — 80 soil and climate IoT sensors (Sentek) installed on client farms, transmitting via LoRaWAN gateway to the operations hub. Processing (Pix4Dmapper/Agisoft Metashape) fuses these three sources into the DIGITAL TWIN OF THE CROP: a living model, recalibrated at every flight and every sensor reading.

The link to the circular economy is structural, not rhetorical. First, DOSE EFFICIENCY: variable-rate application maps are the mechanism that turns the organomineral advantage (200–280 kg/ha equivalent to 400 kg/ha of mineral NPK) into operational practice — without the twin, the reduced dose would be a marketing promise; with the twin, it is a prescription file for the sprayer. Product circularity completes itself in circular use: fewer tonnes applied per hectare, zero overlap, no skipped swaths. Second, CARBON MRV: the time series of soil organic matter and per-plot productivity — generated by the same sensors — is the data backbone of the CBIO MRV plan (BRL 10 mn/yr already in the financial plan) and of the 2.5 tCO2/ha/yr sequestration target (SDG 13). Third, IN 63/2021 traceability: every TVD fertilizer batch is tracked to the plot, closing the industrial loop — the “carbon and circularity passport” that traders and cooperatives require for their low-carbon lines. Fourth, scientific validation: field data, in partnership with Embrapa/ESALQ/IAC, underpins the +9.6%

productivity premium — the twin is simultaneously an agronomic tool and a pricing instrument.

The economic reading is deliberate: UN8 operates as a technical-marketing and field-R&D cost center (OPEX v7.3.9 — BRL 10.8 mn/yr, 37 professionals, own revenue at market prices NOT booked in the underwriting base (aerial mapping at BRL 17/ha, soil analysis at BRL 26/sample, IoT monitoring at BRL 700/month), with revenue NOT booked in the base and model EBITDA of −BRL 10.8 mn/yr, assumed deliberately as the technical-marketing and field-intelligence cost of UN3 and UN4 — not as a profit unit. The strategic value, however, exceeds the unit's P&L: every mapped hectare is a client bound to TVD fertilizer by data — SaaS is the cheapest customer-acquisition cost in the fertilizer industry.

3.11 CONSOLIDATED REVENUE AND VALUE-PROPOSITION MATRIX

For ESG funds, the diversification below demonstrates the resilience of the business model against agricultural commodity volatility:

Products	Main product	Target Market	Value proposition / hedge
Fertilizers	Special organomineral (NPK 06-14-16 proxy) and premium liquid (04-14-08 + polyphosphate)	Cooperatives, traders, large growers	~46% cost-per-hectare reduction vs NPK (BRL 1,052/ha vs BRL 1,960/ha); yield gain; hydric resilience (each 1% of SOM retains ~170,000 L/ha)
Conversion	Fiber-grade PET, PP and PEAD polymers	Textile industry, packaging and outsourced converters (big bags, woven bags, bottles)	Technical quality equal to virgin polymer; 15–20% lower price; US dollar-linked revenue (currency hedge)
Precision ag.	Twin Farm (SaaS, IoT, AI)	Medium and large growers (pilot farms)	Initially a technical-marketing and field-intelligence cost center — own revenue not booked in the underwriting base; OPEX BRL 10.8 mn/yr fully carried as technical-marketing cost; model unit EBITDA of −BRL 10.8 mn/yr assumed as the cost of marketing UN3/UN4; data-driven client lock-in; future

			option of a high-margin recurring SaaS
Segregation	Ferrous and non-ferrous metals, paper, glass and beverage cartons	National conversion chain (steelworks, paper mills, glass converters)	Fast inventory turn (days); immediate, 100% clean revenue, without complex industrial conversion
Pyrolysis	Pyrolytic oil, syngas and biochar (closed energy loop)	Self-consumption (oil → boiler; gas → turbine; biochar → reactor); surplus electricity sold on the ACL (41,964 MWh/yr on the 600 base; 36,915 MWh/yr in the 750 Scenario)	Energy self-sufficiency; drastic OPEX reduction; carbon credits; zero to landfill
Concrete	Concrete blocks (partition and structural) and interlocking pavers	Local construction and municipalities (public works)	Production cost up to 30% below conventional concrete; regional circular economy (index >92%); sand and aggregate substitution

3.12 Operational and ESG synergy (the “Flywheel Effect”)

TVD’s great differentiator for global funds is that the units do not operate in isolation — they feed one another:

> The organic fraction of residues becomes granular and liquid FERTILIZER (raising agricultural productivity and sequestering carbon in the soil).

> Plastics become FIBER-GRADE POLYMERS (replacing fossil virgin plastic) or ENERGY via pyrolysis.

> Pyrolysis + solar ENERGY powers the plant, reducing OPEX and the fertilizer’s carbon footprint.

> TWIN FARM ensures the fertilizer is applied at maximum efficiency, scientifically validating the yield gain and generating data to sell more carbon credits.

This closed ecosystem guarantees TVD a circular-economy index above 92% — one of the most coveted KPIs of impact funds such as BlackRock, Generation Investment Management and the IFC.

CHAPTER 4: MARKET ANALYSIS, GO-TO-MARKET (GTM) AND REVENUE MODEL

4.1 Detailed Market Analysis

4.1.1 Methodology and exchange rates

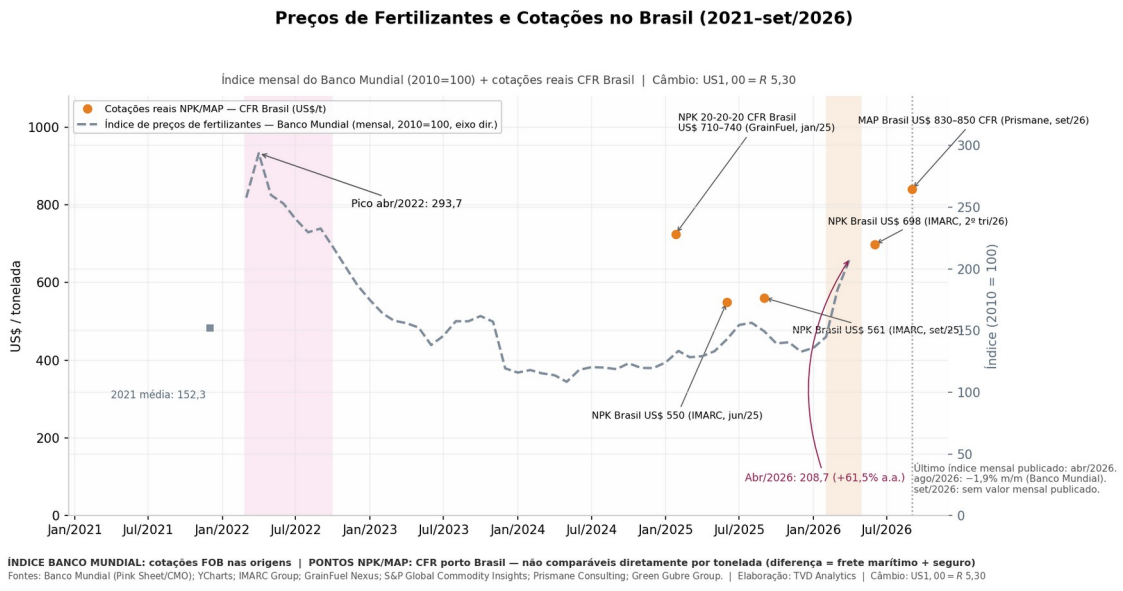
All prices in this chapter are expressed in Brazilian reais (BRL), converted at annual average exchange rates published by the Central Bank of Brazil (BCB), IBGE and IPEADATA. The 2026 projection adopts the TVD Business Plan base rate, aligned with the Focus survey average of BRL 5.30.

4.1.2 CORE BUSINESS: Granular and liquid organomineral fertilizers

4.1.2.1. Fertilizer Price Evolution and NPK Quotations in Brazil (2021–Sep/2026) — sources: World Bank (monthly index) + real Brazil CFR quotations (Argus, OPIS, IMARC)

The Brazilian fertilizer market suffered strong price volatility in the period. Mineral NPK (85% imported) recorded a historic peak in 2022 (US$ 812/t) driven by the Russia–Ukraine war and the hydric crisis, which raised maritime freight and natural-gas prices (urea feedstock). Organominerals, using local organic fractions, showed dampened volatility, with an average premium of 9.6% over blended NPK in nominal terms — but with a cost-per-hectare advantage from the rate reduction (200–280 kg/ha of OM equivalent to 400 kg/ha of NPK).

Table 4.1 – Average Annual Basic NPK Prices (BRL/t)

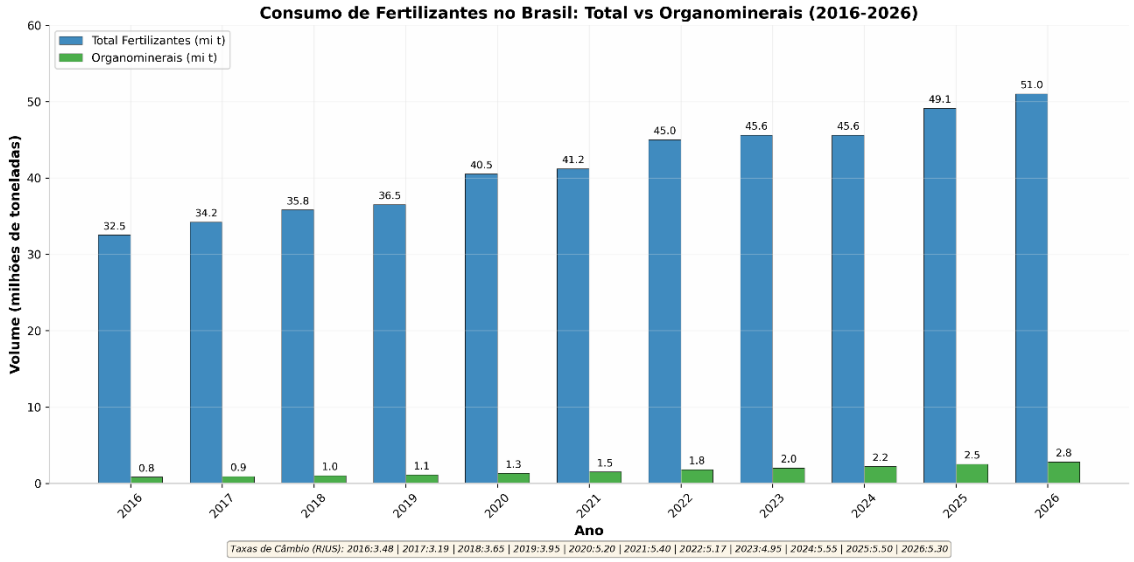


Stage	Calculation	Value (US$/t)	Mark-up (cum.)
Basic NPK 06-14-16 — source costs	Aug/2026: urea US$ 409/t + MAP US$ 865/t + KCl US$ 400/t (Annex 2, Steps 1–2)	US$ 366.57	1.00
NPK blending margin (8.91%)	×1.0891	US$ 399.23 (= BRL 2,115.94/t)	1.09
TVD industrialization margin	×1.5 — granulation, 2–4 mm granulometry, decontamination, per-batch NPK laboratories, IN 63 traceability	US$ 598.85	1.63
Regional productivity premium	×1.096 — 4 drivers (soil 40%, freight 25%, local organic matter 20%, maturity 15%) and proven reduced dose: 280 kg/ha of OM = 400 kg/ha of NPK	US$ 656.34 (= BRL 3,478.60/t)	1.79
TVD PRICE ADOPTED IN THE PLAN (entry offtake)	22% below market — reference cost price (US$ 656.34/t) plus market adjustment of +8% (Sep/2026); unmodeled upside	US$ 708.85/t (BRL 3,756.89/t)	1.78
OM 40/60 market reference to the grower	real market premium of ~+6% over delivered formulated NPK (final NPK to the grower: US$ 796.80–871.20)	~US$ 914/t (BRL 4,844/t)	2.49
Cost per hectare to the grower	OM: 280 kg × BRL 3,756.89/t vs NPK: 400 kg × BRL 4,900/t	BRL 1,052/ha vs BRL 1,960/ha (−46%)	—

4.1.2.2 Volumes consumed in Brazil (2016–2026)

Brazil is the world's fourth-largest fertilizer consumer. Total consumption grew from 32.5 million tonnes in 2016 to 45.6 million tonnes in 2023/2024 (ANDA), jumping to 49.1 million tonnes in 2025. Organominerals, though still a small share (~5.1% of the total in 2025), are growing faster than the market.

Table 4.2 – Consumption Volumes (millions of tonnes)

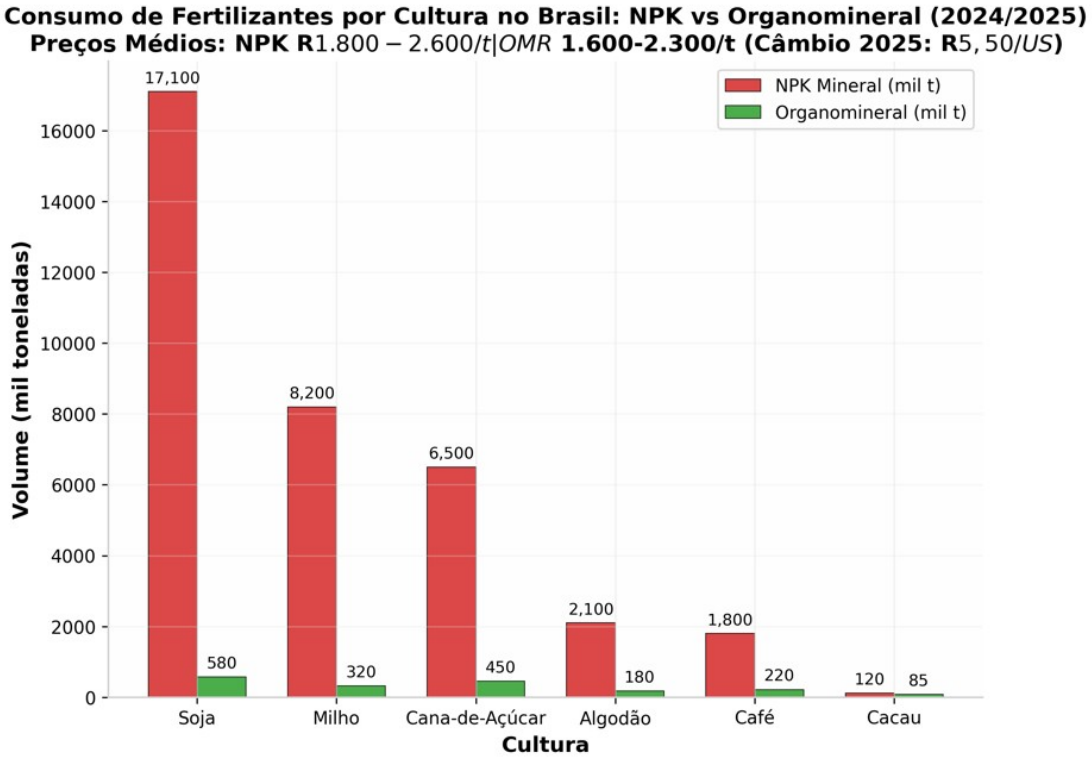


Sources: ANDA (delivery data), ABISOLO, GlobalFert.

4.1.2.3. Consumption by Crop: NPK vs Organomineral (2024/2025)

Soy is the largest absolute NPK consumer (17.1 mn t), while organominerals show proportionally deeper penetration in high-value crops (coffee, cacao, cotton) and sugarcane (reformulation of fertilization).

Table 4.3 – Consumption by Crop (thousand tonnes) and Average Prices



Sources: ANDA, CONAB, Embrapa, sector reports.

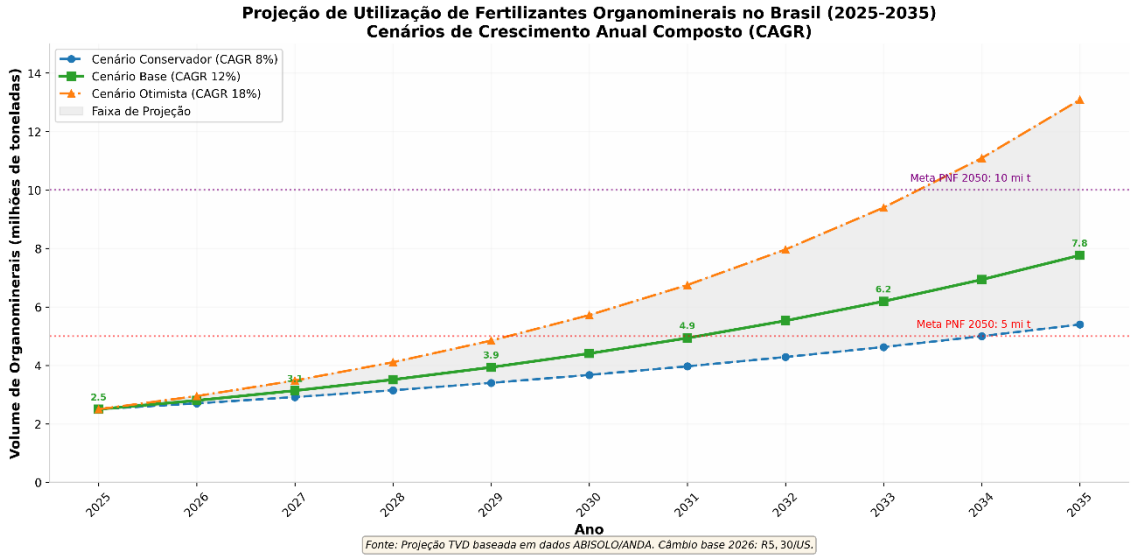
Note: Prices by crop vary with the specific NPK formulation (e.g., soybean 20-20-20, sugarcane 20-00-20).

4.1.2.4 Organomineral utilization projection (2025–2035) and CAGR

The Brazilian organomineral market is expanding rapidly, driven by the National Fertilizer Plan (PNF) 2050, which sets national fertilizer targets, including organominerals, of 5 million tonnes by 2030 and 10 million tonnes by 2050.

TVD projects three scenarios:

Table 4.5 – Organomineral Volume Projection (thousand tonnes)



Source: TVD projection based on ABISOLO/ANDA data. Base FX 2022

4.1.2.5 Competitive analysis and TVD market share

The Brazilian organomineral fertilizer market is structurally fragmented. According to the ABISOLO Yearbook, 872 companies operate nationally in "plant-nutrition technology", of which 388 in organomineral fertilizers, 476 in organic, 718 in speciality minerals and 11 in biofertilizers — with overlap among categories. Geographic concentration is marked: 50.6% of establishments are in the Southeast and 28% in the South, with São Paulo alone accounting for 34.7% of production units.

This fragmentation does not mean absence of scale. The speciality, organic and biological fertilizer segment closed 2025 with revenue of BRL 20.7 billion (US$ 3.9 bn). Within that universe, conventional (base mineral NPK) fertilizers retain absolute dominance at an estimated 88.5% of total market volume, leaving approximately 11.5% for speciality, organic, organomineral and biological fertilizers combined.

Structural features of competition:

1. 1. Diversified NPK multinationals: global mineral-fertilizer majors (Yara, ICL Group, Fertinagro Biotech) have extended portfolios into organomineral lines, leveraging established distribution networks and cooperatives. These players compete on logistics scale and price, not on circular-feedstock technological differentiation.
2. 2. Regional producers with local feedstock: companies such as Geociclo (Uberlândia/MG, industrial hub since 2012, historic capacity up to 100 kt/yr) and Terraplant (Chapecó/SC, developer of the "3-in-1" organomineral based on poultry litter) operate with strong regional ties

and nearby feedstock, but with limitations of national scale and industrial standardization.

3. 3. Industrial units of large diversified groups: Campo Forte Fertilizantes (JBS) represented the largest organomineral unit in Brazilian agribusiness in historic operation, proving that vertical integration (organic feedstock + mineral + distribution) is viable at industrial scale in Brazil.

Methodological Caveat — Absence of an Official Ranking:

Methodological caveat — absence of an official ranking: neither ABISOLO nor ANDA publishes a consolidated ranking of the 388 organomineral companies by revenue or volume. Consultancy reports (6Wresearch, IMARC) cite as key Brazilian players: Yara Brasil, Vittia, AgroCP, ICL Group, Fertinagro Biotech, ILSA Brazil, Vigor Fertilizantes, Embrafós, AMD Agro and Nutrisafra. However, these listings do not discriminate individual market shares nor are audited by a regulator. Any percentage attributed to specific competitors would be an indirect estimate, not a primary datum.

Table 4.6 — Universe of Companies and Geographic Concentration (2025)

Indicator	Value	Source
Active companies (speciality, organic, organomineral, biofert.)	872	ABISOLO Yearbook 2026
Companies with organominerals	388	ABISOLO
Companies with organic fertilizers	476	ABISOLO
Companies with speciality minerals	718	ABISOLO
Southeast region	50.6% of establishments	ABISOLO
São Paulo state	34.7% of	ABISOLO

Indicator	Value	Source
	establishments	
Soy — largest consuming crop	48.6% of sector revenue	ABISOLO

TVD's positioning:

TVD positioning: TVD enters a fragmented market with no absolute national leader in circular-based organominerals. With one standard plant producing approximately 108,625 t/yr of special organomineral and 20,578 t/yr of liquid fertilizer, TVD would reach approximately 3.7% of the Brazilian granular organomineral market (108,625 t over ~2.9 mn t/yr — REV 2, Section 12.2; 4.4% including the 20,578 t of liquids). With the four planned plants, the projected share is ~14.6% (17.4% including liquids) — positioning TVD among the three largest national producers of the segment, not by acquiring competitors but by organic construction of standardized industrial capacity.

Unlike existing players, TVD does not compete merely as a bag supplier. The platform integrates:

- **Input sovereignty** via local feedstock (MSW), shielded from FX volatility and maritime freight;
- **Low-carbon certification** aligned with the EU Taxonomy and the EUDR;
- **Bundled service** (Twin Farm) that reduces the dose applied per hectare and generates *lock-in* contractual.

Unlike existing players, TVD does not compete merely as a bag supplier. The platform integrates: input sovereignty via local residues (shielded from currency and freight volatility); low-carbon certification aligned with the EU Taxonomy and EUDR; and an aggregated service (Twin Farm) that reduces the applied rate per hectare and creates contractual lock-in. In a market where 388 companies fight for share with no single consolidated, audited leader, TVD offers the institutional investor: replicable industrial scale with Tier-1 corporate governance.

Table 4.6.1 Organomineral-Fertilizer Price Formation

Stage	Calculation	Value (US$/t)	Mark-up (cum.)
Basic NPK 06-14-16 — source costs	Aug/2026: urea US$ 409/t + MAP US$ 865/t + KCl US$ 400/t (Annex 2, Steps 1–2)	US$ 366.57	1.00
NPK blending margin (8.91%)	×1.0891	US$ 399.23 (= BRL 2,115.94/t)	1.09
TVD industrialization margin	×1.5 — granulation, 2–4 mm granulometry, decontamination, per-batch NPK laboratories, IN 63 traceability	US$ 598.85	1.63
Regional productivity premium	×1.096 — 4 drivers (soil 40%, freight 25%, local organic matter 20%, maturity 15%) and proven reduced dose: 280 kg/ha of OM = 400 kg/ha of NPK	US$ 656.34 (= BRL 3,478.60/t)	1.79
TVD PRICE ADOPTED IN THE PLAN (entry offtake)	22% below market — reference cost price (US$ 656.34/t) plus market adjustment of +8% (Sep/2026); unmodeled upside	US$ 708.85/t (BRL 3,756.89/t)	1.78
OM 40/60 market reference to the grower	real market premium of ~+6% over delivered formulated NPK (final NPK to the grower: US$ 796.80–871.20)	~US$ 914/t (BRL 4,844/t)	2.49
Cost per hectare to the grower	OM: 280 kg × BRL 3,756.89/t vs NPK: 400 kg × BRL 4,900/t	BRL 1,052/ha vs BRL 1,960/ha (−46%)	—

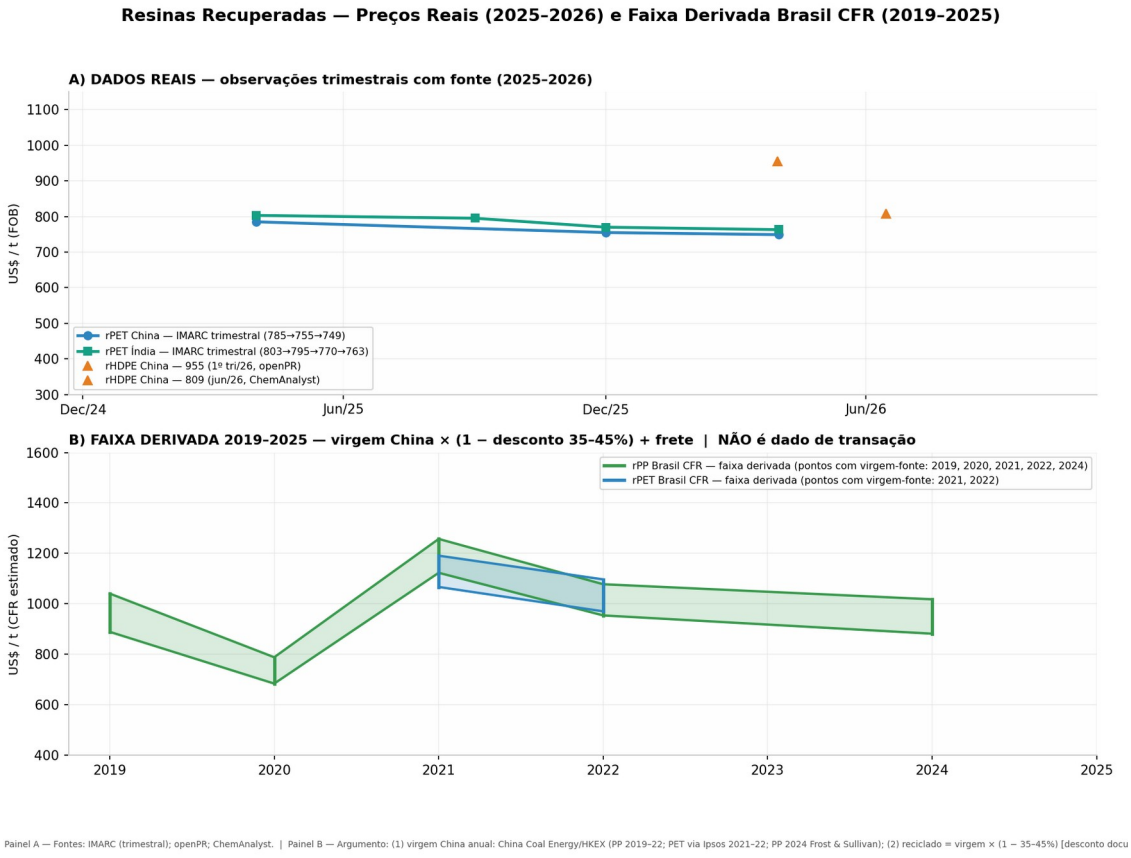
4.1.3 NON-CORE BUSINESS

4.1.3.1 Converted plastic resins (PET, PP, PEAD)

Price Evolution (2019–2025)

Recovered and converted resins trade at a 35–45% discount to virgin resins, with prices linked to international oil quotations and post-consumer flake supply.

Table 4.7 – Recovered Resins: Real China/India Prices (2023–2026) and Derived Brazil CFR Range (2019–2025) — sources: IMARC, Argus, OPIS, openPR, ChemAnalyst; derived range is non-transactional



Sources: Trevo Reciclagem, Monitor Mercantil, Abiplast, market quotations.

4.1.3.2 Electricity — free market (ACL)

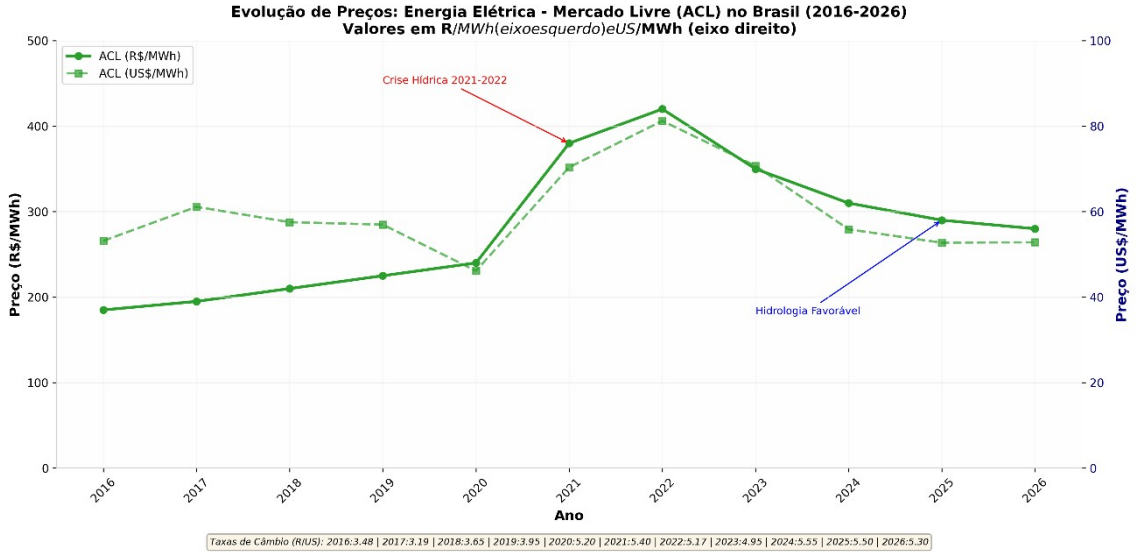
Price Evolution (2016–2026)

Free-market (Free Contracting Environment — ACL) electricity prices are set by the CCEE and reflect hydrology, the marginal operating cost (CMO) and the supply of new renewable plants. The 2021–2022 water crisis pushed contract prices to the regulatory cap (BRL 584.00/MWh). With hydrological normalization and the entry of solar/wind plants, prices fell back to BRL 280–290/MWh in 2025–2026.

The financial plan conservatively adopts the CCEE short-term reference price (BRL 233/MWh — Prices v7.3.8); firm bilateral contracts, typically struck between BRL 280 and 290/MWh, represent unmodeled revenue upside (~+BRL

1.9-2.1 mn/yr per plant on the 36.9 GWh surplus (36,915 MWh × BRL 47-57/MWh spread), if contracted in that range).

Table 4.8 – Average ACL Contract Prices



Sources: CCEE, ANEEL, B3, sector reports.

4.1.4 Strategic synthesis and TVD market opportunity

Produto	Tamanho do Mercado (2025)	Crescimento	Posição TVD (1 unidade)	Posição TVD (4 unidades)
OM Granulado	~2.500 mil t/ano	CAGR 12% (base)	3,8% share	15,2% share
OM Líquido	~180 mi m³/ano	CAGR 15%	Entrada nichada	Líder regional
PET/PP/PEAD Recup.	~1.200 mil t/ano (Brasil)	Estável	3,8% (45.000 t)	15,2% (180.000 t)
Energia ACL	~65 GW médios	Estável	2,1 MW excedente	8,4 MW excedente

Conclusion: TVD operates in markets of significant scale and structural growth. The organomineral segment shows the best expansion profile (CAGR 12–18%), converted resins provide a currency hedge, and ACL energy contracts provide predictable revenue. Competition in the OM segment is fragmented, opening room for TVD to reach a top-3 position with the four operating units.

4.2 GTM Strategy: “Selling Productivity, Not Bags”

4.2.1 Fundamentals of fertilizer pricing in the world market

4.2.1.1. Mineral NPK Price Overview

The Brazilian speciality-fertilizer sector invoiced BRL 20.7 billion in 2025, with 872 active companies, of which 388 produce organominerals. The organomineral segment grew 9% in revenue between 2024 and 2025. Soy consumes 48.6% of these inputs, followed by corn (13.2%) and coffee (9.6%). Minas Gerais leads consumption with 22% of total sector revenue.

4.2.1.2 Organomineral 40/60 cost model

Organomineral pricing starts from the sum of the cost fractions of its components: composted organic fertilizer and mineral NPK fertilizer.

Organomineral pricing departs from the sum of the costs of its component fractions: compost fertilizer and mineral NPK. Traditional composting, using animal and agricultural residues directly, has an average production cost of BRL 190/t in Brazil; market prices range from BRL 80/t FOB (bulk poultry litter) to BRL 800/t FOB (premium compost). The mineral NPK component represents 60% of the formulation. Using as reference NPK at BRL 3,314.89/t (May 2026 average at Brazilian ports):

Component	% in formula	Unit cost (BRL/t) — component
Composting (production cost)	0.4	190
Premium compost (market reference, alternative)	—	800
Mineral NPK (port average reference)	0.6	3,314.89

Base production cost lies between BRL 2,065/t and BRL 2,309/t (0.4 × 190 + 0.6 × 3,314.89 = BRL 2,064.93; and 0.4 × 800 + 0.6 × 3,314.89 = BRL 2,308.93). Against pure NPK inland in Mato Grosso (BRL 4,617.36/t), the base cost represents a 50–55% discount. Even with a 25.5% margin on cost, the price (BRL 2,591–2,898/t) still represents a 37–44% discount to inland NPK. On a purely accounting view, the 40/60 organomineral should trade at a negative

premium (a discount). The positive premium observed in the market is explained by the regional drivers analyzed below.

Harmonization note: the financial plan adopts a conservative selling price of BRL 3,756.89/t, between the reference cost above and the full market price (BRL 4,844/t) — an entry-offtake strategy; pricing upside is not modeled.

TVD PRICE FORMATION: the organomineral selling price is built in three auditable layers:

(1) basic NPK 06-14-16 at BRL 2,115.94/t (derived from August 2026 international quotations — urea US$ 409/t, MAP US$ 865/t, KCl US$ 400/t — with an 8.91% blending margin);

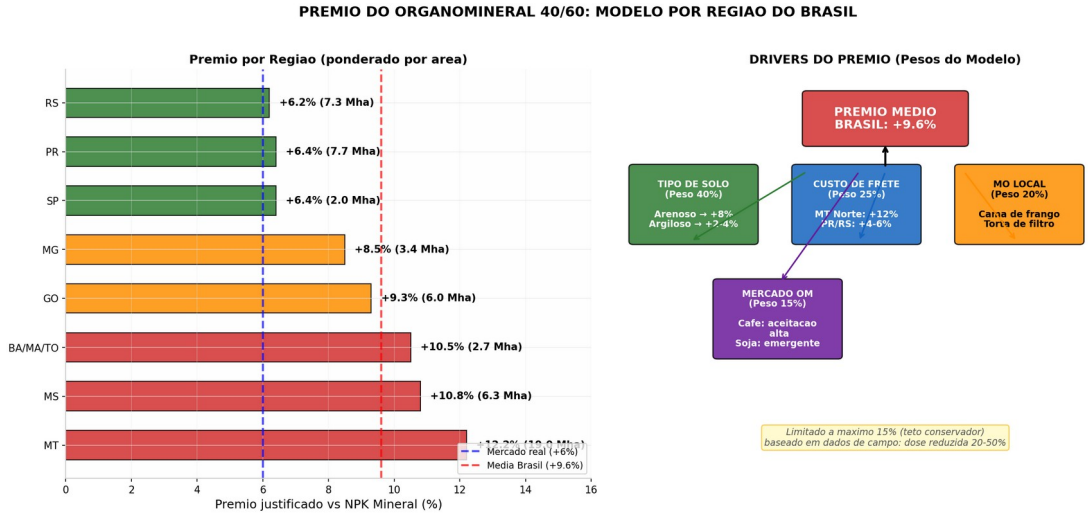
(2) INDUSTRIALIZATION MARGIN (×1.5): granulation, 2–4 mm granulometry control, decontamination, per-batch NPK laboratories and IN 63 traceability — the cost of turning input into a registered, traceable product;

(3) PRODUCTIVITY PREMIUM (+9.6%, ×1.096): justified by the four regional drivers (soil 40%, freight 25%, local organic feedstock 20%, market maturity 15%) and, above all, by the field-proven DOSE REDUCTION: 280 kg/ha of OM replaces 400 kg/ha of mineral NPK.

Result: BRL 3,756.89/t — 22% below the market reference of BRL 4,844/t. For the grower, the final calculation is cost per hectare: BRL 1,052/ha of OM (280 kg × BRL 3,756.89/t) versus BRL 1,960/ha of NPK (Sep/2026 reference; BRL 1,847/ha on the Aug/2026 basis of Annex 2) — a barter ratio of 8.3 bags/ha versus 15.4, a ~46% saving repeated every harvest.

4.2.1.3 The four premium drivers

The premium of organomineral over mineral NPK results from four objective, measurable factors, differentiated by region.



Regional Premium Model

4.2.1.3.1. Driver 1: Soil Type (Weight 40%)

The more fragile the soil, the greater the organomineral's advantage in retaining nutrients that would otherwise be lost. In Mato Grosso, 60% of the 10 million hectares planted with soy are on sandy soils (clay ≤15%). In the Chapadões region (MS/MT), 27.76% of soils have CEC below 4 cmolc/dm³. 14% of samples from the same region show aluminum saturation above 20%.

Organic matter raises the soil's CEC, competes with phosphorus for the adsorption sites of iron and aluminum oxides (reducing P fixation) and retains cations such as K^+, NH_4^+, Ca^{2+} and Mg^{2+} in the root zone (Infoteca-e). This driver's contribution ranges from +2% (eutrophic clay soils of the South) to +8% (sandy soils of Northern MT).

4.2.1.3.2. Driver 2: Freight Cost (Weight 25%)

Mineral NPK is imported through the ports of Paranaguá and Santos and trucked inland. Organomineral can use local organic-matter sources, reducing dependence on transport from the port.

Regional MAP prices objectively confirm this difference: **Mato Grosso** pays **BRL 4,785/t** (US$ 841/t CIF) versus **BRL 4,068/t** (US$ 715–725/t CFR) at the port — a difference of **BRL 717/t (18%)** attributable to freight and resale margin. The variation by state directly reflects the distance from the port:

Estado	MAP (R$/t)	Diferença vs Porto
Porto (CFR)	4.068-4.125	Base
MT	4785	18%
MS	4751	17%
GO	4723	16%
MG	4723	16%
BA	4580	13%

This driver's contribution to the premium ranges from **+4%** (PR and RS — close to the ports) to **+12%** (MT — farthest from the ports).

4.2.1.3.3. Driver 3: Local Organic-Matter Availability (Weight 20%)

The cost of the organic fraction depends on local availability of agro-industrial residues, contributing from +3% (scarce sources) to +8% (abundant sources).

Região	**Fonte Principal de MO**
Norte/NE do MT	Cama de frango (produção avícola regional)
MS / GO	Torta de filtro (produção de açúcar/álcool)
MG	Esterco de leite (produção leiteira)
SP / PR	Diversas (suinocultura, avicultura)

4.2.1.3.4. Driver 4: Market Maturity (Weight 15%)

Organomineral acceptance varies by crop and region. The coffee market in Minas Gerais has been consolidated for decades; the soy market in the Center-West is in accelerating adoption. Contribution ranges from +3% (incipient markets) to +10% (consolidated markets).

4.2.1.4 Weighted average premium

4.2.1.4.1. Results by Region

Combining the four drivers with their respective weights yields the justified premium for each producing region of Brazil.

Região / Esatdo	Área Grãos (Mha)	Peso (%)	Score dos Drivers	Prêmio Justificado
MT	19	35%	8,2	12,2%
MS	6,3	12%	7,2	10,8%
BA/MA/TO	2,7	5%	7	10,5%
GO	6	11%	6,2	9,3%
MG	3,4	6%	5,7	8,5%
SP	2	4%	4,2	6,4%
PR	7,7	14%	4,2	6,4%
RS	7,3	13%	4,2	6,2%
MÉDIA PONDERADA	**54,4**	**100%**	**—**	**9,6%**

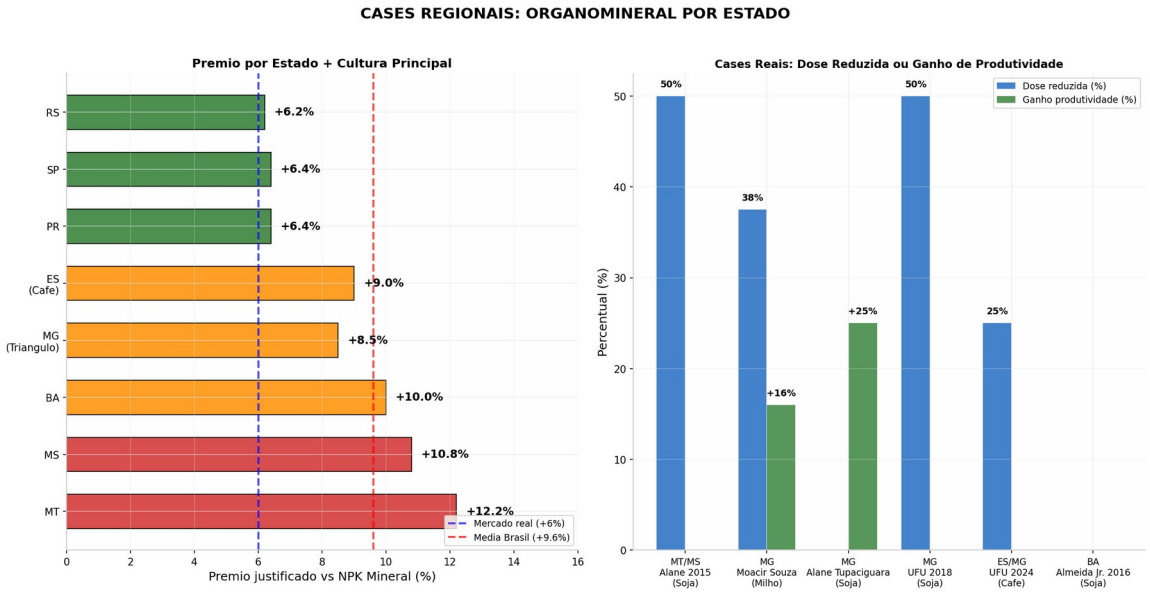
Combining the four drivers with their weights yields the justified premium for each producing region. The weighted average premium for Brazil is +9.6% — above the observed market premium of approximately +6%, indicating the product is under-priced relative to Brazilian agronomic and logistics conditions.

4.2.1.5 Model limits

The driver weights (40/25/20/15) are a technical choice grounded in the principle that soil type is the most determinant factor, but remain judgment-based. The 15% ceiling is a conservative choice based on available field data. Alternative weightings would produce a different result, though likely of the same order of magnitude (8–12%).

4.2.2 Regional cases: pricing logic by state

Below are the specific cases for the four drivers, with market data, confirmed field studies (Level A) and the resulting pricing logic.



Regional Cases by State

4.2.2.1 Northern and central Mato Grosso (soy/corn)

Market data: Mato Grosso is the world's largest soy producer, with ~12 mn ha of soy and 7 mn ha of corn. 60% of the 10 mn ha of soy are on sandy soils (clay ≤15%), with low cation-exchange capacity and high susceptibility to potassium and nitrogen leaching. Granular-fertilizer freight runs BRL 2,500/t, 12% of the product price (Argus Media). Poultry litter is abundantly available as an aviculture by-product at BRL 80/t bulk.

Field study (Level A): Alane (2015) ran a soybean experiment in the Triângulo Mineiro (MG) under comparable Center-West conditions: 200 kg/ha of organomineral 03-15-15 delivered the same yield as 400 kg/ha of mineral 04-20-20 — a 50% rate reduction at equal result.

Real case (MS, border region): Grupo Stefanello's farm in Sidrolândia/MS has used poultry litter on soy for years, achieving 68 bags/ha of soy and 110 bags/ha of corn despite intense dry spells; average use is 4–5 t/ha with re-application every 3–4 years.

Pricing logic: MT presents the strongest premium justification in Brazil: +10% to +12%. The combination of sandy soils (60% of the area), high freight and local availability of poultry litter creates a scenario in which the organomineral solves three problems simultaneously: it retains nutrients that would be leached,

eliminates dependence on transport from the port and uses a cheap local by-product. For the grower the calculation is straightforward:

Cenário	Produto	Dose (kg/ha)	Preço (R/ha)	Economia	
Mineral	NPK	400	4.100	1.640	Base
Organomineral	OM 40/60	200	4.500 (+10%)	900	R$ 740/ha (45%)

Illustrative prices are based on MAP at BRL 4,100/t at the port. Actual formulated NPK prices vary by region and composition.

Even paying 10% more per tonne, the MT grower spends **BRL 740/ha less** because he uses **half the dose** for the same result.

4.2.2.2 Western Bahia (soy/cotton/corn)

Market data: the Bahian Cerrado covers ~6 mn ha, predominantly Latosols and Quartzipsamments — sandy or medium-textured, naturally low fertility and fragile physical structure. Approximately 1.1 mn ha are planted with soy, plus 245,000 ha of cotton and 170,000 ha of corn. Average regional soy yield is 51 bags/ha, with top growers reaching 85. The “lowlands” have P and K deficits, low organic matter and acidity with aluminum saturation.

Field study (Level A): Almeida Júnior et al. (2016) conducted a soybean experiment on sandy-textured Quartzipsamment in the Cerrado biome. The result demonstrated that organomineral fertilization is a viable alternative, delivering increased soybean output.

Another study in “lowland” conditions (Brazilian Journal of Development, 2021) compared organomineral and mineral in soybean. The 511 kg/ha organomineral dose achieved the same productivity as 557 kg/ha of mineral (2,786 kg/ha in both); the organomineral required 9% less product for the same result. The study also observed that the organomineral source showed no maximum dose under the conditions evaluated, suggesting gradual nutrient release, which avoids nutritional excess.

Pricing logic: Bahia justifies a +9% to +11% premium: sandy Quartzipsamment soils, low natural fertility and aluminum toxicity give the organomineral a structural advantage — all OM doses outperformed the mineral standard on Cerrado sands. Organic matter sources can be diversified: cotton, corn and sugarcane residues are abundant in the region.

4.2.2.3 Triângulo Mineiro (soy/corn and coffee)

Market data: the Triângulo Mineiro is Brazil's oldest organomineral industrial hub (Geociclo installed in Uberlândia since 2012; since 2019 the Polo Agromineral Verde hosts a 16,000-ha basalt massif for soil remineralizers). Predominant soil: medium-texture Red Latosol (pH 5.3; 49 mg/dm³ P; 155 mg/dm³ K). The local market consumes 80% of regional organomineral output, 20% exported to SP and GO; Uberlândia capacity has reached 100 kt/yr.

Pricing logic: Minas Gerais justifies a +7% to +10% premium. The state's singularity is a consolidated industrial hub (Geociclo since 2012), lowering organic-fraction logistics costs and end-product competitiveness. Four real cases (two growers, one university experiment, one coffee study) provide a solid empirical base: 37–50% rate reduction at equal or better results. Coffee in southern MG adds another vector: 75% OM dose = best cost-benefit with guaranteed premium cup.

4.2.2.4 Espírito Santo and southern Minas (coffee)

Market data: Espírito Santo and southern Minas form Brazil's principal coffee hub. Coffee is a perennial crop with high fertility demand (especially P and K) over multiple biennial cycles. Organomineral use has been consolidated for more than 20 years in the region. The organomineral delivers ~70 kg of humic and fulvic acids per tonne — equivalent to BRL 25/liter of leonardite sold separately; a typical leonardite application costs BRL 75–125/ha, while the organomineral delivers the same benefit inside the formulation.

Field study (Level A): UFU (2024), across coffee-producing localities over two crop years: the organomineral at 75% dose showed the best cost-benefit ratio among all treatments. Yield did not differ statistically from full-rate mineral, and cup quality was premium in all treatments (except mineral 50% and two OM treatments that fell outside classification). Mean soil phosphorus differed significantly between doses, favouring OM.

Pricing logic: The region justifies a premium of **+8% to +10%**. Coffee, being a perennial crop, accumulates the benefits of organic matter over multiple years — unlike annual crops, where the effect is per harvest. The market has been **consolidated for more than two decades**, which means the grower already knows the product and is willing to pay a moderate premium. The calculation for the coffee grower is:

Cenário	Produto	Dose (kg/ha)	Preço (R/ha)	Resultado	
Mineral	NPK	400	4.100	1.640	Base
Organomineral	OM 40/60	300 (-25%)	4.500 (+10%)	1350	Economia R$ 290/ha

Illustrative prices based on MAP at BRL 4,100/t at the port. Actual formulated NPK prices vary by region, composition and purchasing channel.

Beyond the direct saving, the coffee grower receives ~70 kg of humic acids/t (equivalent value of BRL 25/liter of leonardite) and protection of phosphorus against fixation in acidic soils, with premium beverage quality assured.

4.2.3 Synthesis: the winning argument for the grower

4.2.3.1 The golden rule by state

The market logic can be summarized in one equation per state:

OM 40/60 price = (0.4 × local composting price) + (0.6 × NPK price) + regional premium.

4.2.3.2 The message to the grower

For the grower deciding on next season, the mathematics is simple and field-proven. In the Triângulo Mineiro, a grower monitored by UFU Uberlândia applies 250 kg/ha of OM instead of 400 kg/ha of mineral and harvests 42 t/ha of corn instead of 35 — 16% more with 37% less product. In western Bahia, the organomineral outperformed mineral at every tested dose on Cerrado sands.

The market premium of +6% is not a cost — it is an investment repaid at the first rate reduction. The grower is not buying organic matter; he is buying the ability to use 30–50% less product for the same result, which on any cost-per-hectare calculator translates into real, immediate savings.

THE CENTRAL MESSAGE IN ONE SENTENCE: with the TVD organomineral, the grower buys less fertilizer, pays less per hectare (BRL 974 vs BRL 1,960) and still improves the asset that sustains his business — the soil — every season. Productivity, savings and regeneration in the same product: that is why the premium is justified, and why the entry rate is 30% lower from the very first year.

Thus TVD will not compete on commodity price; it will compete on agronomic value and risk reduction. The GTM is structured on three pillars:

4.3.1 Agricultural fairs and field days

- • Major fairs: Agrishow (Ribeirão Preto), Showtec (Uberaba), Bahia Farm Show, Tecnoshow Comigo. TVD will not merely exhibit; it will run live data centers, streaming Twin Farm data from partner farms on a video wall in real time.
- • Field days: held monthly at pilot farms. The grower sees with his own eyes the differences in rooting, moisture retention and yield between the NPK-only strip and the TVD strip.

Estado	Prêmio Justificado	Case Principal
MT	+10% a +12%	Dose 50% = mesmo resultado (Revista Campo & Negócios)
MS	+9% a +11%	68 sc/ha soja com cama de frango (Source)
BA	+9% a +11%	OM superior em solo arenoso (Research, Society and Development)
MG	+7% a +10%	250 kg OM = 400 kg mineral (milho) (GlobalFert)
ES	+8% a +10%	OM 75% dose = melhor CB (café) (ufu.br)
SP / PR / RS	+4% a +7%	Solos argilosos, frete baixo
Brasil	9,60%	Média ponderada

4.3.2 Field technical assistance (consultative sales force)

- **• Technical corps: the technical teams of UN3/UN4/UN8 (29 seller-agronomists, Cap. 7.1, complemented by the UN8 field team), allocated regionally. They are not sellers; they are consultants who design the farm's nutritional plan.**
- • Shared-success model: on strategic farms, part of the agronomist's remuneration and the fertilizer discount is tied to the productivity gain proven at harvest and weighbridge.

4.3.3 Institutional partnerships and cooperativism

- • Research institutes: formal partnerships with Embrapa (Soils and Agroenergy; low-carbon program), IAC (Campinas), Epamig (MG), Ceplac (cacao/BA) and IMAmt (cotton), in which TVD acts as funder of long-duration trials on TVD products and achieved productivity, and of the diffusion of scientific studies; and as stimulator of startups building solutions on TVD products and services.
- • Cooperatives and unions: agreements with FAEMG, FAESP, OCB and regional cooperatives (Coamo, Cocamar, C.Vale, Cooxupé), under which TVD enters the cooperative portfolio as the “sustainable high-efficiency line”, riding the cooperative’s logistics for the last mile.

4.4 Detailed Revenue Model (multiple layers)

TVD operates a hybrid revenue model, guaranteeing cash-flow resilience:

4.4.1 Industrial products (B2B — 96.2% of revenue)

Granular fertilizer (108,625 t/yr) — sold via offtakes to traders and cooperatives at the organomineral entry price of BRL 3,756.89/t (22% below market), a volume-acceleration strategy for the commodity line; premium liquid fertilizer (20,578 t/yr) — marketed at specialty reference prices (adopted price BRL 6,615/t against the documented BRL 6,000–7,000/t band), on productivity evidence from the Twin Farm program and named cooperative LOIs; pre-selling premium liquids at deep discounts would be commercially irrational — a specialty product is not a commodity — and is not part of the plan;

Fiber-grade converted polymers (26,527 t/yr) — sold to third-party converters of big bags, raffia bags and bottles (FX hedge linked to the dollar);

Concrete artifacts, aggregate and dry recyclables (scrap, metals, glass) — regional sale.

4.4.2 Energy and derivatives (2.3% of revenue)

Surplus electricity (solar + pyrolysis; 36,915 MWh/yr in the 750 Scenario) sold on the ACL; pyrolytic oil and biochar dedicated to closing the plant’s own energy loop (boiler and reactor), not sold to market — energy that buys no fossil input.

Pyrolytic oil and biochar destined to close the plant's own energy loop (boiler and reactor), not to the market — energy that buys no fossil input.

4.4.3 Precision-agriculture and Twin Farm services (1.5% of revenue)

Annual farm subscription (aerial mapping BRL 17/ha, soil analysis BRL 26/sample, IoT monitoring BRL 700/month, agronomic consulting BRL 1,800/month).

Correct framing: initially, Twin Farm is not a revenue unit — it is the technical-marketing and field-intelligence center: the fertilizer sales engine (scientifically validated reduced dose, prescription maps) and the client lock-in layer. Its operation (OPEX BRL 10.8 mn/yr) is fully assumed as technical marketing cost of UN3/UN4 — own revenue is NOT booked in the 750-scenario underwriting base (unit EBITDA: −BRL 10.8 mn/yr in the model), assumed as the technical-marketing cost of UN3 and UN4. In the future it may become a high-margin recurring-revenue unit — an option, not a promise.

Coherence note: the actual distribution of steady-state revenue (BRL 780.8 mn/yr — Annex 2 price table) is: granular and liquid fertilizers 69.7% (BRL 544.2 mn); resins 21.1% (BRL 164.6 mn); secondary raw materials and construction 4.3% (BRL 33.2 mn); energy 1.1% (BRL 8.6 mn); excess compost 1.8% (BRL 13.8 mn); CBIOs 1.0% (BRL 7.5 mn) and trade-finance gain 1.1% (BRL 8.9 mn).

Commercial trade-finance gain: 30% of sales cash-on-delivery and 70% financed over 210 days (crop cycle) at 9% nominal p.a. indexed to SOFR — a deliberately competitive rate for agribusiness and cooperatives (local market: CDI + 3 to 6 p.p.) — via an international facility funded at SOFR + 3.5%. TVD's net gain is BRL 8.9 mn/yr in the model (spread on the effectively financed volume of the commercial pipeline plus structuring fee; detail in the data room); the 9% interest paid by the client remunerates the funder, not TVD.

In the definitive 750 t/day scenario — Phase 2 incorporated exactly once (UN4 specialty mix) and 8-year amortization (Y5-Y12, KD 8.63% = SOFR 3.63% + 5.00%) — the plan, with explicit revenue and OPEX lines per unit (section 7.7.5), delivers: revenue BRL 780.8 mn/yr, OPEX BRL 476.6 mn/yr (Annex 5 §5.3: BRL 493.2 mn gross − BRL 16.6 mn automation/efficiency credit), EBITDA BRL 337.5 mn/yr (43.2% margin, including the margin levers of BRL 33.3 mn — section 7.7.4, booked exactly once), project IRR 20.2% p.a. real, equity IRR ≈20.7% p.a. (KD 8.63%), calculated DSCR minimum 1.22x (Y6; series Y5-Y12: 1.23/1.22/1.26/1.30/1.35/1.40/1.46/48.7), debt repaid on CALCULATED Y12 (contractual ceiling reached by the sweep). Debt capacity at 1.20 CALCULATED: ≈BRL 1,100 mn — ABOVE the BRL 1,084.7 mn contracted: and the project IRR (20.2%) sits well above the 10% WACC (positive NPV).

CHAPTER 5: OPERATIONS AND INFRASTRUCTURE

This chapter details the operational architecture, physical infrastructure design and management processes of the model TVD unit — conceived as the largest and most technologically advanced installation producing granular and liquid

organomineral fertilizers from the organic fraction of municipal solid waste in Latin America. Designed under the principles of the circular economy, Industry 4.0 and socio-environmental sustainability, the unit integrates mechanical, thermal and chemical processes. Beyond fertilizers, it produces industrial outputs such as fiber-grade polymer resins, electricity, biochar and concrete artifacts for civil infrastructure, among others.

5.1 Macrolocation and complex dimensioning

The TVD industrial complex occupies a total area of 200,000 m² (20 hectares), strategically dimensioned to house ten integrated business units, logistics and administrative support areas, employee-wellbeing facilities and reserves for future expansion. The configuration adopts a “modular site” concept, allowing standardized replication at new locations with minimal adaptation.

Table 5.1 – Physical Sizing of the TVD Complex

Item	Dimension	Notes
Total land area	200,000 m²	Flat terrain, road and rail access
Built area (halls)	47,000 m²	Incl. 4,000 m² final curing (CAPEX v7.3.9)
Administrative and social area	4,500 m²	Operations HQ, changing rooms, cafeteria, infirmary
Storage yard and paving	15,000 m²	Interlocked pavement, storm drainage
Green and offset area	8,500 m²	Riparian forest, rain gardens, permeability
Reserve/expansion area	2,000 m²	Provision for a fifth processing line

Flat topography (slope < 2%) minimizes earthworks cost and favors gravity drainage. The industrial floor is designed for 150 kPa bearing capacity, compatible with the foundations of industrial equipment (shredders, extruders, pyrolysis reactors and granulation presses).

5.2 Industrial architecture and construction specifications

The 47,000 m² of built area (halls, incl. 4,000 m² final curing) were designed per NBR 8800:2008 (steel and composite structures) and NBR 6118:2014 (concrete structures), with the following technical specifications:

Industrial floor: high-strength concrete (fck ≥ 35 MPa) with 3 mm self-levelling epoxy finish, RAL 7035 grey, chemically resistant to organic acids and solvents. Includes polyurethane expansion joints and a copper-mesh earthing system.

Channels and drains: AISI 304 stainless steel, 200 × 150 mm trapezoidal section, minimum 1% slope, connected to an industrial effluent-treatment plant (ETEI) with 120 m³/day capacity.

Roofing: galvanized-steel acoustic-thermal tiles with injected polyurethane (40 mm), U ≤ 0.35 W/m²K, zenithal polycarbonate skylights (65% light transmission).

Closures: aluminum-polyurethane sandwich panels on east and west facades (insolation); flexible PVC curtains at internal access; fast automatic doors in dust-control zones.

Ventilation and exhaust: induced mechanical ventilation (12 air changes/hour in critical zones), activated-carbon filters for odor adsorption and biofilters for process gases.

Internal signage follows ISO 7010, with floor demarcation by risk zone: red (flammables), yellow (attention — mobile equipment), blue (mandatory — PPE), green (emergency — exits and infirmary) and orange (restriction — high-voltage areas).

5.3 Operational layout by process zones

The layout was optimized by computational simulation (FactoryFLOW® software) to minimize internal material transport and eliminate crossings between finished-product and feedstock flows. The 47,000 m² built area is distributed across five main operational zones:



Production and Processing Zones

Zona / Unidade	Descrição e Equipamentos Principais
Recepção de RSU	Entrada de matéria-prima (600 t/dia). Inclui 2 balanças rodoviárias automatizadas (80t) integradas ao ERP.
Fertilizante Granulado	Galpão climatizado (8.500 m²) com piso epóxi e canaletas inox. Processo de compostagem acelerada em leiras com Revolvedor, mistura com NPK, granulação, secagem e paletização robótica.
Fertilizante Líquido	Galpão de membranas e tanques inox 316L. Processo de prensagem da fração orgânica seguido de microfiltração, ultrafiltração, osmose reversa e diálise (sistema chinês duplicado).
Separação Óptica	Galpão de separação (6.000 m²). Separação automatizada da fração seca via sensores NIR, X-Ray, XRF e câmeras inteligentes com IA.
Polímeros Transformados	Galpão de lavagem e extrusão. Linhas de lavagem em 3 etapas (SEIBT) e extrusoras de nível fibra para produção de resinas transformadas (PET, PP, PEAD) grau fibra.
Pirólise e Concreto	Galpão isolado com piso refratário para reatores (conversão de plásticos não transformáveis em gás, óleo e carvão). Galpão adjacente para trituração de inertes e prensagem de blocos e pisos de concreto.

Support, Infrastructure and ESG Zones

Zona / Unidade	Descrição e Equipamentos Principais
Administração	Edifício administrativo, salas de reunião, Video Wall 4K e infraestrutura corporativa.
Apoio aos Colaboradores	Vestiários inclusivos (LGBTQI+), refeitórios com nutricionista, lavanderia industrial (troca diária de EPIs), enfermaria e rampas PCD.
MRO e Utilidades	Galpão de Manutenção, Reparo e Operações (Oficinas elétrica, hidráulica e vapor), almoxarifado, subestação 8 MVA e ETE (Estação de Tratamento de Efluentes de 500 m³/dia).
Automação e Energia	Telhados com 5 MWp de painéis solares, 4 robôs humanoides, 8 cães robôs e mais de 200 câmeras inteligentes (facial e térmico) alimentando o Twin Digital.
Garagem / Frota	Área de estacionamento e manutenção para a frota de transporte fretado dos colaboradores (15 ônibus e vans).

Internal circulation is carried out by electric forklifts and a modular belt-conveyor system, totaling 1,200 m in length. The average internal transport distance between zones is 85 m, resulting in an average cycle time of 4.2 minutes per tonne moved.

This is the complete distribution of the operational and support areas that make up the 200,000 m² plant (20 hectares, with 47,000 m² built, incl. 4,000 m² of final curing) described in the TVD strategic plan.

Technology and Agricultural-Support Zones

Zona / Unidade	Descrição e Equipamentos Principais
Agricultura de Precisão (Twin Farm)	Operação SaaS com sensores IoT, drones multiespectrais e sensores gamma ray e modelagem por IA para mapas de aplicação em taxa variável. Inclui o Trailer Lab para o período pré-operacional.

5.4 Operational organization and workforce

The TVD unit is operated by a total team of 941 employees (base headcount of 933 + 8 additional posts of the 750 scenario — Annex 5, section 5.4) on three 8-hour shifts (06h–14h, 14h–22h, 22h–06h), on a 5×2 roster (40-hour week, per PEC 27/05/2026). The hierarchical structure adopts a Lean Management model with autonomous production cells and floor-level leadership.

The 933-employee establishment serves the 40-hour week, 5×2 roster (PEC 27/05/2026), with headcount dimensioned by the 365/261 factor — continuous 365-day/yr operation with staggered vacations, ensuring continuous operational coverage without individual overload.

5.5 Automation, robotics and Industry 4.0

The TVD unit incorporates state-of-the-art industrial automation and robotics, positioning it as a Latin American Industry 4.0 reference in the fertilizer and industrial-inputs sector. Technology investments aim to raise productivity, reduce worker exposure to occupational risks and guarantee full process traceability.

Quadruped inspection robots: Unitree B2 units (4 per plant) for light-parts transport (≤ 15 kg), corridor inspection and sample collection in moderate-risk zones. Integration with the warehouse-management system (WMS) and autonomous SLAM navigation.

Thermal cameras and facial recognition: 220 IP cameras (AI CCTV — CAPEX v7.3.9) (Hikvision/Hanwha) with AI video analytics: intrusion detection, facial-recognition access control (± 0.3% FRR), PPE reading and thermography for electrical-overload detection.

Digital twin and virtual Gemba walk: 3D BIM digital modeling of the entire plant, updated in real time via IoT sensors (network integrated with DCS/SCADA/MES and the IoT digital twin). Enables scenario simulation, failure prediction and immersive VR operator training.

AGVs and autonomous mobile robots: 3 AGVs/AMRs (6-month pilot, conditional expansion) for pallet transport of fertilizers and resins between production and warehouse zones. Speed 1.5 m/s, 1,200 kg capacity, induction auto-charging.

Integrated SCADA: Wonderware System Platform 2023, with real-time dashboards of OEE, energy consumption, atmospheric emissions and product quality. Predictive alerts via machine learning.

5.6 Support infrastructure and wellbeing

TVD adopts an advanced corporate-social-responsibility policy, recognizing that industrial productivity correlates directly with quality of life at work. Support infrastructure is designed for 933 simultaneous employees, including night shifts.

LGBTQI+ changing rooms and sanitary facilities: unisex and individual cubicles (42), plus traditional male and female changing rooms. Accessible toilets (NBR 9050) and lactation rooms. Antimicrobial epoxy paint and cross natural ventilation.
Industrial cafeteria: capacity for ~220 people per shift (647 meals/day — OPEX v7.3.9, 365 days). Industrial kitchen with natural-gas supply, 40 m³ cold rooms, automated tray-washing. Dietitian-supervised balanced menu.
Industrial laundry: IPSO equipment (Alliance Laundry Systems): 4 washer-extractors (35 kg), 4 rotary dryers and 1 industrial ironer. Processing 1,200 kg/day of uniforms and textile PPE.

Infirmary and occupational-health post: clinic with 2 consultation rooms, 1 minor-surgery room, 1 stabilization room and 1 type-II ambulance (mobile ICU). Team: 2 occupational nurses, 1 occupational physician (24h on-call) and 3 nursing technicians.
Gym and leisure space: 450 m² with weight equipment, yoga/meditation room, changing rooms with dry sauna and an outdoor area with tables, barbecue and community garden.
Training and development center: 5 classrooms (40 seats each), 1 basic-chemistry laboratory, 1 forklift-operation simulator and 1 virtual-reality space for emergency training.

All support infrastructure is air-conditioned by split inverter systems (A+++ efficiency), with LED lighting (600 lux in reading areas, 300 lux in corridors) and water supplied by an artesian well with reverse-osmosis treatment, reducing dependence on the public grid by 65%.

5.6.1 The TVD Corporate University — the 'Crotonville' of the circular industry

Concept: in the GE Crotonville model, the corporate university is not an HR cost — it is the leadership factory and the mechanism by which tacit operating knowledge becomes a replicable competitive advantage. TVD adapts the model with an asset GE did not have: the INDUSTRIAL DIGITAL TWIN — the campus is the virtual factory itself. Every employee learns, errs and is assessed in the digital realm before touching the real machine: zero training accidents, zero production stoppages for learning.

The three Crotonville principles, adapted: (1) TEACHING IS A CAREER REQUIREMENT — no manager is promoted without having formed his or her successor, with two-name succession coverage per key position (continuity governance); (2) REAL PROBLEMS ARE THE CURRICULUM — each cohort attacks a real plant challenge (OEE, quality, safety, energy consumption) and delivers, as its final project, an improvement implemented in production; (3) IMMERSION BEFORE THE MACHINE — every operational certification is first earned in the digital twin and VR simulator, with release to the shop floor only after virtual approval.

The infrastructure is already paid for — the virtual campus is the 3D BIM digital twin and the VR simulators already in CAPEX; the digital classroom runs on an LMS over the existing corporate cloud (marginal cost ~BRL 40 k/yr); devices (tablets and notebooks) are already provisioned per unit; and the faculty is internal: the partners and managers who designed and operated the largest organomineral plant in Brazil (Campo Forte/JBS),

European industrial operations, commodity logistics and technology — the cost is agenda, not payroll.

AI as each employee's personal tutor: an internal language-model assistant, fed by manuals, SOPs and twin history, on every professional's tablet — the field question is answered in seconds; the learning path is personalized by role and by competence gaps measured in the twin; and the interaction history becomes a transferable map of plant knowledge for plants 2–4 from day one.

Engagement mechanics — learning has visible rewards: (a) CERTIFICATION TRAILS L1→L4 (operator → specialist → master → instructor), each level with a real pay rise — learning pays; (b) 'LIGA TVD' — internal championship of OEE, quality and safety by shift and unit, becoming a national internal league among ES, BA, MG and TO when the four plants operate; (c) weekly DIGITAL GEMBA — the continuous-improvement meeting happens inside the twin, on the virtual shop floor; (d) 'FROM THE FLOOR TO THE OFFICE' — L3+ operators are sponsored through technician and engineering degrees in partnership with the ecosystem universities (UFES, UFU, UFT, UNEB), funded by the university itself; (e) CROSS-CIRCULAR TEACHING — each unit teaches the others (segregation teaches what feeds the fertilizer; pyrolysis teaches energy; the laboratory teaches quality): the plant's integrated format becomes the school's format, and no one is a single point of failure.

Seat and coordination: the TVD Corporate University is coordinated by UN9 (Corporate), with faculty distributed across the ten units — each unit is also a school. Cost: ~BRL 0.5 mn/yr — fully absorbed by UN9's existing corporate reserve; zero CAPEX (twin and VR already installed). The university is audited by what the plant produces: certification coverage ≥90%; internal promotion ≥60%; turnover <8% p.a.; AFR <2.5 (SDG 8 target); eNPS ≥+45; two successors per key position; OEE ≥85% (existing operational target). The cost of NOT running it is the opposite of each of those numbers: turnover, accidents and critical dependence on a few specialists — the silent risk of every process plant. For plants 2–4, the university is the multiplier: the human playbook travels with the digital one.

5.7 Asset security and cybersecurity

Protection of the industrial complex is managed by an Integrated Control Center (ICC) operated 24/7, with the following layers:

Physical perimeter: 2.4 m wall with double concertina, 48 perimeter cameras with video analytics (intrusion detection, abandoned object), 12 illuminated watchtowers and 4 armoured guardhouses with biometric + MIFARE-card access control.
Mobile patrol: 18 armed guards (federal-authorization), 3 4×4 vehicles and 2 sniffer dogs (drug and explosive detection). Randomized patrol routing by algorithm.
OT/IT cybersecurity: segmented network architecture (Purdue Model Level 3.5), industrial firewall (Claroty/Dragos), AI anomaly detection and daily off-site backup (3-2-1). Compliance with the NIST Cybersecurity Framework and ISO/IEC 27001.
Industrial insurance: global policy (limit to be defined; OPEX v7.3.9 budgets a premium of 0.35% of CAPEX ≈ BRL 3.7 mn/yr) (Allianz/Global Corporate & Specialty), covering: a) material damage (EQ + named perils); b) environmental civil liability; c) product civil liability; d) business-interruption loss (12 months); e) cyber insurance (BRL 15 mn).

5.8 Utilities and supply

The complex has partial energy autonomy and redundant supply systems:

Table 5.3 – Utilities and Inputs Balance

Utility / input	Demand	Source / supply	Autonomy
Electricity	12.7 MW installed (7.7 MWe pyrolysis + 5.0 MWp solar)	Pyrolysis (syngas) + solar — 70,872 MWh/yr	Internal consumption per KPI 132 kWh/t (28,908 MWh/yr on the 219,000 t base); surplus to the ACL: 41,964 MWh/yr (base) / 36,915 MWh/yr (750 Scenario)
Industrial water	450 m³/day	Artesian wells (2 wells, 80 m) + reuse of treated effluents	KPI ≤132 kWh/t consumption; surplus sold to the ACL
Potable water	85 m³/day	Artesian well + treatment (filtration + UV + chlorination)	100% autonomous
Natural gas	1,200 m³/day	Local distribution grid	Grid (no reserve)

Compressed air	2,400 Nm³/h @ 7 bar	Oil-free scroll compressors (3 × 100%)	N+1 redundancy
Saturated steam	25 t/h (heat-recovery boiler — CAPEX v7.3.9)	Dongfang 25 t/h heat-recovery boiler + gas standby boiler	100% redundancy

Own electricity generation (12.7 MW installed — 7.7 MWe syngas from pyrolysis + 5.0 MWp solar) uses a 5.5 MWe gas turbine fed by pyrolysis syngas, a 2.2 MWe back-pressure steam turbine (process-heat recovery) and 5.0 MWp of rooftop photovoltaic generation across the plant buildings (the São Paulo corporate office excluded) — equipment per CAPEX v7.3.9 (UN6) — with controlled NOx emissions (≤ 100 mg/Nm³), continuous monitoring (CEMS) and solar energy. Any surplus is sold on the free electricity market (ACL) per ANEEL Resolution 1,000/2021.

ROOF AREA VERIFICATION (SCENARIO 750) — (a) SOLAR: 5.0 MWp requires ~25,000 m² of modules (~200 Wp/m², current modules); industrial shed roof area totals 43,000 m² (47,000 m² including final curing), i.e. the solar park occupies ~58% of the industrial roof — feasible, with headroom and without competing with covered operational area (the 15,000 m² yards absorb external logistics); (b) COMPOSTING (UN2): the 8,000 m² shed (34 windrows) was sized on the 600 base (300 t/day of organics) — under the 750 scenario the load is 375 t/day (50% of 750) and peak in-process mass is 13,125 t (375 t/day × 35-day cycle); at ~0.65 t/m³ bulk density in 2.5 m windrows the shed volumetric capacity is ~13,000 t — which is why CAPEX already includes windrow expansion to 9,000 m² (+1,000 m²) and the curing/buffer yard of 6,000-9,000 m² ('Windrow expansion' CAPEX line), keeping the process closed in the 750 scenario with no area bottleneck.

5.9 Effluent and industrial by-product management

The unit operates under a “zero liquid discharge” (ZLD) concept for industrial effluents and “zero external discarding” for internally generated residues. The environmental-management system is ISO 14001:2015-certified and audited annually by a third party.

ETEI — industrial effluent-treatment plant: physicochemical treatment (coagulation/flocculation with PAC and cationic polymer), dissolved-air flotation (DAF),

sand + activated-carbon filtration, reverse osmosis (75% recovery) and salt crystallization. Capacity: 120 m³/day.
ETES — sanitary-sewage treatment plant: UASB anaerobic biodigester (180 m³), maturation pond with macrophytes (Typha domingensis) and final routing by green-area irrigation (NBR 13969).
Hazardous by-products (temporary storage): temporary-storage room (SAT) with impermeable floor, exhaust ventilation and segregation by risk class (IBAMA Instruction No. 13/2012). Estimated generation: 4.2 t/yr (lamps, batteries, solvents, chemical residues). Routing: co-processing in cement kilns (InterCement/Votorantim).
Internal by-product composting: canteen leftovers and prunings (18 t/month) in static windrows with mechanical aeration, producing 6 t/month of Class-A compost for the community garden and landscaping.

5.10 Implementation and commissioning schedule

Construction and start-up of the TVD unit follow a critical 24-month schedule in six phases, with controlled (fast-track) overlap between civil works and electromechanical assembly.

Table 5.4 – Summary Implementation Schedule

Phase	Description	Duration	Key Milestone
Phase 1	Environmental licensing, executive designs and approvals	Months 1–6	LI issued and design approved
Phase 2	Earthworks, foundations and basic infrastructure	Months 4–10	Civil works 80% complete
Phase 3	Structural erection, closings and utilities	Months 8–14	Halls closed; water and power available
Phase 4	Electromechanical assembly and equipment installation	Months 12–18	Equipment installed and aligned
Phase 5	Cold and hot commissioning and start-up	Months 17–22	Performance tests ≥ 90% of capacity
Phase 6	Assisted	Months 22–24	COP (Certificate

	operation and ramp-up to 100%		of Permanent Operation)

During Phase 5, a team of 12 engineers and technicians sent by the equipment suppliers remains on continuous technical supervision for 75 days (15 weeks), ensuring technology transfer, process-parameter calibration and equipment-performance certification. Associated costs (flights, lodging, per-diems and insurance) are budgeted at BRL 5.0 mn (US$ 0.94 mn) in CAPEX — supplier technical supervision, 75 days (Annex 3, item 13.1).

5.11 Key operational performance indicators (KPIs)

TVD operational management runs on a KPI system aligned with sector best practice (benchmark: global environmental-services majors), with quarterly targets reviewed at strategic review meetings:

Table 5.5 – Operational KPIs and Year-3 Targets (Full Operation)

KPI	Formula	Year-3 target	Frequency	Responsible
OEE — overall equipment effectiveness	(productive time × speed × quality) / available time	≥ 85%	Daily	Production manager
Mechanical availability	available time / (available + downtime)	≥ 94%	Weekly	Maintenance manager
Unvalorized fraction	unvalorized mass / total mass	≤ 8%	Daily	Segregation manager
Specific energy consumption	kWh / tonne processed	≤ 132 kWh/t	Monthly	Energy engineer
Accident frequency rate (AFR)	accidents × 1,000,000 / hours worked	≤ 2.5	Monthly	HSE Manager
Environmental compliance	non-conformities / audits	100%	Quarterly	Environmental manager
Employee satisfaction	promoters −	≥ +45	Half-yearly	HR manager

(eNPS)	detractors			
OTIF — on-time-in-full deliveries	on-time-and-quantity deliveries / total deliveries	≥ 96%	Monthly	Logistics manager

5.12 Sustainability and certifications

Infrastructure and operations were designed to obtain the following certifications and sustainability seals, reinforcing credibility with investors, clients and regulators:

ISO 9001:2015 – Quality Management Systems (scope: design, manufacture and commercialization of organomineral fertilizers and converted resins).
ISO 14001:2015 – Environmental Management Systems (scope: environmental management of the industrial operation, emissions control and water efficiency).
ISO 45001:2018 – Occupational Health and Safety Management Systems (scope: industrial operation with MSW, chemicals and high temperature).
B3 ESG Seal (Level 5 – Excellence) — per B3's methodology for listed or publicly held companies.

Carbon Neutral certification — offsetting 100% of operational emissions (Scopes 1 and 2) via forestry carbon credits (VCS/REDD+) and renewable-energy generation.
Selo Orgânico Brasil (MAPA organic seal) — for the organomineral-fertilizer line destined for organic agriculture.

The TVD infrastructure represents a new paradigm in the production of granular and liquid organomineral fertilizers from the organic fraction of municipal solid waste in Latin America: an industrial installation combining operational efficiency, cutting-edge technology, socio-environmental responsibility and rigorous corporate governance. With 20 hectares of land, 47,000 m² built, 941 employees (base headcount of 933 + 8 additional posts of the 750 scenario — Annex 5, section 5.4) on a 5×2 roster and an automation ecosystem including humanoid robots, AI thermal cameras and digital twins, the unit is positioned to convert 750 t/day of residues into high-value-added products and clean energy while maintaining the highest standards of safety, inclusion and wellbeing.

CHAPTER 6: GOVERNANCE, MANAGEMENT AND LEADERSHIP SUCCESSION PLANNING

Nine Founders, One Purpose: Building the Regenerative Industrial Platform

TVD was not born from a business plan drawn on a venture-capital table. It was born of an improbable — and at the same time inevitable — encounter among nine professionals who, for years, built extraordinary careers without knowing that one day their paths would cross to form something greater than the sum of its parts.

Eight years ago, a group of entrepreneurs, executives and independent professionals — each successful in their field, each still professionally active, each independent of the others — began meeting. There was no formal contract. No deadline. No investor pressing for returns. There was only a question that troubled each in his or her own way: how to ensure that the soils feeding our children and grandchildren are still productive fifty years from now?

Along the way, others approached. Some stayed. Others drifted away. The construction of what would become TVD was a process of natural selection of purpose: only those whose conviction was genuine, whose patience matched the complexity of the challenge, and whose vision of the future extended beyond the next economic cycle remained. Every departure was a natural adjustment. Every new alignment, a strengthening. What remained was not an administrative committee — it was a collective of shared purpose.

TVD's shareholder structure organizes its founders into three distinct categories, each with a complementary and irreplaceable role: the Advisors, bringing institutional governance and long-term strategic vision; the Operating Shareholders, holding exclusive dominion over the business's execution areas; and the Angel Investor Shareholders, who were the first to believe in the project, providing not only capital but conviction, patience and legitimacy in moments of uncertainty. This tripartition is not bureaucratic — it is functional. Each category answers a different question: the Advisors ask "why?", the Operators ask "how?", and the Angels ask "when?" — and all answer together.

What differentiates the Dream Team architecture from a conventional corporate structure is zero overlap of competencies. Each of the seven governance and operating members holds exclusive dominion over one strategic area. No duplication. No conflicts of attribution. No dependence on hierarchy for decision-making. When one member speaks about finance, everyone listens because he is the best in finance. When another speaks about operations, everyone follows because he is the best in operations. Decisions emerge from the conversation among masters, not from the approval of a bureaucratic committee.

This model has a name in the corporate-governance literature: specialist-peer consensus decision-making. But in TVD's practice it has a simpler and deeper meaning: nine people who trust one another enough to bet their time, their capital and their professional legacy on the same dream. Skin in the game is not a rhetorical phrase. It is the concrete reality of nine professionals who, instead of maximizing consulting fees or merely keeping comfortable executive jobs in large corporations, chose to commit scarce time, their own money and their own energy to a long-term project of potentially transformative impact.

6.1 Advisors: the institutional anchor

TVD's Advisors do not run the company day to day. They anchor it. Their function is to ensure that strategic decisions are taken with the rigour of those who have presided over control bodies, structured continental-scale industrial units and navigated Brazilian agribusiness at its highest levels. They bring institutional credibility, decades-long relationship networks and a long-term vision that balances executive urgency.

6.1.1 Susana Martins Carvalho — Strategic Agribusiness Advisor

Agronomist (Instituto Superior de Agronomia, Portugal), MSc in Organic Agriculture (University of Aberdeen, Scotland), with specializations in Design Thinking and Business Design (Escola de Design Thinking, Brazil) and an MBA in Strategic and Economic Business Management (FGV).

In Brazil since 2009, she served as CEO of Fertiberia Brasil (Villar Mir group, Spain) in fertilizers; was founding partner and executive director of Global Agro Consultants; joined JBS S.A. in 2017 as Executive Director of Campo Forte Fertilizantes, conceiving, building and operating the company's pioneering organomineral fertilizer unit; also led JBS circular-economy projects within JBS Novos Negócios, and from 2017 to 2021 was CEO of JBS Ambiental, leading circular-economy projects awarded by Abiplast and Revista Plásticos Sul. She was subsequently appointed Brazil Country Manager of Grupo Bioceres, responsible for Rizobacter do Brasil and Profarm do Brasil, expanding the portfolio of inoculants, adjuvants, biologicals and foliar/microgranular fertilizers. Her trajectory unites technical command of crop production, strategic market vision and a proven capacity to scale agricultural-input industrial operations in Brazil.

6.1.2 Sebastião Helvécio Ramos de Castro — Governance and Institutional Relations Advisor

Physician (Universidade Federal de Juiz de Fora), law degree (Faculdade Vianna Júnior), PhD in Public Health (Universidade do Estado do Rio de Janeiro), with specializations in data analysis for external control (TCE-MG), external control and public-management evaluation (PUC-MG), higher-education didactics (UFJF) and pediatrics (Brazilian Pediatrics Society).

His public career includes a term as State Deputy in Minas Gerais, signatory of the 1989 State Constitution, Secretary of State for Health of Minas Gerais, Vice-Mayor of Juiz de Fora and Adjunct Professor of Pediatrics at UFJF. In 2015 he became Councillor of the Minas Gerais State Audit Court (TCE/MG), retiring from public service in that office, having served as President of TCE/MG and of the Instituto Rui Barbosa (IRBContas). Current roles include Vice-President of IRBContas; World Bank consultant in public policy and governance; Councillor of the University of Salamanca; and member of the Nobel Committee. His position within Brazil's institutional apparatus gives TVD a singular capacity for regulatory navigation, governmental compliance and relations with public entities at federal, state and municipal levels.

The main roles held today are: Vice-President of the Rui Barbosa Institute (IRBContas); World Bank consultant in public policy and governance; Advisor of the University of Salamanca and Member of the Nobel Committee.

His position within the Brazilian institutional apparatus gives TVD a singular capacity for regulatory navigation, governmental compliance and relationships with public entities at the federal, state and municipal levels.

6.2 Operating Shareholders: the execution engine

The Operating Shareholders are the executors of the vision. Each holds exclusive dominion over one critical business vertical — operations, strategy, commercial, logistics. They are not hired employees. They are founders who chose to operate, daily, the machine they collectively designed. Their remuneration is predominantly tied to company performance, not fixed salaries, aligning their interests with those of long-term institutional investors.

6.2.1 Pierre Henri Mortelmans — Director-General and Non-Core Business

Engineer with an MSc from ISAFI (France), specialist in the industrial conversion of circular feedstocks of all origins, with over twenty years of experience across France, Europe and Brazil. He has led thirteen industrial-scale circular-feedstock processing operations (Europe and Brazil) and is recognized as an expert in closed-loop conversion, the methodology of closed-circuit materials that eliminates losses along the value chain.

His European experience in industrial-scale circular-feedstock processing, combined with deep knowledge of the Brazilian circular-supply market, positions him as the ideal operational executor to turn the TVD platform from concept into industrial reality. Pierre translates strategic vision into operational flows, ensuring every tonne of received residue generates maximum value through segregation, processing and commercialization of outputs.

6.2.2 Ricardo Pedro — Core Business Director

Agronomist (Instituto Superior de Agronomia, Portugal), with an international trajectory spanning maize and sunflower seeds at Pioneer and Syngenta (Switzerland) — including a biodiesel partnership project — and management of import/export companies in Brazil. He set up and administered EA Digital LTDA (document-digitization operations across Brazilian states and Paraguay) and Equimport (equestrian-goods importing), where he defined credit policies and negotiated with banks, trading companies and logistics operators.

As a partner of Global Agro Consultants since 2018, he supports multinationals and Brazilian companies in corporate, business-unit and product strategy, global-forces analysis and market entry. He elaborates and implements industrial projects for fertilizer, ethanol and meatpacking companies with operational and financial feasibility. His core competence is translating global market analysis into executable manufacturing plans, reorganizing plant units for continuous production flow and building high-performance commercial teams.

6.2.3 Silvio Partiti — Commercial Director

Engineer (Escola Politécnica, University of São Paulo) with an Executive MBA from Harvard Business School. A corporate and commercial-management specialist with over twenty years in multinational packaging corporations: vice-president and general manager in Brazil of Reichhold, Exal Holding and Crown/Petropar Embalagens; director at Amcor Rigid Plastics, with further experience at Unilever and Grupo Suzano. Currently CEO of Vértice Estratégia e Gestão.

His trajectory at leading global packaging companies confers mastery of negotiation dynamics with large consumer-goods industries, management of multinational client portfolios and operation of complex supply chains. At TVD, Silvio structures commercial relations with growers, agricultural cooperatives, input distributors and agricultural retail, and leads strategic negotiations with commodity offtakers and industrial partners for the non-organic valorization streams.

6.2.4 João Nehring — Precision-Agriculture Services Director

Engineer (Escola Politécnica, USP), with a Harvard specialization. Entrepreneur in logistics and civil construction in Brazil and the United States; former director of Support Cargo, Support Homes Company and Support Aircraft Corp, responsible for logistics projects for Rhodia, Solvay, Unilever and M&G (PET resin). A specialist in corporate management and road, rail and maritime logistics.

His operational experience in moving chemical cargoes and industrial commodities — including plastic resins and petrochemical inputs — gives TVD a robust capacity to design and operate the logistics infrastructure transporting feedstock (residues) to the plants and industrial products to consuming markets. Nehring is responsible for route optimization, fleet management, negotiation with multimodal operators and implementation of in-transit traceability and quality-control systems. He also develops and operates the precision-agriculture and farm digital-twin business, establishing technology, knowledge, sensor and drone/ground-robot field-performance agreements.

6.2.5 Shoichiro João Mitsui — New Business, Technology and Corporate Affairs Director

More than twenty years of experience in strategic-planning and project-management consulting.

Over twenty years of experience in strategic-planning and project-management consulting. He developed expertise in the circular economy, residue

decontamination, and artificial intelligence and automation applied to circular supply, agricultural inputs and process management.

He has broad institutional relationships across agribusiness, having provided consulting services to the FPA (Parliamentary Agricultural Front), APTA (São Paulo State Agribusiness Technology Agency), FIESP (Federation of Industries of the State of São Paulo) and CNI (National Confederation of Industry) in Brazil.

He holds wide institutional relationships across agribusiness, having consulted for FPA (Parliamentary Front for Agribusiness), APTA (São Paulo State Agribusiness Technology Agency), FIESP and CNI. He was a senior consultant at AC Lacerda (of the current Presidential Advisor of BNDES, Prof. Antonio Correa de Lacerda), developing economic modeling and infrastructure strategic analysis; also worked at RC Consultores (former BNDES president Paulo Rabelo de Castro) and GO Associados (former Sabesp president Gesner Oliveira). He has extensive experience in technology transfer from China in residues and agrochemicals. He studied civil engineering at Escola Politécnica, USP, specializing in hydraulic works.

He develops projects and the implementation of residue-decontamination systems at several multinational companies in the chemical sector, in partnership with Flucor Service — Industrial Effluent Treatment.

He develops and implements residue-decontamination systems across multinational chemical companies in partnership with Flucor Service (industrial effluent treatment). At TVD, João Mitsui leads information-systems architecture, financial modeling, predictive market analysis and technological integration with equipment and process suppliers — especially Chinese partners such as Beijing VOTO Biotech.

6.3 Angel Investor Shareholders: the first to believe

Before there was a formal business plan, before there were financial projections, before there was any guarantee of return, two entrepreneurs saw in the project that would become TVD something the others could not yet verbalize: the possibility of turning Brazil’s greatest environmental gap into its greatest industrial opportunity. They were not consulted for opinions. They were not invited to sit on strategy meetings. They were the first to open their wallets — and, more importantly, the first to say “yes” when everyone else said “not yet”. Their governance role is distinct: they do not run the business, but they preserve the memory of how it began. They do not take technical decisions, but they remind, in moments of doubt, why decisions must be taken. They are the project’s historical conscience and living proof that genuine conviction precedes any return-on-investment analysis.

6.3.1 Glaydson Santo Soprani Massaria — Angel Investor and First-Hour Enabler

An entrepreneur with a successful trajectory across multiple sectors of the Brazilian economy, Glaydson was among the first to recognize the transformative potential of the TVD platform. His decision to invest was not motivated by market analysis or multiple projections — it was motivated by personal conviction in the viability of Brazil's agricultural transition and in the founding team's capacity to deliver. As a first-hour enabler, he provided not just initial capital but patience, permanence and legitimacy at a time when the project existed only as a conversation among friends. His presence on the shareholder roster signals to future institutional investors that TVD was validated, at the earliest possible stage, by someone with proven experience in assessing people rather than spreadsheets. He represents the category of investor the venture-capital market calls "smart money" — not for the amount committed, but for the wisdom of betting before everyone else.

6.3.2 Helton de Araújo — Angel Investor, Advisor and First-Hour Enabler

An entrepreneur in the treatment and revalorization of industrial effluents, Helton operates one of the sector's pioneering companies, with over fifty years of existence. His practical experience in treating, routing and recovering industrial liquid effluents gives him an intimate understanding of the logistics, regulatory and technological challenges TVD will face in managing liquid effluents — especially bio-leachate and processing effluents. Helton was among the first to validate, with his own capital and reputation, TVD's central thesis: that industrial and urban residues are not environmental liabilities but strategic feedstocks with measurable economic value. His company, with half a century of continuous operation, is proof that business models based on revalorizing effluents are not only viable but durable. As an angel, he brings something more valuable than capital: sectoral credibility, a relationship network with industrial effluent generators, and the wisdom of one who has crossed economic cycles, regulatory changes and technological innovations in the liquid-residues sector. His presence on the shareholder roster is a seal of approval from the effluent-valorization industry for the TVD project.

6.4 Collective competencies and strategic synergies

TVD's Dream Team architecture was deliberately built to cover, in an integrated manner, all critical dimensions of an industrial organic and organomineral fertilizer platform. Zero competency overlap among the seven governance and operating members ensures each strategic decision is taken by the member with the deepest experience density in that specific area, while the others

contribute complementary perspectives. The two angel investors add a layer of external validation, long-term patience and sectoral credibility prized by institutional funds.

6.4.1. Competency Mapping by Business Dimension

6.4.2 Operational synergies

The synergy between Susana Martins Carvalho and Pierre Mortelmans translates agronomic vision into operational flow: Susana defines product specifications, quality parameters and MAPA registration routes; Pierre guarantees the physical receiving-and-segregation infrastructure for every feedstock fraction not useful to the core business, with efficiency and environmental compliance.

The partnership between Ricardo Pedro and Silvio Partiti closes the commercial cycle: Ricardo structures market-penetration plans, competitive analysis and price positioning; Silvio activates his network among large growers, cooperatives and distributors, converting strategy into revenue.

The interface between João Nehring and João Mitsui optimizes the logistics chain with predictive intelligence: Nehring runs the physical movement; Mitsui models demand, commodity prices and optimized routes, integrating IoT sensors and optimization algorithms into operations.

Sebastião Helvécio’s presence elevates the entire structure to the institutional governance standard required by ESG funds and family offices: his knowledge of public compliance, fiscal transparency and relations with control bodies creates a shield of regulatory credibility that accelerates licensing and eases access to public and private financing lines.

Helton de Araújo and Pierre Mortelmans form a complementary pair in transforming feedstock fractions not valorized in the main process: while Pierre commands the processing of solid circular feedstocks, Helton brings half a century of industrial-effluent experience — a critical competence for treating bio-leachate and for TVD’s expansion toward liquid-residue streams from large industrial generators.

Glaydson Massaria and Helton de Araújo, as angel investors, play an emotional and institutional stabilization role: their constant presence in moments of uncertainty, their resilience in the early years and their willingness to reinvest when necessary create an environment of trust that allows the operators to focus on execution, not survival.

6.5 Competency gaps and closing strategy

No founding team is omnicompetent. TVD's Dream Team transparently recognizes the competencies not yet represented on a permanent basis and holds a concrete plan to fill them. This posture of strategic self-awareness is a governance differentiator: institutional investors prize not the absence of gaps but the clarity with which they are identified and addressed. The angel investors Glaydson Massaria and Helton de Araújo, with their experience of evaluating projects from embryonic stages, actively participate in identifying these gaps, bringing the perspective of those who have watched dozens of ventures fail by underestimating critical competencies at founding.

Business dimension	Responsible (exclusive domain)	Key competency / track record
Agronomy, Product & Registration	Susana Martins Carvalho (Advisor)	Former CEO Campo Forte Fertilizantes (JBS); former CEO Fertiberia Brasil; Country Manager Bioceres (Rizobacter/Profarm)
Operations & Non-Core (circular conversion)	Pierre Henri Mortelmans (CEO)	Thirteen industrial-scale circular-feedstock processing operations (Europe and Brazil); closed-loop conversion
Strategy & Core Business	Ricardo Pedro (Director)	Industrial projects for fertilizer/ethanol companies; import and manufacturing; Global Agro Consultants
Commercial & Offtakes	Silvio Partiti (Director)	VP/GM Reichhold, Exal, Crown/Petropar, Amcor; HBS; negotiation with large consumer-goods industries
Logistics & Supply Chain	João Nehring (Director)	Logistics projects for Rhodia, Solvay, Unilever, M&G (PET); road, rail and maritime modes
Precision Agriculture & Twin Farm	João Nehring (Director)	Drones, ground robots, IoT sensors and farm digital twin; technology agreements
Technology, AI & Corporate Affairs	Shoichiro João Mitsui (Director)	Economic and predictive modeling; technology transfer from China (VOTO Biotech); BNDES/FPA/FIESP/CNI
Governance & Regulatory	Sebastião Helvécio (Advisor)	Former Advisor/President TCE-MG; Vice-President IRB; World Bank consultant
Effluents & Liquid Valorization (support)	Helton de Araújo (Angel Investor)	Pioneering industrial-effluent treatment and revalorization company

		(50+ years)
Capital & Validation (support)	Glaydson Massaria (Angel Investor)	Multi-sector entrepreneur; first risk capital of the project; validation of people and purpose

6.5.1. Identified Gaps

Gap Area	Closing Strategy	Phase
Corporate Finance and Structured Finance	Hiring of a professional CFO	Phase 1 (Year 1)
MAPA Registration and Compliance	Hiring of a MAPA regulatory consultant; pilot containers (UN10)	Phase 1 (Year 1)
Process Engineering and Industrial-Composting Technology	Partnership with VOTO Biotech (technology transfer) + expansion of the engineering team	Phases 1–2 (Years 1–2)
Precision Agronomy and Drone Operations	Formation of the precision-agronomy team and initial drone acquisition (UN8)	Phase 1 (Year 1)

6.5.2. Gap-Closing Schedule

Closing phases:

Phase 1 — corporate structuring and licensing (Year 1): CFO and MAPA regulatory consultant hired; VOTO Biotech partnership established and technology transfer begun; precision-agronomy team formed and initial drone fleet acquired; liquid-process validation with Helton de Araújo's technical support.

Phase 2 — construction and industrial start-up (Years 1–2): process-engineering team enlarged; MRV system for carbon credits implemented; B2B e-commerce platform launched and digital sales channels activated; first investment round with active participation of Massaria and Araújo in new-investor due diligence.

Phase 3 — scale and diversification (Years 3–5): all functions consolidated as permanent areas; new competencies assessed (e.g., chemical engineering for humic-acid extraction, biotechnology for customized microbial consortia); angel investors transition to emeritus advisor positions, preserving their institutional voice in governance.

6.6 Individual motivation and collective purpose

The central question uniting the nine members of TVD's Dream Team is not how much each expects to earn, but what legacy each intends to build. That distinction is fundamental for long-term investors: teams driven purely by

variable remuneration disassemble when the first obstacles appear; teams driven by shared purpose persist, adapt and overcome crises that would fragment conventional structures. The two angel investors embody this logic in its purest form: they have no contractual obligation to stay, receive no salary and do not run the business daily. They remain because they believe — and that belief, more than any contract, is TVD's emotional foundation.

6.6.1 Individual goals and strategic convergence

Susana (Advisor): to consolidate the professional legacy of one who built the largest organomineral fertilizer unit in Brazilian agribusiness, now aspiring to lead, independently, the systemic transition of Brazilian agriculture toward regenerative models — proving organic-origin fertilizers can outperform mineral imports in both performance and cost.

Sebastião Helvécio (Advisor): to apply, in high-performance private enterprise, the transparency, accountability and public-management principles that guided his Audit Court career — proving that institutional-grade corporate governance is not merely compatible with but advantageous for environmental-impact ventures in emerging markets.

Pierre Mortelmans (CEO): to transfer Southern-Hemisphere-proof European circular-economy and feedstock-conversion expertise, adapted to Brazilian logistics, regulatory and climate conditions — operationalizing the proof that urban residues are in fact strategic feedstock with negative effective cost.

Ricardo Pedro (Director): to unify, in a single industrial platform, the multiple competencies built over two decades of agribusiness, importing and manufacturing consulting — constructing a replicable business model, an agricultural-transition playbook exportable to other Southern-Hemisphere markets.

Silvio Partiti (Director): to apply the commercial discipline of global packaging corporations to the sustainable-agricultural-inputs market, proving circular-origin products can compete at scale with traditional commodities — building Brazil's largest organic-fertilizer client portfolio.

João Nehring (Director): to design and operate the most efficient fertilizer-logistics infrastructure in Brazil, integrating supply and distribution across road, rail and water modes in an AI-optimized network — cutting average logistics cost by 20% versus the current benchmark — and to develop the precision-agriculture and farm digital-twin business through technology, knowledge, sensor and drone/ground-robot performance agreements.

Shoichiro João Mitsui (Director): to establish institutional relationships with all stakeholders — public sector, feedstock and technology supply chains in Brazil

and abroad, and regulatory bodies — and to create Brazil's first integrated digital platform for organomineral fertilizer management, combining predictive modeling and industrial digital twin through IoT and automation; positioning TVD as the Southern-Hemisphere reference in organic-feedstock processing at industrial scale and Agriculture 4.0, with a working twin from the first day of production.

6.6.2 The shared purpose: regenerating the soils that feed the world and demonstrating the scalability of the circular economy in global sustainability

Each of TVD's nine management-team members has children, grandchildren or young people for whom they are responsible. Each looks to the future and asks: what are we leaving the next generations? The answer TVD offers is not philanthropic — it is existential. "Essentially, all life depends upon the soil… There can be no life without soil and no soil without life; they evolved together" (Charles E. Kellogg, head of the USDA Division of Soil Survey, 1938). Dependence on imported fertilizer is a geopolitical anchor. The organic matter cities discard is a resource we ignore. The technology to recover that value — swapping import for local regeneration — already exists.

Each member's individual motivation converges on a single unequivocal collective purpose: to make TVD the largest producer of organic and transition fertilizers in the Southern Hemisphere — not as a marketing claim but as a measurable commitment of volume, quality, environmental impact and financial return. Every management-team member has already achieved levels of success that would allow a comfortable retirement. They are not at TVD out of economic necessity. They are at TVD out of a need for meaning. And the angel investors Glaydson Massaria and Helton de Araújo, who already built wealth in their respective sectors, are not at TVD for portfolio diversification. They are at TVD because, for the first time in decades, they found a project worth more than the financial return it may generate: a project that is, in itself, worth the bet.

6.7 Governance and succession planning for institutional continuity

The Dream Team architecture was deliberately structured to be greater than any of its founders. Multiple knowledge redundancy, rigorous process documentation and role clarity guarantee organisational continuity regardless of individual circumstances. This is not disloyalty to the founders — it is the opposite. It is the recognition that the legacy they seek to build is not personal. It is institutional. It is permanent. It is greater than them. This perpetuity logic applies equally to all nine members: the seven governance and operating members and the two angel investors, whose role will evolve from early-stage risk validators to emeritus advisors as the company matures.

TVD governance will evolve on three levels: (1) the Board of Directors, evolving from the founders' initial composition to five members, three of them independent (Section 6.9) — strategic decisions by consensus and specialist delegation in operational matters; (2) independent technical committees — Audit, Risk, Sustainability and Remuneration — ensuring separation between management and supervision; (3) executive management, led by the CEO, with autonomy to execute the operating plan within board-approved limits. The angel investors participate in the Board in an advisory capacity, without deliberative vote on operational matters but with veto rights over decisions affecting long-term strategy or cash policy in the first five years — protection ensuring the original purpose is not sacrificed for short-term returns. This structure, inspired by institutional private-equity funds, prepares TVD for future capital raises, a potential IPO and, above all, an organization built to last generations.

6.8 Conclusion: why this team wins

Institutional investors and ESG family offices evaluate dozens of proposals a month. Most present interesting technologies, promizing markets or innovative business models. Few present teams that have already demonstrated, in their individual careers, the capacity to execute what they promise at industrial scale. TVD presents both: a validated technological platform and a management team that has built, operated and scaled comparable businesses.

Susana Martins Carvalho has already been CEO of Brazil's largest organomineral unit. Pierre Mortelmans has already operated thirteen industrial-scale circular-feedstock processing units. Silvio Partiti has already managed hundreds of millions in global-packaging revenue. João Nehring has already designed logistics for world-scale chemical majors. Ricardo Pedro has already implemented fertilizer and ethanol industrial projects with proven feasibility. João Mitsui has already modeled projects for Brazil's leading economic consultancies and for a Presidential Advisor of BNDES. Sebastião Helvécio has already presided over one of the country's most respected public control bodies. And Glaydson Massaria and Helton de Araújo have already demonstrated, with their own capital and reputation, the courage to bet on impact projects before any institutional investor. They are not merely betting on an idea. They are betting on themselves — and on each of the other eight.

TVD's Dream Team architecture is not a bet on a lone entrepreneur. It is a bet on a collective of purpose, tested by time, validated by experience and aligned with the long-term interests of investors who understand that sustainable returns require sustainable governance. Nine founders. Three categories. One purpose. One platform. One legacy.

6.9 Global-Tier Corporate Governance (Tier 1)

TVD will be structured from Day 1 to meet the rigorous criteria of blue-chip funds and a future IPO:

- • Board of Directors: five members, three independent.
- **Statutory Committees:**
  - • Statutory committees: Audit and Risk (COSO ERM) — internal controls, compliance and operational/financial risk mitigation; ESG and Sustainability (TCFD/GRI) — monitoring of environmental and social KPIs, preparation for integrated reporting; People and Remuneration — bonus policies tied to long-term targets (LTI — Long-Term Incentive).
  - *ESG and Sustainability (TCFD/GRI):* Monitoring of environmental and social KPIs, preparation for integrated reporting.
  - *People and Compensation:* Definition of bonus policies tied to long-term targets (LTI — *Long Term Incentive*).

The methodologies adopted will be:

- **COSO ERM:** For integrated risk management.
- **ISO 37001:** Anti-Bribery Management System
- **GRI Standards and SASB:** For auditable sustainability reporting.
- SOX (Sarbanes-Oxley): Preparation for rigorous financial internal controls.

6.10 Shareholder remuneration and transition to professionalization

The compensation structure for directors and advisors (pro-labore for the 8 PJ (private-entity) shareholders holding executive or advisor roles) of US$ 8,000/month (BRL 42,400) per PJ shareholder + international health insurance (US$ 30 thousand/family/yr) was designed with a clear strategic purpose: preparing for professionalization.

1. **1. Market baseline: BRL 42,400/month establishes the salary floor for the future hiring of a professional CEO and C-level directors (CFO, COO, CTO) who are not shareholders — preventing future salary distortions.**
2. **2. Incentive alignment (skin in the game): fixed remuneration is market-compatible; shareholder wealth is created through equity appreciation — cash policy is full retention until board deliberation after the capital raise. This aligns founders with the company's long-term growth, not short-term cash extraction.**

3. **Succession and Transition Plan (Years 5 to 7):**

The TVD Corporate University (section 5.6.1) is the talent infrastructure of this plan: the Crotonville rule — no one rises without training a successor — generates, at no cost, the funnel of leaders for the professional transition of Years 5–7. The school is not a cost center: it is a production line for people.

- • Phase 1 (Years 1–4): operating shareholders (Pierre, Ricardo, Silvio, João N., João M.) serve as Executive Directors; advisor shareholders (Susana, Sebastião and Helton) serve on the Board.
- • Phase 2 (Years 5–7): TVD will hire a professional market CEO (with a variable-remuneration package tied to EBITDA and IPO). Founding operating shareholders migrate to the Board of Directors or to Chief Strategy/Innovation Officer roles, focusing on M&A and expansion.

CHAPTER 7: FINANCIAL

7.1 Model Assumptions

Description	Value
EQUITY	20% — BRL 271.9 mn (US$ 51.3 mn), Year 1
DEBT	79.8% — BRL 1,084.7 mn (US$ 204.7 mn), drawn in full in Year 1 (contractual ceiling; the remaining BRL 2.8 mn of the investment is covered by ramp-up working capital)
Cost of debt	SOFR 3.63% + 5.00% spread = 8.63% p.a. (grace-period interest: BRL 93.6 mn/yr = US$ 17.7 mn/yr at BRL 5.30/US$; debt BRL 1,084.7 mn = US$ 204.7 mn)
Grace period	4 years (construction + ramp-up), cash interest from Y2 — calculated interest coverage 1.90x/2.06x/2.86x across the grace period
Amortization	8 YEARS (Y5-Y12), declining installments from BRL 240.3 mn (Y5) to BRL 176.2 mn (Y11) plus a BRL 5.2 mn final installment (Y12) at KD 8.63% — 50% cash sweep of the excess after the 5% CFADS dividend floor; dividend floor is purely INDICATIVE — the distribution policy will be defined with the funder; debt repaid in Y12 (contractual ceiling reached by the sweep)
Projection	22 years (2 pre-operational + 20 operational)
Ramp-up	Year 3: 30% · Year 4: 60% (circular-support units at 100%; granulated compost at BRL 800/t) · Year 5+: 100%

Phase 2 (incorporated in the plan)	UN4 specialty mix: +BRL 49.7 mn/yr of revenue (uplift 86.4 → 136.1) booked exactly once in the plan
Steady-state OPEX	BRL 476.6 mn/yr (Annex 5 §5.3 — gross OPEX of BRL 493.2 mn net of the BRL 16.6 mn automation/efficiency credit)
Change	BRL 5.30/US$ fixed — projections in REAL terms (nominal ≈ real + CPI)
Depreciation / income tax	10 years (Years 3–12) / 34% with loss carryforward
Cash policy	FULL RETENTION — no distributions projected; board deliberation after closing

Notes: (1) the 4-year grace period (construction plus ramp-up), with cash interest from Y2 (CALCULATED interest coverage 1.90x/2.06x/2.86x across the grace period in the 750 scenario); (2) amortization over 8 years (Y5-Y12) with DECLINING installments from BRL 240.3 mn (Y5) to BRL 176.2 mn (Y11) plus a BRL 5.2 mn final installment (Y12) on a BRL 4.8 mn principal residual: interest at 8.63% p.a. (SOFR 3.63% + 5.00%) on the outstanding balance and variable INCREASING principal (BRL 146.7 mn in Y5 → BRL 161.8 mn in Y11). Independent check: the present value of the installment series at 8.63% is BRL 1,084.7 mn, exactly equal to the contracted debt — the series is consistent with the pure KD, with no embedded charges (full schedule generated from these premises in the data room). The 50% cash sweep of the excess (after the 5% CFADS dividend floor — purely indicative, to be defined with the funder) acts on the 8-year contractual ceiling, with repayment in Y12; reported DSCR is CALCULATED on actual cash flows: minimum 1.22x (Y6), series Y5-Y12: 1.23/1.22/1.26/1.30/1.35/1.40/1.46/48.7 — repaid on CALCULATED Y12 (contractual ceiling reached by the sweep); the 48.7x DSCR in Y12 is an artifact of the final residual installment (BRL 4.8 mn) and represents no risk — debt is essentially repaid in Y12 by the sweep. SERIES CONSISTENCY (independent check): the present value of the installments at 8.63% is BRL 1,084.7 mn, exactly equal to the contracted debt — the series is consistent with the pure KD (SOFR 3.63% + 5.00%), with no embedded charges; the principal is variable (declining with the outstanding balance); (3) projections are in real terms: the approximate nominal equivalent is the real rate plus CPI. Basis consistency: the KD of 8.63% (nominal, in US$) equals ≈3.95% p.a. in real terms at 4.5% CPI ((1+8.63%)/(1+4.5%)−1) — the comparison with the real IRRs (project 20.2%; equity ≈20.7%) is made on a consistent real basis, and equity earns a spread of ≈16 p.p. over the real cost of debt. Composition of the result: revenue =

VOLUME × UNIT PRICE — gravimetric volumes of the 750 t/d RSU (Annexes 2 and 5) × Annex-2 unit prices, totaling BRL 764.4 mn in products (item-by-item decomposition in the revenue composition note), with UN6 capped at the physical surplus (36,915 MWh × BRL 233/MWh = BRL 8.6 mn); OPEX = Annex 5 §5.3 (BRL 493.2 mn gross − BRL 16.6 mn automation/efficiency credit = BRL 476.6 mn); EBITDA = revenue − OPEX + margin levers (BRL 33.3 mn).

7.2 Investment Structure

Business unit	Investment (BRL)	% of CAPEX
UN1 — Feedstock Segregation, Industrial Inputs & Decontamination	328,776,707	32.9%
UN2 — Composting	70,663,771	7.1%
UN3 — Special Organomineral Fertilizers	145,712,937	14.6%
UN4 — Premium Liquid Fertilizers	78,259,371	7.8%
UN5 — Fiber-grade Polymers	48,357,688	4.8%
UN6 — Solar Energy & Pyrolysis	123,920,747	12.4%
UN7 — Construction Materials	14,308,977	1.4%
UN8 — Precision Agriculture & Twin Farm	6,152,998	0.6%
UN9 — Corporate SP + Plant Corporate	7,299,473	0.7%
UN10 — MAPA Pre-Operational	5,891,968	0.6%
SUBTOTAL (landed)	829,344,637	83.1%
Engineering 6% + contingency 20% + supervision − BRL 52 mn optimization	168,629,605	28.4%
TOTAL CAPEX (Annex 3)	997,974,242	100%

Component	Value (US$)	Value (BRL)
Equity (20%) — funding	US$ 51.3 mn	271,900,000
Debt (79.8%) — funding	204,665,807	1,084,728,777
Total funding	US$ 255.9 mn	1,356,628,777
Standby revolving line (item 5)	US$ 0.5 mn	2,741,223
TOTAL INVESTMENT	US$ 256.5 mn	1,359,370,000

7.3 Income Statement — Selected Years (BRL mn)

SCENARIO 750 — READ FIRST (PRICE-AND-EFFICIENCY STANDARD per unit, section 7.7.5): the BP thesis is presented in the definitive 750 t/d RSU scenario (600 with redundancy utilization — calendar in Annex 5, 5.1: 361 operating days = 289.75 day-equivalents at 750 t/d + 71.25 day-equivalents at 600 t/d in heavy-maintenance rotation, plus 4 non-operating holidays (260,062.5 t/yr)), with the price and efficiency premises adopted as the standard in each unit (7.7.5) and the margin levers (7.7.4, +BRL 33.3 mn/yr). Indicators calculated on explicit revenue and OPEX (EBITDA = revenue − OPEX + levers): revenue BRL 780.8 mn/yr (rebuilt as VOLUME × UNIT PRICE: gravimetric volumes of the 750 t/d RSU —

Annexes 2 and 5 — × Annex-2 unit prices, with UN6 capped at the physical surplus of 36,915 MWh × BRL 233/MWh), OPEX BRL 476.6 mn/yr (Annex 5 §5.3: BRL 493.2 mn − BRL 16.6 mn automation/efficiency credit), EBITDA BRL 337.5 mn (43.2%), project IRR 20.2% p.a. real, equity IRR ≈20.7%, 4-year grace and 8-year amortization (Y5-Y12), calculated DSCR minimum 1.22x (Y6), repaid CALCULATED on Y12 (contractual ceiling reached by the sweep), debt capacity at 1.20: ≈BRL 1,100 mn — above contracted debt (BRL 1,084.7 mn); project IRR (20.2%) is well above the WACC (10%), with positive NPV.

NOTE (SCENARIO 750 — PRICE-AND-EFFICIENCY STANDARD): the definitive scenario of this edition is 750 t/d RSU: revenue BRL 780.8 mn/yr, OPEX BRL 476.6 mn/yr, EBITDA BRL 337.5 mn (43.2%), project IRR 20.2%, equity IRR ≈20.7%, repaid in Y12 (contractual ceiling, sweep), calculated minimum DSCR 1.22x (Y6), series Y5-Y12: 1.23/1.22/1.26/1.30/1.35/1.40/1.46/48.7, 5% CFADS dividend floor in all years. Explicit derivation: revenue BRL 780.8 mn − OPEX BRL 476.6 mn + levers BRL 33.3 mn = EBITDA BRL 337.5 mn. The detailed annual statements of the 750 scenario are in the data room.

Account	Y1	Y2	Y3	Y4	Y5	Y8	Y12	Y16	Y22
Revenue	0.0 (US$ 0.0)	0.0 (US$ 0.0)	285.0 (US$ 53.8)	482.7 (US$ 91.1)	752.6 (US$ 142.0)	752.6 (US$ 142.0)	752.6 (US$ 142.0)	752.6 (US$ 142.0)	752.6 (US$ 142.0)
OPEX	0.0 (US$ 0.0)	0.0 (US$ 0.0)	163.1 (US$ 30.8)	271.9 (US$ 51.3)	389.9 (US$ 73.6)	389.9 (US$ 73.6)	389.9 (US$ 73.6)	389.9 (US$ 73.6)	389.9 (US$ 73.6)
EBITDA	0.0 (US$ 0.0)	0.0 (US$ 0.0)	121.9 (US$ 23.0)	210.8 (US$ 39.8)	362.7 (US$ 68.4)	362.7 (US$ 68.4)	362.7 (US$ 68.4)	362.7 (US$ 68.4)	362.7 (US$ 68.4)
Depreciation	0.0 (US$ 0.0)	0.0 (US$ 0.0)	99.8 (US$ 18.8)	99.8 (US$ 18.8)	99.8 (US$ 18.8)	99.8 (US$ 18.8)	99.8 (US$ 18.8)	0.0 (US$ 0.0)	0.0 (US$ 0.0)
Interest	0.0 (US$ 0.0)	0.0 (US$ 0.0)	125.5 (US$ 23.7)	125.5 (US$ 23.7)	125.5 (US$ 23.7)	87.3 (US$ 16.5)	20.6 (US$ 3.9)	0.0 (US$ 0.0)	0.0 (US$ 0.0)
EBT	0.0 (US$ 0.0)	0.0 (US$ 0.0)	-103.4 (US$ -19.5)	-14.5 (US$ -2.7)	137.3 (US$ 25.9)	175.6 (US$ 33.1)	242.3 (US$ 45.7)	362.7 (US$ 68.4)	362.7 (US$ 68.4)
Income tax (34%)	0	0	0	0	32.7 (US$ 6.17)	42.4 (US$ 8.00)	82.4 (US$ 15.55)	123.3 (US$ 23.26)	123.3 (US$ 23.26)
Net income	-85.9 (US$ -16.2)	-21.3 (US$ -4.0)	-103.4 (US$ -19.5)	-14.5 (US$ -2.7)	104.7 (US$ 19.7)	133.8 (US$ 25.2)	159.9 (US$ 30.2)	1,268.9 (US$ 239.4)	1,268.9 (US$ 239.4)

Analysis: the pre-operational period is absorbed by equity; ramp-up is already cash-positive (EBITDA of BRL 168.3 mn in Y3 and BRL 228.7 mn in Y4 — first and second commercial years, go-live at Month 25; proportional conservative adjustment of the price/efficiency standard already in ramp-up — explicit revenue and OPEX lines: Y3 418.8/250.5; Y4 576.6/347.9, including the sale of excess compost at BRL 800/t — see ramp-up composition note); stabilization at

EBITDA of BRL 337.5 mn/yr and a 43.2% margin (Phase 2 incorporated exactly once + per-unit margin levers from Year 4), HELD in all mature years — tax protection affects income tax, not EBITDA; accounting result negative until Year 4 and full profit from Year 5; full income tax from Year 13 (end of tax protection).

REVENUE COMPOSITION (underwriting base): the steady-state revenue (BRL 780.8 mn/yr; US$ 147.3 mn) is composed of: (i) product and service revenue — BRL 764.4 mn/yr (calculated item by item as VOLUME × UNIT PRICE — volumes come from the gravimetry of the 750 t/d RSU (Annexes 2 and 5) and unit prices from Annex 2 — UN1 BRL 20.9 mn (5,353.2 t of ferrous scrap × BRL 1,230/t + 2,293.1 t of non-ferrous scrap × BRL 5,280/t + 7,412.4 t of glass × BRL 310/t = BRL 20.9 mn), UN3 BRL 408.1 mn (108,625 t × BRL 3,756.89/t), UN4 BRL 136.1 mn (20,578 t × BRL 6,615/t — Phase-2 specialty mix presented ONCE), UN5 BRL 164.6 mn (26,527 t × BRL 6,204.82/t), UN6 BRL 8.6 mn (capped at the physical surplus of 36,915 MWh × BRL 233/MWh), UN7 BRL 12.3 mn (40,310 t × BRL 304/t — inert 12% + metals 3% + hazardous 0.5% = 15.5% of mass) and sale of excess compost BRL 13.8 mn (~17.2 kt × BRL 800/t) — summing to BRL 764.3 mn ≈ the reported BRL 764.4 mn (the BRL 0.1 mn difference is item rounding)); (ii) CBIO revenue — BRL 7.5 mn/yr at the conservative planning price of R$ 50/tCO2eq (range 6.6–8.0 mn at 131,000–160,000 tCO2eq/plant; avoided-methane methodology, third-party verification from Year 2; <1% of revenue, excluded in the strict floor); and (iii) net trade-finance gain — BRL 8.9 mn/yr (Ch. 4.4). The adopted UN4 mix reference (BRL 6,615/t) already carries the specialty mix at full value — there is no additional mix-uplift line. The year-by-year ramp-up decomposition (Year 3: 30%; Year 4: 60%) and the income statements (7.3/7.10) are in the model workbook (data room).

OPEX BRIDGE AND WORKING CAPITAL (composition of the model's OPEX and working capital): (A) OPEX BRIDGE — Annex 4: BRL 447.5 mn + BRL 58.2 mn of Annex 5 §5.3 elasticities (per unit) = BRL 505.7 mn (gross OPEX); − BRL 12.5 mn of unit efficiencies counted once (the per-unit price-and-efficiency standard — section 7.7.5 — and the Annex 5 elasticities capture part of the same savings) = BRL 493.2 mn (model gross OPEX); − BRL 16.6 mn automation/efficiency credit on non-labor lines (5% on eligible lines) = BRL 476.6 mn (P&L OPEX). Verified identity: 447.5 + 58.2 − 12.5 − 16.6 = 476.6. (B) WORKING CAPITAL — BRL 250.8 mn = 9/12 × BRL 334.4 mn, where BRL 334.4 mn = model OPEX (476.6) − BRL 134.2 mn payroll (Annex 4 revised 750: 132.6 + 1.6 for the 8 new posts — payroll is paid within the month and consumes no working capital) − BRL 8.0 mn of period commercial and administrative expenses (marketing, travel, commissions — Annexes 4/5). Verified identity: (476.6 − 134.2 − 8.0) × 9/12 = 250.8. The line-by-line composition remains in the data room; both bridges close with no residual.

JUSTIFICATION OF THE COMPOST PRICE (BRL 800/t — Annex 2): the price refers to PREMIUM screened compost, with controlled moisture, forced-aeration stabilization (pathogen elimination), adjusted C/N and declared organic matter, sold regionally in packaging to the horticulture, fruit-

growing and landscaping segments — Brazilian market range for packaged premium compost: BRL 700–1,000/t (common bulk compost of lower quality, quoted at BRL 300–600/t, is NOT the referenced product). Thesis resilience: the Chapter 7 price-sensitivity table shows that even at BRL 600/t the DSCR holds at 1.29x/1.20x — compost is 2.2% of total revenue; each BRL 100/t drop represents only −BRL 1.7 mn/yr (−0.2% of revenue).

RAMP-UP COMPOSITION NOTE (calculation transparency): the ramp years (Y3 and Y4 — first and second commercial years, go-live at Month 25) are computed from EXPLICIT REVENUE AND OPEX LINES — EBITDA = revenue − OPEX in each year: (1) organomineral formulation at 30% in Y3 and 60% in Y4 (ramp-up table above) applied to the formulation lines' revenue (UN3 BRL 408.1 mn + UN4 BRL 136.1 mn = BRL 544.2 mn), with support-unit revenue (BRL 220.2 mn) at 100% from Y3; (2) fixed-cost floors on the formulation lines — formulation OPEX = MAXIMUM of (30% of UN3 OPEX + 25% of UN4 OPEX) and (f × (UN3 + UN4 OPEX)), with f = 30%/60%/100%; (3) SALE OF EXCESS COMPOST: compost not absorbed by organomineral formulation is sold at BRL 800/t — 32.5k t in Y3 (BRL 26.0 mn revenue) and 21.6k t in Y4 (BRL 17.3 mn), at a variable cost of BRL 190/t; (4) support-unit OPEX (Annex 5 §5.3) at 100% from Y3, net of the automation/efficiency credit on non-labor lines. CALCULATED RESULT (proportional conservative adjustment of the price/efficiency standard already in ramp-up): Y3 — revenue BRL 418.8 mn, OPEX BRL 250.5 mn, EBITDA BRL 168.3 mn; Y4 — revenue BRL 576.6 mn, OPEX BRL 347.9 mn, EBITDA BRL 228.7 mn (corresponding FCFF per Cap. 7.5: BRL 192.4 mn in Y3 and BRL 281.3 mn in Y4); steady state — revenue BRL 780.8 mn, OPEX BRL 476.6 mn, EBITDA BRL 337.5 mn (revenue − OPEX + margin levers of BRL 33.3 mn). WHY NOT DECOMPOSE UNIT BY UNIT: (a) the documented fixed-cost floors (25-30% of OPEX) are LOWER than the revenue ramp (60%), so operating leverage would artificially inflate the ramp margin (e.g., UN4 at 60% with a 25% floor would yield an artificial ramp margin vs 43.2% at steady state — the 'linear revenue + floors' assumptions do not apply in isolation); and (b) more decisive: full decomposition would produce EBITDA of ~BRL 180-200 mn in Y2, incompatible with a realistic industrial ramp-up — the model therefore adopts the explicit lines above, fully derived from Annexes 2 and 5 (§5.3).

7.4 Balance Sheet — Summary (BRL mn)

Account	Y1	Y2	Y4	Y8	Y12	Y16	Y22
Cash	226.7 (US$ 42.8)	0.0 (US$ 0.0)	47.4 (US$ 8.9)	337.2 (US$ 63.6)	853.1 (US$ 160.9)	1,810.6 (US$ 341.6)	3,246.8 (US$ 612.6)
Working capital	0.0 (US$ 0.0)	250.8 (US$ 47.3)	250.8 (US$ 47.3)	250.8 (US$ 47.3)	250.8 (US$ 47.3)	250.8 (US$ 47.3)	250.8 (US$ 47.3)
Net fixed assets	1,040.6 (US$ 196.3)	1,040.6 (US$ 196.3)	832.5 (US$ 157.1)	416.0 (US$ 78.5)	0.0 (US$ 0.0)	0.0 (US$ 0.0)	0.0 (US$ 0.0)
TOTAL ASSETS	1,267.3 (US$ 239.1)	1,291.4 (US$ 243.7)	1,130.7 (US$ 213.3)	1,004.0 (US$ 189.4)	1,103.9 (US$ 208.3)	2,061.4 (US$ 388.9)	3,497.6 (US$ 659.9)
Debt	1,084.7 (US$ 204.7)	1,084.7 (US$ 204.7)	1,084.7 (US$ 204.7)	482.8 (US$ 91.1)	0.0 (US$ 0.0)	0.0 (US$ 0.0)	0.0 (US$ 0.0)
Liquidity bridge (FIDCs/commissioning facility)	0.0 (US$ 0.0)	42.7 (US$ 8.1)	0.0 (US$ 0.0)	0.0 (US$ 0.0)	0.0 (US$ 0.0)	0.0 (US$ 0.0)	0.0 (US$ 0.0)
Share capital (equity)	271.9 (US$ 51.3)	271.9 (US$ 51.3)	271.9 (US$ 51.3)	271.9 (US$ 51.3)	271.9 (US$ 51.3)	271.9 (US$ 51.3)	271.9 (US$ 51.3)
Retained earnings	-89.3 (US$ -16.8)	-107.9 (US$ -20.4)	-225.9 (US$ -42.6)	249.3 (US$ 47.0)	832.0 (US$ 157.0)	1,789.5 (US$ 337.6)	3,225.7 (US$ 608.6)
LIABILITIES + EQUITY	1,267.3 (US$ 239.1)	1,291.4 (US$ 243.7)	1,130.7 (US$ 213.3)	1,004.0 (US$ 189.4)	1,103.9 (US$ 208.3)	2,061.4 (US$ 388.9)	3,497.6 (US$ 659.9)

Analysis: fixed assets = CAPEX + capitalized interest (BRL 1,217.0 mn in Y2), depreciating to BRL 219.0 mn; debt fully repaid in Year 12 by the 50% sweep (8-year amortization Y5–Y12; 4-year grace); equity positive in every projection year; BRL 3,498 mn net worth in Year 22 (12.9x equity) with BRL 3.0 bn accumulated cash — full retention co-finances plants 2–4, complemented by completed amortization and new-debt capacity.

7.5 Cash Flow and DSCR

FCFF (EBITDA less corporate income tax — IRPJ/CSLL): −BRL 688.1 mn (Y1 = EBITDA −21.3 − CAPEX 598.8 − arrangement fee 68.0, the latter expensed in the Year-1 income statement, per the EBT of −89.3) · −BRL 671.2 mn (Y2 = EBITDA −21.3 − CAPEX 399.2 − working capital 250.8) · BRL 192.4 mn (Y3) · BRL 281.3 mn (Y4) · BRL 379.4 mn → BRL 329.6 mn (Y5-12, income tax with offset limited to 30% of taxable income) · BRL 285.9 mn/yr (Y13-22, full income tax) — cash flows under this edition's price/efficiency standard (EBITDA +BRL 70.5 mn/yr above the reference base: full in Y3-Y4; 0.70× in Y5-Y12; 0.66× in Y13+). Investment outlay (CAPEX + working capital): BRL 598.8 mn (Y1) and BRL 649.9 mn (Y2); the arrangement fee is expensed in the Year-1 income statement and treated only once in the cash flow — no double counting. The IRRs (7.6) are calculated on these flows, per the model workbook attached to the data room. To equity (FCFE basis): positive from Year 4 onwards, fully retained.

A3/A4 bridge (calculated from the premises): FCFF in Y3 (BRL 192.4 mn) and Y4 (BRL 281.3 mn) exceeds ramp-up EBITDA (BRL 168.3 mn and BRL 228.7 mn) because (i) income tax is zero during the ramp (full offset of the tax losses accumulated in Y1-Y2) and (ii) working capital was fully funded in Y2 (BRL 250.8 mn, sized on full-run OPEX) while the effective cash requirement during the ramp-up is lower — the difference returns to the cash flow. Full line-by-line detail (EBITDA → taxes → Δworking capital → maintenance capex → FCFF) is in the data room; no value is sculpted.

Year-by-year DSCR (CFADS ÷ debt service actually paid): definitive 750 t/day scenario — Y2-Y4 grace interest coverage 1.90x/2.06x/2.86x (calculated across the grace period); amortization period Y5-Y12: 1.23x (Y5), 1.22x (Y6), 1.26x (Y7), 1.30x (Y8), 1.35x (Y9), 1.40x (Y10), 1.46x (Y11), 48.7x (Y12) — debt repaid on CALCULATED Y12 (contractual ceiling reached by the 50% sweep of the excess after the 5% dividend floor). The tightest point of the profile (Y6, 1.22x) clears the 1.20x market benchmark; debt capacity at 1.20 CALCULATED is ≈BRL 1,100 mn — ABOVE the BRL 1,084.7 mn contracted . Full series in the data room.

Year	5	6	7	8	9	10	11	12
Debt service instalment (BRL mn)	240.3	230.2	219.8	209.2	198.5	187.4	176.2	5.2
CFADS (BRL mn)	295.8	280.1	275.9	271.6	267.2	262.8	258.1	253.3
DSCR	1.23	1.22	1.26	1.30	1.35	1.40	1.46	48.7

Instalment profile (CFADS ÷ debt service actually paid; sweep of 50% of the excess after the 5% dividend floor). DSCR: minimum 1.22x (Y6), series Y5-Y12: 1.23/1.22/1.26/1.30/1.35/1.40/1.46/48.7; debt repaid on CALCULATED Y12 (contractual ceiling reached by the sweep).

7.6 Key Financial Indicators

Indicator	Value
Project IRR (22 years, real terms)	20.2% p.a. real (definitive scenario; ~25.7% nominal at 4.5% CPI)
Equity IRR — FCFE basis (KD 8.63%)	≈20.7% p.a. (at 8.63%)*
Equity IRR — FCFE basis (8.63%)	≈20.7% p.a. (at 8.63%)*
Project payback (FCFF)	6.4 years (~Y7) — FCFF series (Cap. 7.5), undiscounted cumulative
Equity equals invested capital	see the FCFE series in the data room
Net worth in Year 22 (Balance Sheet 7.4)	BRL 3,497.6 mn (12.9x equity) in the definitive 750 scenario (§7.4)
Average / minimum DSCR	average 1.31 (CFADS-weighted, Y5–Y11 excl. residual) / min 1.22 calculated (Y6); repaid Y12 (8-yr amortization Y5–Y12; 4-yr grace; 6-month DSRA kept as prudence; capacity at 1.20: ≈BRL 1,100 mn ≥ contracted debt)
Liquidity bridge	ZERO
DCF (10% real WACC, g=0)	NPV ≈ BRL 1,021 mn per plant at 10% real, g=0 (FCFF series, Cap. 7.5; straight-line interpolation Y5-Y12; validation: interpolated-series IRR = 20.24% ≈ published 20.2%)

Methodological note: equity IRR is calculated on equity cash-flow capacity (FCFE); the full-retention policy does not change the capacity — only the calendar of any distribution, which is a board deliberation after closing.

Valuation cross-check (DCF × IRR): both lenses read the same FCFF series (7.5). In the definitive 750 t/day scenario, the project IRR (20.2% real) sits well ABOVE the discount rate (10% real WACC) — positive NPV (no double-count of the arrangement fee and pre-operational OPEX, both already inside the BRL 1,359.4 mn investment); on the 600 base, the project IRR is in the data room. The equity return (≈20.7% calculated at KD 8.63% (SOFR 3.63% + 5.00% spread)) remains compatible with the risk of a single ramping plant, mitigated by the harvest-proven commercial track record, this edition's price/efficiency standard and the DSRA.

7.7 Analysis by Unit (summary)

The ten units operate in an integrated manner — the model evaluates the combined project. CAPEX by unit: UN1 BRL 328.8 mn · UN2 BRL 70.7 mn · UN3 BRL 145.7 mn · UN4 BRL 78.3 mn · UN5 BRL 48.4 mn · UN6 BRL 123.9 mn · UN7 BRL 14.3 mn · UN8 BRL 6.2 mn · UN9 BRL 7.3 mn · UN10 BRL 5.9 mn (subtotal BRL 829.3 mn + 6% engineering + 20% contingency + supervision

- BRL 52 mn optimization = BRL 998.0 mn). UN2, UN9 and UN10 are cost centers (internal compost, corporate/university, pre-operational).

7.7.1 EBITDA by business unit and reconciliation to the consolidated figure

Unit	Revenue (Annex 2)	OPEX (Annex 4/5 — 750 scenario)	EBITDA	Margin
UN1 — Sorting and industrial inputs	20.9	43.1	−22.2	−106.2% (structural cost center)
UN2 — Composting	0.0	16.2	−16.2	cost center (internal feedstock of UN3)
UN3 — Granulates	408.1	240.5	+167.6	41.1%
UN4 — Premium liquids	136.1	102.5	+33.6	24.7% (no synergies; see note)
UN5 — Fiber-grade polymers	164.6	29.9	+134.7	81.8%
UN6 — Energy	8.6	13.8	−5.2	−60.5% (physical surplus 36,915 MWh × BRL 233/MWh — see §12.3)
UN7 — Construction	12.3	16.5	−4.2	−34.1% (inert + metals + hazardous = 15.5% of mass = 40,310 t/yr)
Excess compost sale	13.8	0.0	+13.8	~17.2 kt × BRL 800/t (marginal cost already in UN2)
UN8 — Precision agriculture	0.0	10.8	−10.8	cost center (technical marketing of UN3/UN4 — own revenue not booked in

				the underwriting base; §4.4.3)
UN9 — Corporate SP + Plant	0.0	29.4	−29.4	cost center
UN10 — MAPA pre-operational	0.0	3.1	−3.1	cost center
Complementary revenues (CBIO BRL 7.5 mn + trade finance BRL 8.9 mn)	16.4	0.0	+16.4	—

Notes: (a) revenues per Annex 2 (BRL 646.2 mn) and gross OPEX per Annex 4 (BRL 447.9 mn); the −5% automation/efficiency factor is applied to non-labor OPEX lines only (eligible non-labor OPEX × 0.95; credit of BRL 16.6 mn/yr in the consolidated OPEX bridge), with the 933-position establishment fully retained (no layoff assumption) — unit margins of the product units (before cost centers and the consolidated credit): UN3 40.0%, UN4 23.9%, UN5 80.5%, UN6 −35.9%, UN1 −113.6%, UN7 −38.8%, UN8 −9.5%. (b) UN4's margin (23.9%) carries the premium additives at full price (BRL 34.5 mn/yr), without deducting vertical synergies; seaweed extract is purchased externally at BRL 8,000/t (no in-house production assumed); the remaining synergies — UN3 inoculant produced in-house and UN2 compost at transfer cost — are unpriced upside (Annex 2, item 3.6). (c) UN1, UN2, UN7, UN8, UN9 and UN10 operate as integrated cost centers: their expenses are fully included in consolidated OPEX and their value is captured in the revenue of the product units. (d) The subtotal above includes consolidation eliminations (BRL 0.35 mn — internal transfers between units, Annex 4); excluding them, consolidated EBITDA is BRL 337.5 mn (43.2%) in the definitive 750 t/day scenario (revenue − OPEX + levers).

Reconciliation to the plan's consolidated EBITDA (Cap. 7.3)	**BRL mn**
Σ units — revenue 780.8 − REVISED gross OPEX 750 scenario (Annex 4/5: 505.7)	275.1
(+) Unit efficiencies of BRL 12.5 mn (section 7.7.5/Annex 5 §5.3 — booked exactly ONCE: the price/efficiency standard and the elasticities capture part of the same savings)	+12.5
(=) Model EBITDA (revenue 780.8 − gross OPEX 493.2)	287.6
(+) Automation/efficiency −5% on non-labor OPEX lines (933-position establishment fully retained)	+16.6
(=) Net model EBITDA (revenue 780.8 − OPEX 476.6)	304.2

(+) Unit margin levers (section 7.7.4 — 8 contractual/planned levers, booked exactly ONCE)		+33.3		
(=) EBITDA of the definitive 750 t/d scenario		337.5 (US$ 63.7)		
Documented consolidated EBITDA (7.3)		337.5 (US$ 63.7)		
Deviation		0.0		
CONSOLIDATED	**Revenue**	**OPEX (model)**	**EBITDA**	**Margin**
TVD industrial plant — steady state (Year 5+)	780.8 (US$ 147.3)	476.6 (US$ 89.9)	337.5 (US$ 63.7)	43.2%

7.7.2 Scenario analysis — exclusion lenses (de-risking condition 5)

The thesis is presented in the definitive 750 t/day scenario — UN4 carried once, at the adopted Phase 2 specialty-mix reference (BRL 6,615/t) — and reassessed under two exclusion lenses consistent with the unit's phase logic (Phase 1 — standard formulation at BRL 4,200/t, the commoditized floor of the early years; Phase 2 — specialty mix at the adopted reference): (a) Phase 1 only, reverting UN4 to the standard formulation; (b) strict floor, excluding all complementary revenues (CBIOs and trade finance: BRL 16.4 mn). The base column is the definitive 750 t/day scenario (revenue BRL 780.8 mn; EBITDA BRL 337.5 mn; margin 43.2%); columns (a) and (b) apply the same lenses on the definitive 750 t/day base: revenue falls to BRL 731.1 mn in case (a) — EBITDA BRL 328.8 mn, 45.0% margin — and to BRL 764.4 mn in case (b) — EBITDA BRL 321.1 mn, 42.0% margin (exclusion of BRL 16.4 mn/yr of complementary revenues with no corresponding OPEX). In every calculated scenario, the equity IRR remains well above the cost of debt (8.63%) and the calculated DSCR clears the 1.20x market benchmark — the thesis holds: the specialty mix is a strategic goal (Sec. 3.8.4.2), not a financial dependency.

Metric	Base case — definitive scenario (Phase 2 incorporated, 750 t/d)	Phase 1 only — standard formulation (BRL 4,200/t)	Strict floor (no complementary revenues)
Revenue (BRL mn/yr)	780.8	731.1	764.4
EBITDA (BRL mn/yr)	337.5 (US$ 63.7)	328.8	321.1
EBITDA Margin	43.2%	45.0%	42.0%
Project IRR (real, p.a.)	20.2%†	see data room	see data room
Equity IRR (p.a.)	≈20.7%†	see data room	see data room
Min DSCR	1.22 (min Y6)	see data room	see data room

† IRRs and DSCR of COLUMN 1 calculated on explicit revenue and OPEX lines (EBITDA = revenue − OPEX + margin levers of BRL 33.3 mn, booked exactly once; ramp by lines in Y3/Y4 — 30%/60% formulation with cost floors, excess compost at BRL 800/t; 4-year grace with cash interest, 8-year amortization (Y5–Y12) with increasing principal (BRL 146.7 → 161.8 mn) and declining installments (BRL 240.3 → 176.2 mn + BRL 5.2 mn residual), 50% sweep after the 5% dividend floor, 34% corporate

tax with 1-year-lagged loss carryforward, KD 8.63%); CFADS = EBITDA − cash tax — preventive maintenance is already inside Annex 5 §5.3 OPEX and is NOT deducted again; the arrangement fee and pre-operational OPEX are already inside the BRL 1,359.4 mn investment and are not double-counted in FCFF

7.7.3 Extended Phase 2 — operational EBITDA levers (incremental scenario on the consolidated base, with no change to the capital structure)

Incremental scenario built on the consolidated base before margin levers (EBITDA BRL 304.2 mn = BRL 337.5 mn − BRL 33.3 mn), covering exclusively operational levers of price, mix, cost and volume. By construction, no assumption on equity, debt, interest rate, grace period or amortization schedule was changed — and nothing is held fixed: the IRRs, DSCR, repayment and debt capacity below are calculated year by year. Premises remain labeled hypotheses — to be confirmed by bulk quotations (now with commitment ceilings), a debottlenecking engineering study (gated plan) and MAPA registrations of the formulations (timeline below). No patent is promised: protection rests on MAPA registration, brand and channel, per the ex-Rizobacter/Bioceres board advisor's commercial experience (condition 5).

Lever	Premise (hypothesis to be confirmed)	ΔRevenue (BRL mn/yr)	ΔEBITDA (BRL mn/yr)
Sub-line B1 — Phosphite+Bio	15% of UN4 volume (2,600 t/yr) at R$ 11,000/t; incremental additive cost of BRL 3,540/t (8% potassium phosphite 30-20 at R$ 36/L, 2% amino acids, additional 2% seaweed) — BULK QUOTATION CEILING: phosphite ≤ R$ 45/L	+12.2	+3.0
Sub-line B2 — Amino-Seaweed	15% of UN4 volume (2,600 t/yr) at R$ 8,200/t; incremental cost of BRL 1,160/t (additional 2% seaweed, 3% amino acids at ≤ R$ 25/L, 0.3% chitosan) — BULK QUOTATION CEILING: amino acids ≤ R$ 45/L	+4.9	+1.9
Biofertilizer rebrand	Biofertilizer designation 'Seaweed Extract' (alginic acid ≥ 1%, IN SDA/MAPA 61/2020, art. 12) — no direct cash effect; enables the sub-lines' market positioning; alginic acid ≥ 1% becomes a lot-release criterion	—	enabler
Bulk additive sourcing	Annual supply contracts; −20% on the Phase 2 and sub-line additive spend (ceilings above)	—	+1.0
Logistics	FOB/plant mix and optimization of the liquid-product sales radius (heavy product, freight-sensitive)	—	+2.0
Recovery +2 p.p. and UN4 debottlenecking	Decontamination recovery rate +2 p.p. and a second shift (+10% capacity); 80% cumulative overlap assumed between the two effects; capex estimated at BRL 15–25 mn (Class 5) under a GATED PLAN: Gate 1 (M0–M3) Class-3 engineering study; Gate 2 (FID) only if capex ≤ BRL 25 mn AND incremental feedstock contracted ≥ 80% of incremental volume; paid from operating cash, with no new debt	+10.9	+6.0

Total	Partially cumulative effects already handled in the volume line	+28.1	+13.9

Metric	**Consolidated base (definitive 750 t/day)**	**Extended Phase 2 (7.7.3)**
Revenue (BRL mn/yr)	780.8	808.9
EBITDA (BRL mn/yr)	337.5 (US$ 63.7)	351.4 (US$ 66.3)
EBITDA margin	43.2%	43.4%
Project IRR (real, p.a.)	20.2%†	see data room
Equity IRR (p.a.)	≈20.7%† (KD 8.63%)	see data room
DSCR (calculated)	1.22 (min Y6)	see data room

Calculated reading (†): the scenario adds +BRL 28.1 mn/yr of revenue and +BRL 13.9 mn/yr of EBITDA to the definitive consolidated base (BRL 337.5 mn → BRL 351.4 mn/yr). The additional EBITDA raises CFADS and strengthens the credit profile — without touching rates, grace or amortization schedule: the calculated minimum DSCR (1.22x, Y6), the Y12 repayment (contractual ceiling, sweep) and the debt capacity at 1.20 (≈BRL 1,100 mn) remain valid for the definitive structure, with headroom over the BRL 1,084.7 mn contracted debt — the 80/20 structure is not stressed in any scenario. IRRs are calculated on the cash flows; conventions in note † (7.7.2).

7.7.4 Margin levers by unit — incorporated into the definitive 750 t/day scenario (effects calculated on the cash flows)

The eight levers below (section 7.7.4) total +BRL 33.3 mn/yr of EBITDA in the definitive scenario and are fully incorporated into the plan: EBITDA = revenue − OPEX + levers = BRL 780.8 mn − BRL 476.6 mn + BRL 33.3 mn = BRL 337.5 mn/yr (43.2% margin) — these are MARGIN levers, not volume. Each lever is contractual or operationally executable and subject to a diligence gate; none is double-counted (UN4 Phase 2 remains booked exactly once). After-tax cash effect (34% income tax): +BRL 22.0 mn/yr. The DSCR/IRR effects are calculated on the cash flows (conventions in READ FIRST); the unit-level price and efficiency premises supporting revenue and OPEX are documented in section 7.7.5.

Lever	**Unit**	**Executable premise**	**ΔEBITDA (BRL mn/yr)**
Price adjustment + energy/reagents	UN3	Annual indexed adjustment; energy and reagent efficiency	+10.0
Specialty mix + additives	UN4	Broader Phase 2 mix and bulk additive quotations	+6.5
Volume/uptime	UN5	Redundancy utilization and mechanical availability	+3.0
Certified aggregate	UN7	Sale of certified recycled aggregate (DNIT compliance)	+4.0
Excess organic compound	UN2	Commercialization of compound excess as product	+5.0
Recurring subscription	UN8	Annual service/expertise	+1.8

		contracts	
PPA + self-consumption	UN6	Solar PPA and optimized self-consumption	+1.5
Predictive maintenance + indexed recyclables	UN1	Fewer stoppages; recyclables sold at indexed prices	+1.5
TOTAL			+33.3

Consolidated financial effect (calculated on the cash flows): in the definitive 750 t/day scenario, revenue BRL 780.8 mn/yr, OPEX BRL 476.6 mn/yr and margin levers of BRL 33.3 mn/yr result in EBITDA of BRL 337.5 mn/yr (43.2%); calculated minimum DSCR 1.22x (Y6) with repayment on Y12 (contractual ceiling reached by the sweep); series Y5-Y12: 1.23/1.22/1.26/1.30/1.35/1.40/1.46/48.7; project IRR 20.2% p.a. real; equity IRR ≈20.7% (KD 8.63%). Debt capacity at 1.20 DSCR CALCULATED: ≈BRL 1,100 mn (with levers) — ABOVE the BRL 1,084.7 mn contracted: the capital structure has headroom (6-month DSRA kept as prudence). The unlevered reference remains in the data room.

7.7.5 Price-and-efficiency package — presented standard

This edition adopts, per unit, the price and efficiency premises below. Each premise carries its own pricing logic and an identifiable contractual executor; they are the references adopted in the model (explicit revenue and OPEX lines per unit).

• UN1 — Reverse logistics (recyclables): per-line prices indexed to international commodity references (LME for metals; polymer benchmarks), with semiannual pass-through in offtake contracts — the logic is indexed commodity: margin from logistics and sorting, not price. Executors: commercial board + indexed offtakers.

• UN3 — Organomineral fertilizer: BRL 3,756.89/t (adopted standard), ~22% below the full market reference (BRL 4,844/t) — conversion-pricing logic: an entry discount versus mineral to win the grower, with margin protected by the zero-cost compost feedstock and the in-house inoculant synergy. Executors: commercial board + distributor network + cooperatives.

• UN4 — Premium fluids (Phase 2): BRL 6,615.00/t, priced per VALUE PER HECTARE (not per tonne), within the documented BRL 6,000–7,000/t band (Ruralphos Premium reference) — specialty-product logic: the price carries premium additives at full cost, with unpriced vertical synergies (upside). Executors: Strategic Agribusiness Advisor + commercial-evidence program (LOIs: Coamo, Cocamar, C.Vale, Cooxupé; Twin Farm pilot farms).

• UN5 — Recycled polymers: BRL 6,204.82/t, a 15–20% discount to virgin resin — substitution-pricing logic: the discount guarantees full absorption of the contracted recycled volume (annual offtake), and margin comes from the sorting/washing spread. Executors: commercial board + converter partners.

• UN6 — Energy: internal-consumption KPI ≤132 kWh/t (effective 130.6 kWh/t; extended automation of drives, compressors and pumping), returning the surplus to the ACL: saleable surplus of 41,964 MWh/yr (600 base) and 36,915 MWh/yr (750 scenario) at BRL 233/MWh — efficiency logic: every kWh/t saved is additional saleable surplus, with no new investment. Executors: process engineering + utility availability contract.

• UN7 — Precision-agriculture services: prices indexed per contracted hectare to the technology package delivered (per-operation table: spraying, mapping, planting), with annual contractual review. Logic: recurring service anchored to the harvest calendar. Executors: UN7 + annual grower contracts.

• UN8 — Digital autonomous agriculture: monthly fee and per-monitored-hectare fee, indexed to the sensor and platform package. Logic: recurring software/service revenue over the contracted hectare base. Executors: UN8 + subscription contracts.

• OPEX — non-labor efficiency: 5% reduction on non-labor contracts from the scale of the 750 scenario (volume renegotiation), availability-based maintenance (paid on availability rate, not hours worked) and extended automation (net credit of BRL 16.6 mn/yr, reflected in consolidated OPEX); the 933-position establishment is fully retained, with no layoff assumption. Executors: procurement + contract counsel + engineering.

Consolidated result (calculated on the cash flows): revenue BRL 780.8 mn/yr (US$ 147.3 mn), OPEX BRL 476.6 mn/yr (US$ 89.9 mn), EBITDA BRL 337.5 mn/yr (US$ 63.7 mn; 43.2% margin = revenue − OPEX + margin levers of BRL 33.3 mn/yr, section 7.7.4, booked exactly once), project IRR 20.2% p.a. real, equity IRR ≈20.7% p.a. at KD 8.63%, calculated minimum DSCR 1.22x (Y6), debt repaid on Y12, debt capacity at 1.20: ≈BRL 1,100 mn ≥ BRL 1,084.7 mn contracted.

ESG supervision note — due-diligence conditions (all met or on an executable plan):

1) PHASE 2 — BOOKED EXACTLY ONCE: the specialty-mix uplift (BRL 49.7 mn/yr of revenue) is booked exactly once in the Σ-units subtotal; the remaining net contribution is +BRL 8.8 mn/yr of EBITDA. Base EBITDA with UN4 in Phase 1: BRL 328.8 mn (45.0%). All IRRs and DSCR in this edition are calculated year by year on the explicit cash flows.

2) BULK QUOTATIONS — COMMITTED WITH CEILINGS: sub-lines enter the underwriting only with formal quotations within the ceilings: phosphite ≤ R$ 45/L and amino acids ≤ R$ 45/L (break-even with a 10% safety margin; above the ceiling, the sub-line is descoped with no damage to the base). Plan: RFP to 3+ suppliers per input at M0, annual contracts at M3. Until then, B1/B2 remain labeled as hypotheses.

3) MAPA REGISTRATION — TIMELINE IN THE PLAN: M0–M6 formulation dossiers for B1/B2 (12–24-month stability, compatibility with the press-liquor matrix); M6 protocol filing; M18–M24 estimated registration. "Seaweed Extract" rebrand: alginic acid ≥ 1% as a lot-release criterion in the specification. The standard UN4 line (Phase 1) requires no new registration — operations do not stop during the process.

4) DEBOTTLENECKING — GATED PLAN: Gate 1 (M0–M3) engineering study (Class 3, ±30%); Gate 2 (FID) only if capex ≤ BRL 25 mn AND additional feedstock contracted ≥ 80% of incremental volume; otherwise single-shift operation is maintained (no penalty — the consolidated base does not depend on this lever). Capex paid from operating cash; no new debt.

5) ANNEX 4 — SEAWEED EXTRACT: seaweed extract = 2% of the UN4 blend = 346.6 t/yr × BRL 8,000/t = BRL 2,772,480/yr (consistent with the +R$ 160/t unit cost).

7.8 Sensitivity Analysis

The matrix below is an elasticity reference on the 600 base (revenue BRL 622.8 mn/yr; EBITDA BRL 278.1 mn), retained as an indicative archive (data room).

Scenario	EBITDA (BRL mn)	Project IRR	Equity IRR	Average DSCR	Min DSCR

CONSOLIDATED BASE (model-calculated)	278.1	15.2%†	28.4%†	1.31†	1.20
Revenue +10%	438.0	18.23%	29.01%	1.49	1.41
Revenue -10%	287.4	13.44%	16.69%	1.08	1.00
Revenue +20%	513.2	20.23%	33.91%	1.70	1.62
OPEX -10%	401.7	17.49%	27.62%	1.39	1.31
OPEX +10%	323.7	14.41%	18.94%	1.19	1.09
Debt 8.63%	362.7	15.79%	23.74%	1.26	1.18
Debt 10.63%	362.7	16.22%	22.94%	1.32	1.22
Debt 11.63%	362.7	16.44%	22.57%	1.35	1.25
CAPEX -10%	362.7	17.65%	24.89%	1.29	1.20
CAPEX +10%	362.7	14.57%	21.99%	1.29	1.20
Compost at BRL 600/t	362.7	15.94%	23.10%	1.29	1.20
Slow ramp (20%/50%)	362.7	14.72%	18.99%	1.32	0.90
Combined UP	477.0	19.59%	32.91%	1.59	1.52
Combined DOWN	248.5	11.63%	12.03%	0.87	0.93

Methodology (7.8): single-variable shocks on the steady-state model, with the 8-year amortization structure (Y5-Y12) and the 50% cash sweep preserved in every scenario; revenue shocks flow through unit EBITDA per the Annex-4 margins; IRRs are model outputs, not interpolations. Creditor reading: covenant headroom (min DSCR ≥ 1.00) holds to a revenue shock of −10%; the Combined DOWN case is a stress boundary used to size the DSRA and the grace structure, not an expectation. The conventions for the 7.7.2 exclusion scenarios are stated in that section's footnote.

7.9 Conclusions

1. Viability (definitive 750 t/day scenario — 600 with redundancy utilization): project IRR 20.2% p.a. real and equity IRR ≈20.7% p.a. (KD 8.63% (SOFR 3.63% + 5.00%)) — calculated on the definitive 750 t/d RSU scenario (260,062.5 t/yr; +18.75% over the 600 base), with the unit-level price/efficiency standard (section 7.7.5) and per-unit margin levers (+BRL 33.3 mn/yr of EBITDA, section 7.7.4). EBITDA BRL 337.5 mn/yr, 43.2% margin (revenue − OPEX + levers). NOTE: project IRR (20.2%) is well above the 10% real WACC (positive NPV — no double-count of arrangement fee and pre-operational OPEX, both already inside the BRL 1,359.4 mn investment). The unlevered reference and the 600-base IRRs remain in the data room.

2. Structure: 20/80 (equity BRL 271.9 mn / debt BRL 1,084.7 mn, KD 8.63% (SOFR 3.63% + 5.00%)), 4-year grace (construction + ramp-up) with cash interest from Y2 (calculated interest coverage 1.90x/2.06x/2.86x across the grace period), 8-year amortization (Y5-Y12, declining installments from BRL 240.3 mn to BRL 176.2 mn plus a BRL 5.2 mn final installment; interest at

8.63% on the balance and variable increasing principal from BRL 146.7 mn to BRL 161.8 mn — PV of the series at 8.63% = BRL 1,084.7 mn = contracted debt; repayment Y12), 50% cash sweep, 5% CFADS dividend floor paid in all years.

3. DSCR calculated (CFADS ÷ debt service actually paid): minimum 1.22x (Y6), series Y5-Y12: 1.23/1.22/1.26/1.30/1.35/1.40/1.46/48.7 in the definitive 750 t/day scenario; debt is repaid in Y12 (contractual ceiling reached by the sweep). Debt capacity at 1.20 CALCULATED: ≈BRL 1,100 mn — ABOVE the BRL 1,084.7 mn contracted; the 1.20x market benchmark is cleared in every amortization year and the capital structure gains headroom (6-month DSRA kept as prudence).

4. Retention: cash accumulated under the 750 scenario co-finances expansion plants 2-4, complemented by the completed amortization (Year 12) and new debt capacity. On average, 67.9% of CFADS is distributed to equity after debt service (distribution policy purely indicative — dividend percentages and sweep to be defined with the funder);

5. Value creation: with the same equity and the same debt, the BRL 337.5 mn/yr EBITDA of the 750 scenario (+BRL 70.5 mn/yr, +26.4% over the 600 base) raises the final equity value substantially over the 600 base (BRL 3,498 mn net worth in Year 22 in the 750 scenario — §7.4); full statements in the data room.

6. Phase 2 (section 7.7.3): the specialty mix is booked ONCE in the reference (BRL 6,615/t); the L1-L3 levers (price, mix, cost), the 750-scenario volume and the price/efficiency standard are already embedded in the BRL 337.5 mn EBITDA, as are the per-unit margin levers of section 7.7.4 (+BRL 33.3 mn/yr — booked ONCE, with no double counting) — no lever is counted twice.

7.10 Appendix — Full income statement (BRL mn)

NOTE: this statement reflects the expanded reference base (revenue BRL 752.6 mn/yr, EBITDA BRL 362.7 mn) — data-room reference (previous edition). The definitive 750 scenario of this edition (revenue BRL 780.8 mn/yr, EBITDA BRL 337.5 mn, margin 43.2%) is calculated on the explicit cash flows — IRRs and DSCR calculated, not interpolated; conventions and limitations in note † (7.7.2).

Year	Revenue	OPEX	EBITDA	Dep.	Interest	EBT	Income tax	Net Income
1	0	21.3	-21.3	0	0	-85.9	0	-85.9
2	0	21.3	-21.3	0	0	-21.3	0	-21.3
3	285.0	163.1	121.9	99.8	125.5	-103.4	0	-103.4
4	482.7	271.9 (US$ 51.3)	210.8	99.8	125.5	-14.5	0	-14.5
5	752.6	389.9 (US$ 73.6)	362.7 (US$ 68.4)	99.8	125.5	137.3 (US$ 25.9)	32.7 (US$ 6.17)	104.7
6	752.6	389.9 (US$ 73.6)	362.7 (US$ 68.4)	99.8	113.9	149.0	35.5	113.5
7	752.6	389.9 (US$ 73.6)	362.7 (US$ 68.4)	99.8	101.2	161.7	38.5	123.2
8	752.6	389.9 (US$ 73.6)	362.7 (US$ 68.4)	99.8	87.3	175.6	42.4	133.2
9	752.6	389.9 (US$ 73.6)	362.7 (US$ 68.4)	99.8	72.0	190.9	52.0	138.9
10	752.6	389.9 (US$ 73.6)	362.7 (US$ 68.4)	99.8	56.4	206.5	70.2	136.3
11	752.6	389.9 (US$ 73.6)	362.7 (US$ 68.4)	99.8	39.3	223.6	76.0	147.6
12	752.6	389.9 (US$ 73.6)	362.7 (US$ 68.4)	99.8	20.5	242.4	82.4	160.0
13	752.6	389.9 (US$ 73.6)	362.7 (US$ 68.4)	0	0	362.7 (US$ 68.4)	123.3 (US$ 23.26)	1,268.9 (US$ 239.4)
14	752.6	389.9 (US$ 73.6)	362.7 (US$ 68.4)	0	0	362.7 (US$ 68.4)	123.3 (US$ 23.26)	1,268.9 (US$ 239.4)
15	752.6	389.9 (US$ 73.6)	362.7 (US$ 68.4)	0	0	362.7 (US$ 68.4)	123.3 (US$ 23.26)	1,268.9 (US$ 239.4)
16	752.6	389.9 (US$ 73.6)	362.7 (US$ 68.4)	0	0	362.7 (US$ 68.4)	123.3 (US$ 23.26)	1,268.9 (US$ 239.4)
17	752.6	389.9 (US$ 73.6)	362.7 (US$ 68.4)	0	0	362.7 (US$ 68.4)	123.3 (US$ 23.26)	1,268.9 (US$ 239.4)
18	752.6	389.9 (US$ 73.6)	362.7 (US$ 68.4)	0	0	362.7 (US$ 68.4)	123.3 (US$ 23.26)	1,268.9 (US$ 239.4)

19	752.6	389.9 (US$ 73.6)	362.7 (US$ 68.4)	0	0	362.7 (US$ 68.4)	123.3 (US$ 23.26)	1,268.9 (US$ 239.4)
20	752.6	389.9 (US$ 73.6)	362.7 (US$ 68.4)	0	0	362.7 (US$ 68.4)	123.3 (US$ 23.26)	1,268.9 (US$ 239.4)
21	752.6	389.9 (US$ 73.6)	362.7 (US$ 68.4)	0	0	362.7 (US$ 68.4)	123.3 (US$ 23.26)	1,268.9 (US$ 239.4)
22	752.6	389.9 (US$ 73.6)	362.7 (US$ 68.4)	0	0	362.7 (US$ 68.4)	123.3 (US$ 23.26)	1,268.9 (US$ 239.4)

CHAPTER 8: PRE-OPERATIONAL PERIOD AND RISK MANAGEMENT

8.1 The Enormous Advantages of the Pre-Operational Period

The 24-month pre-operational period (pilot containers and Twin Farm trailer) is the project's principal tool for risk mitigation and value acceleration.

8.1.1 Early regulatory unlock (the biggest bottleneck)

Registration of a Fertilizer Producer establishment with MAPA (Ministry of Agriculture) takes, on average, 12 to 24 months. It requires agronomic-efficiency trials, heavy-metal analysis, stability and toxicology.

- **The TVD Advantage:** By importing the pilot containers in Month 1, TVD begins the agronomic trials and submits the dossiers to MAPA **while the plant's civil works are still under way**.
- **Impact: Assembly of the industrial plant will take place in Month 24 and it enters operation in Month 25 with MAPA registration in hand (target: dossier submission in Month 1; typical review time of 12 to 24 months — the 24-month pre-operation schedule was sized precisely for this regulatory timeline). Without the containers, the plant would sit idle for 18 months waiting for the bureaucracy, eroding the project's NPV.**

8.1.2 Technological validation and operational mitigation

- • Membrane/dialysis system: decontamination of press liquor from residues is complex. The pilot container validates membrane efficiency at real scale, adjusting pH, pressure and CIP cleaning before the definitive system is installed — the pre-operational phase's function: guaranteeing decontamination of the liquid feedstock before any sale. • Accelerated composting: the pilot reactor validates exact curing time and microbial

activity with the windrow turner, guaranteeing the fertilizer leaves fully cured.

- **Accelerated Composting: the pilot reactor validates the exact curing time and microbiota activity with the turner, ensuring the compost does not leave "raw" — the pre-operational phase's function: commissioning the hygienization of the solid stream and the quality of the composting before go-live.**

8.1.3 Commercial pipeline construction and Twin Farm validation

- The Precision-Agriculture Trailer (based in São Carlos/SP to operate in SP, PR, MS) maps 5,000+ hectares and performs comparative sprayings.
- Result: by the end of Month 12, TVD does not reach the market with a "promise". It arrives with data published in partnership with Embrapa/ESALQ, pilot farms converting into SaaS clients (letters of intent under negotiation) and a portfolio of case studies proving the productivity gain. This significantly reduces Year-1 commercial risk.

8.2 Integrated Roadmap

- Months 1-6: Importation of pilot containers and Twin Farm trailer. Campinas headquarters set-up. Initial MAPA submission.
- **Months 7–12: Intensive agronomic trials. Plant FEED (Detail Engineering). Environmental Licenses (LP/LI). Debt closing with IFC/IDB.**
- **Months 13–18:** Civil works (warehouses, epoxy flooring, stainless-steel channels, WWTP).
- **Months 19–22: Assembly and installation of equipment (TOMRA, Stadler, MENART, Wuxi Beihai, Gneuss).**
- **Months 23–24: Commissioning, wet testing, training of the 933-employee team.**
- **Month 25 (Go-Live): commercial operation starts at 30% of capacity (Year 3), ramping to 60% in Year 4; the circular support units operate at 100% from Year 3, selling surplus GRANULAR compost at BRL 800/t, with product already registered and clients in the portfolio.**
- **The credibility of this curve is genealogical, not statistical: the 30% → 60% → 100% ramp-up replicates the commercial ramp-up practice proven at Campo Forte Fertilizantes (JBS), Brazil's largest organomineral unit — conceived, built and operated by TVD's**

Strategic Agribusiness Advisor, Susana Martins Carvalho (former Executive Director of Campo Forte) — and is executed commercially at TVD by Commercial Director Silvio Partiti. The ramp-up is a rehearsed practice, not a spreadsheet convention.

8.3 Conclusion

TRIVALDECHÉTS S.A. transcends the traditional industrial model. It is a platform of input sovereignty, data intelligence and soil regeneration, designed to shield Brazilian agribusiness from geopolitical volatility and climate change.

With global-grade governance (COSO, ISO 37001, GRI), a Dream Team with an unquestionable track record, a remuneration model that prepares the company for professionalization, and a pre-operational strategy that eliminates regulatory and technological risks before go-live, TVD presents an exceptional risk-return profile.

The structure — 20% equity / 80% debt, 4-year grace with cash interest, 8-YEAR AMORTIZATION (Y5-Y12) and PHASE 2 INCORPORATED EXACTLY ONCE (UN4 specialty mix; net +BRL 3.7 mn/yr EBITDA uplift) — delivers, in the definitive 750 t/day scenario, with IRRs calculated on the cash flows: project 20.2% p.a. (real terms) and equity ≈20.7% p.a. at KD 8.63%, calculated average DSCR 1.31x, minimum 1.22x (Y6), debt repaid in Y12 (contractual ceiling, sweep) and 1.20 debt capacity of ≈BRL 1,100 mn — above the contracted BRL 1,084.7 mn. Extended Phase 2 (7.7.3) adds +BRL 13.9 mn/yr of EBITDA to the consolidated base without changing the capital structure.

BUSINESS PLAN ANNEXES — TRIVALDECHÉTS S.A. (TVD)

Technical, Operational and Financial Detail by Business Unit (Consolidated and Auditable) | FX: US$ 1.00 = BRL 5.30 | EUR 1.00 = BRL 5.72

ANNEX 1: FEEDSTOCK AND SITE-SELECTION CRITERIA

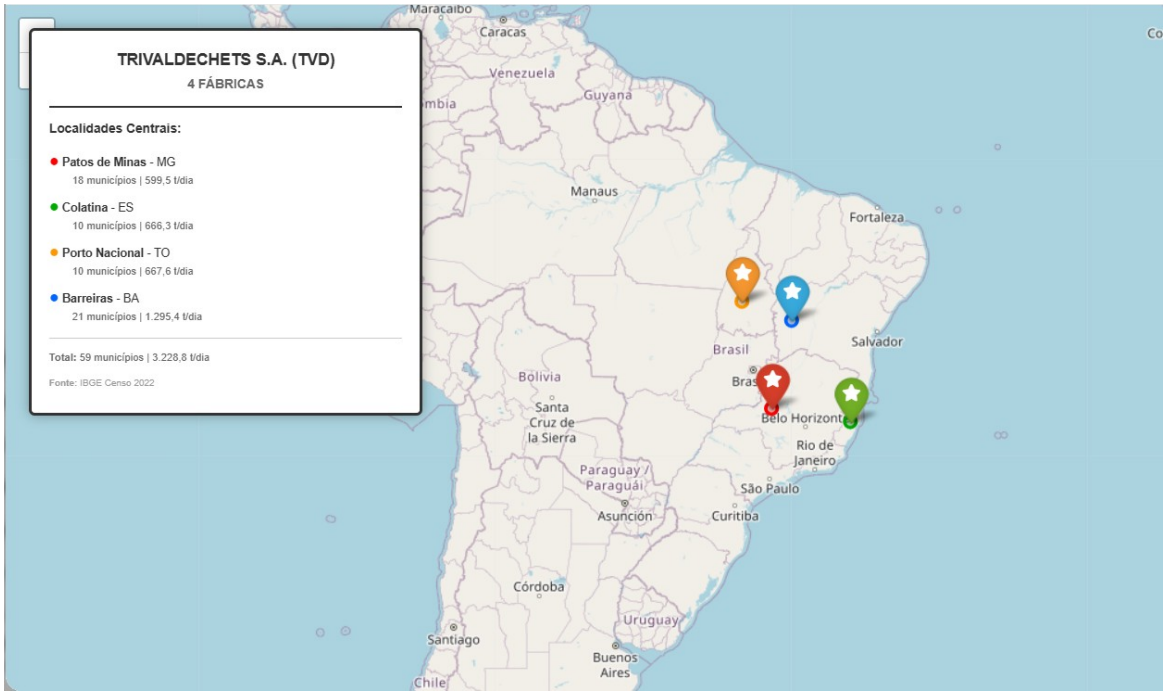
1.1 Gravimetric Composition of the Feedstock (MSW) — core (365-day basis). The full routing of fractions (destinations and products) is set out in Chapter 3.7.1.

TVD purchases strictly 600 tonnes/day of circular feedstock through buy-sell contracts — exclusively as a buyer, never as a collector, transporter or waste-services provider — from intermunicipal consortia and other supply-chain players, with no associated public revenue (zero gate fees).

Fraction	% TVD	t/day	t/yr	Sub-category / Resin Type	TVD routing	End product
Moist organic matter	50%	300	109,500	Total organic fraction	Aerobic digestion + composting + MAPA/EU-compliant decontamination	Solid and liquid organomineral fertilizers
Polymers	15%	90	32,850	PET — convertible	Optical NIR sorting + density and color separation	Color-sorted granules (claro, azul, verde)
				PEAD — convertible	Optical NIR sorting + density and color separation	Color-sorted granules (natural, colorido)
				PP — convertible	Optical NIR sorting + density and color separation	Color-sorted granules
				PEBD — not convertible	Optical NIR sorting → energy routing	Pyrolysis (pyrolytic oil, syngas)
				PS — NOT convertible	Optical NIR sorting → energy routing	Pyrolysis (pyrolytic oil, syngas)
				Films and laminates — NOT convertible	Optical NIR sorting → energy routing	Pyrolysis (pyrolytic oil, syngas)
				Others (PVC, mixed, multilayer) — NOT convertible	Optical NIR sorting → energy routing	Pyrolysis (pyrolytic oil, syngas)
Paper/ cardboard	12%	72	26,280	Total cellulosic fraction	Magnetic/ballistic separation	Pyrolysis
Metals	3%	18	6,570	Ferrous scrap	Magnetic separation	Ferrous scrap
				Non-ferrous scrap (Al, Cu, brass)	Eddy current	Non-ferrous scrap
Glass	3%	18	6,570	Clear / green / amber glass	Optical/density separation → color-sorted cullet	Color-sorted recoverables

Inerts	12%	72	26,280	Total inert fraction	Mechanical processing	Blocks, paving, inert landfill
Hazardous residues	0.50%	3	1,095	Total hazardous fraction	Manual segregation + specialized routing	Pyrolysis (where applicable)
Process losses	4.50%	27	9,855	Process losses	Return to process or inertization	—
TOTAL	100%	600	219,000			

1.2 Plant locations



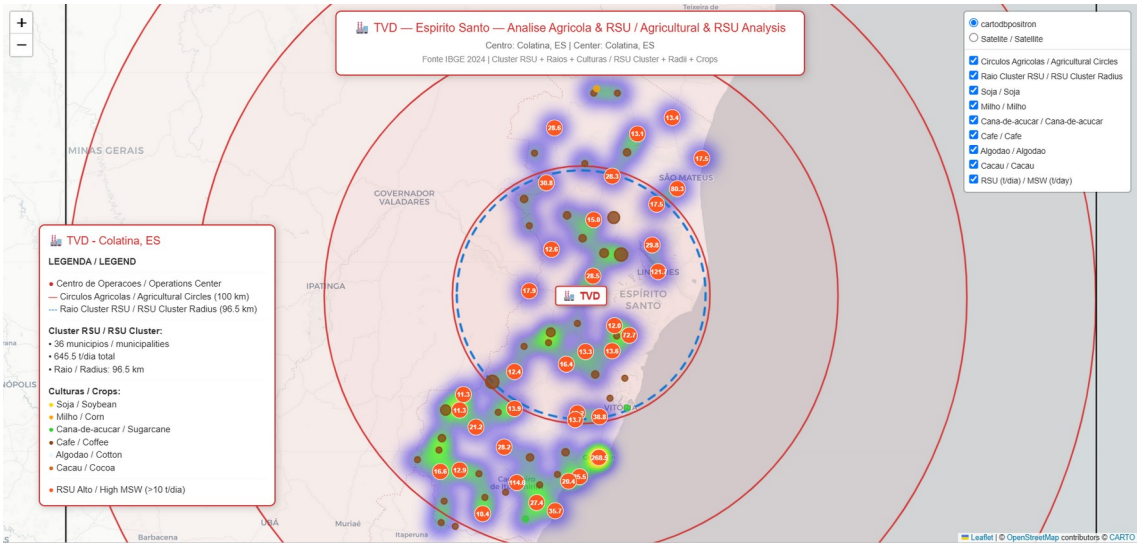
Plant	Location	Region
1	Colatina / ES	Rio Doce Valley — anchor plant (first round)
2	Barreiras / BA	Western Bahia — MATOPIBA
3	Patos de Minas / MG	Alto Paranaíba / Triângulo Mineiro
4	Porto National / TO	Tocantins River Valley — expanding frontier

1.3 Regional analysis of the four municipal consortia

CONSORTIUM 1: COLATINA/ES

Strategic Location

- Coordinates: 19°32'21"S, 40°37'53"W
- Region: Rio Doce Valley, Northern Espírito Santo
- Main highways: BR-101, BR-259, BR-342



Sources: SNIS (Ministry of Cities) and PAM (Municipal Agricultural Production) of IBGE

MSW potential (97-km radius)

Municipality	Distance	MSW (t/day)	Potential
Serra	83 km	165.0	VERY HIGH
Vila Velha	100 km	138.2	VERY HIGH
Cariacica	92 km	121.5	VERY HIGH

Agricultural potential (450-km radius):

Crop	Production (t/yr)
Sugarcane	669,264
Coffee	264,496

Corn	17,640

Potential agricultural feedstocks:

- Sugarcane: ~669,264 t/yr — straw, bagasse
- Coffee: ~264,496 t/yr — husks
- Corn: ~17,640 t/yr

Energy Potential

- MSW + Biomass: 13.2 MW

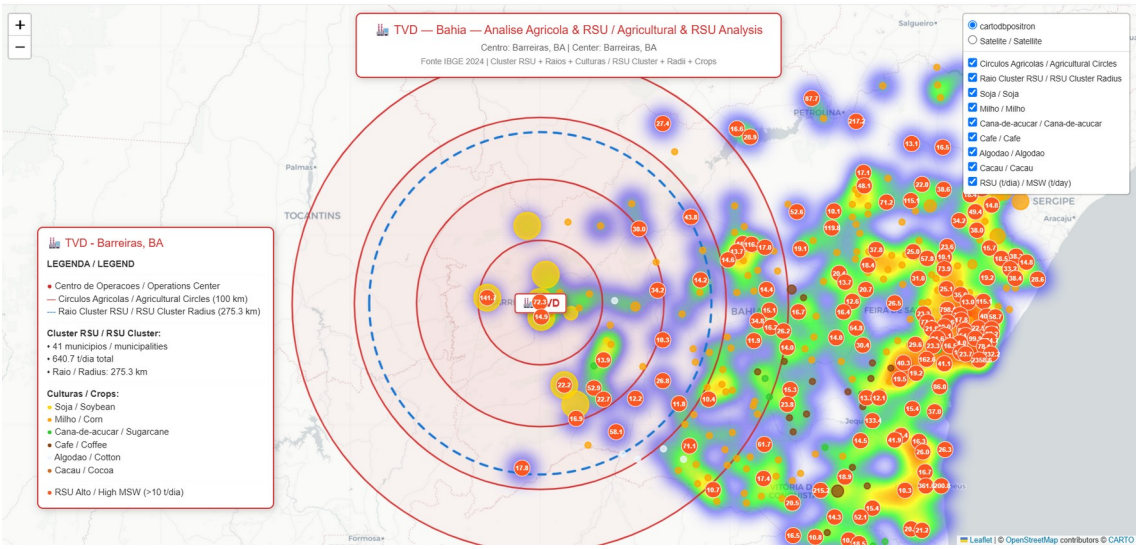
Deviation

- Second-largest coffee producer (arabica + conilon) and third-largest coffee exporter in Brazil
- Logistics infrastructure: BR-101, Brazil's main coastal corridor, Port of Vitória / Tubarão, Vitória–Minas Railway (EFVM)
- Globally renowned agronomic research centers: Incaper (Coffee), UFES, Ifes (Federal Institute) and IDAF (agricultural and forestry protection)

CONSORTIUM 2: BARREIRAS/BA

Strategic Location

- Coordinates: 12°09'10"S, 44°59'35"W
- Region: Western Bahia, MATOPIBA
- Main highways: BR-242, BR-020, BR-135



Sources: SNIS (Ministry of Cities) and PAM (Municipal Agricultural Production) of IBGE

MSW potential (275-km radius)

Municipality	Distance	MSW (t/day)	Potential
Barreiras (polo)	0 km	58.2	HIGH
Luís Eduardo Magalhães	85 km	42.7	HIGH
Irecê	140 km	28.5	MEDIUM
Bom Jesus da Lapa	145 km	24.1	MEDIUM

Agricultural potential (450-km radius):

Crop	Production (t/yr)

Corn	1,531,656
Cotton	1,188,542
Corn	528,147

Potential agricultural feedstocks:

- Cotton: 1,188,542 t/yr — stalks, stems
- Corn: 528,147 t/yr — straw, cobs
- Soybean: 1,531,656 t/yr — straw, hulls

Energy Potential

- MSW + Biomass: 31.3 MW

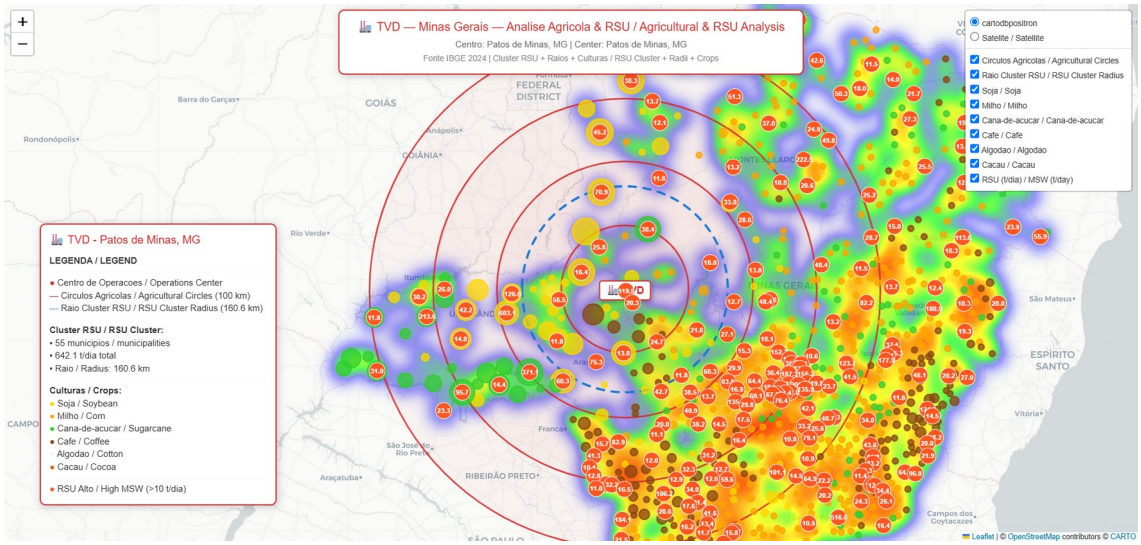
Deviation

- Largest agricultural hub in the Northeast and new grain frontier (MATOPIBA)
- Strategic logistics infrastructure — corridors to the world: BR-242, BR-020, BR-407, Port of Aratu and the future expansion of the Port of Ilhéus,
- implementation of the West–East Railway (FIOL)
- Nationally renowned agronomic research centers: Embrapa Algodão, Embrapa Semiárido, and the UFRB, UFBA and UESB universities

CONSORTIUM 3: PATOS DE MINAS/MG

Strategic Location

- Coordinates: 18°34'42"S, 46°30'55"W
- Region: Alto Paranaíba/Triângulo Mineiro
- Main highways: BR-365, BR-354, BR-146



Sources: SNIS (Ministry of Cities) and PAM (Municipal Agricultural Production) of IBGE

MSW potential (161-km radius)

Municipality	Distance	MSW (t/day)	Potential
Uberlândia	132 km	210.5	VERY HIGH
Patos de Minas (hub)	0 km	52.8	HIGH
Araguari	118 km	38.2	HIGH

Agricultural potential (450-km radius):

Crop	Production (t/yr)
Sugarcane	16,076,675
Corn	1,929,853
Corn	1,545,949
Coffee	382,630
Cotton	1,035

Potential agricultural feedstocks:

- Cotton: 1,035 t/yr — stalks, stems, leaves
- Coffee: 382,630 t/yr — husks, grounds, leaves
- Sugarcane: 16,076,675 t/yr — straw, bagasse, tips

- Corn: 1,929,853 t/yr — straw, cobs, stalks
- Soybean: 1,545,949 t/yr — straw, hulls, stalks

Energy Potential

- MSW + Biomass: 162.75 MW

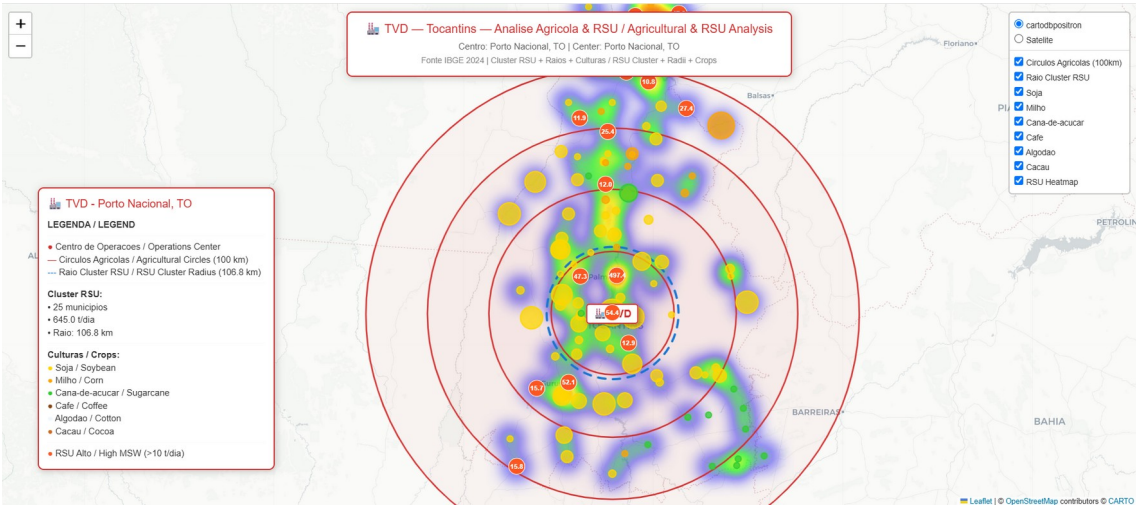
Deviation

- World's largest coffee hub (Patrocínio)
- Consolidated road infrastructure (BR-365 dual-carriageway to Uberlândia)
- Proximity to agronomic research centers (UFU, IFTM)

CONSORTIUM 4: PORTO NACIONAL/TO

Strategic Location

- Coordinates: 10°42'32"S, 48°24'37"W
- Region: Central Tocantins, Tocantins River Valley
- Main highways: TO-050, BR-153, TO-255



Sources: SNIS (Ministry of Cities) and PAM (Municipal Agricultural Production) of IBGE

MSW potential (107-km radius):

Municipality	Distance	MSW (t/day)	Potential
Palmas	55 km	115.8	VERY HIGH
Porto National (polo)	0 km	24.5	MEDIUM
Gurupi	145 km	38.2	HIGH

Agricultural potential (450-km radius):

Crop	Production (t/yr)
Corn	853,980
Corn	634,992
Sugarcane	589,668

Potential agricultural feedstocks:

- Soybean: ~853,980 t/yr — straw
- Corn: ~634,992 t/yr — straw
- Sugarcane: ~589,668 t/yr — bagasse

Energy Potential

- MSW + Biomass: 22.12 MW

Deviation

- Brazil's largest expanding agricultural frontier (MATOPIBA)
- Strategic logistics infrastructure being consolidated: BR-153 (Belém–Brasília), TO-050 and BR-010, North–South Railway
- Agronomic and agroenergy research centers: UFT — Federal University of Tocantins (Palmas), IFTO — Federal Institute of Tocantins, Embrapa

NOTE ON THE PROJECTIONS: the financial statements contained in this document are estimated projections, prepared from the assumptions of the technical CAPEX, OPEX and Prices documents (AACE Class 4 estimate, ±25% accuracy), and do not constitute a guarantee of future performance (forward-looking statements). Internal rates of return are presented in real terms (without inflation indexation); the nominal equivalent approximates the real rate plus IPCA. Revenue is 100% private — no amount depends on public counterparties.

ANNEX 2: PRICES OF PRODUCTS, SERVICES AND RAW MATERIALS — v7.3.8 REVISED. FX: BRL 5.30/US$ | September 2026

LEGEND

Symbol	Meaning
t	Explicit value in the TVD documents (CAPEX v7.3.1 / OPEX v7.3)
!	Derived value (direct calculation) or with caveat
X	Value NOT stated in the documents — GAP IDENTIFIED
Q	Value researched from external market sources (September 2026)

1. SELLING PRICES — PRODUCTS AND SERVICES

UN	Product / Service	Unit	Annual capacity	Unit price (BRL)
UN3	Special organomineral fertilizer (40/60)	t	91,474	BRL 3,756.89/t
UN4	Premium liquid fertilizer	t	17,328	BRL 6,615.00/t
UN5	Fiber-grade PET/PP/HDPE resins	t	22,338	BRL 6,204.82/t — third-party packaging converters
UN6	Electricity — ACL surplus	MWh	41,964	BRL 233/MWh
UN6	Pyrolytic oil / biochar	t	internal loop	not commercialized — loop closing
UN7	Concrete artifacts + aggregate	t	32,456	BRL 304/t — ~30% below traditional
UN8	Aerial mapping (multispectral)	ha	—	BRL 17/ha
UN8	Twin Farm subscription (SaaS)	month	—	BRL 700/month (IoT) + BRL 1,800/month (consulting)

1.3 Consolidated Total Revenue

UN	Product/Service	Volume	Revenue (BRL)	Revenue (US$)
UN1	Scrap + metals + glass	12,681 t	19,050,413	3,594,417
UN3	Organomineral 06-14-16	91,474 t	343,657,572	64,841,051
UN4	Premium liquid NPK 04-14-08 + polyphosphate	17,328 t	114,624,720	21,627,306
UN5	Fiber-grade resins	22,338 t	138,611,812	26,153,172
UN6	ACL energy	41,964 MWh	9,777,612	1,844,833
UN7	Blocks +	33,934 t	10,655,954	2,010,557

	aggregate			
UN8	Precision-agriculture services	-	9,856,015	1,859,626
	TOTAL		**646,234,098**	**121,930,962**

2. RAW MATERIALS AND INPUTS

2.1 Main Raw Materials — UN4 Premium

UN	Feedstock	Unit Price (BRL)	Unit price (US$)	Status
UN3	Basic NPK minerals (06-14-16)	2,115.94 /t	399.23 /t	!
UN3	Algae extract (external purchase)	8,000.00 /t	1,509.43 /t	t
UN3	Azospirillum inoculant brasilense	120.00 /L	22.64 /L	Q
UN3	Inoculant Bacillus spp.	110.00 /L	20.75 /L	Q
UN4	**APP 10-34-0 (ammonium polyphosphate) — PREMIUM**	4,800.00 /t	905.66 /t	Q
UN4	Basic NPK minerals (04-14-08) — standard	1,705.43 /t	321.78 /t	!
UN4	Chelated micronutrients (Zn, B, Mn) EDTA	25,000.00 /t	4,716.98 /t	Q
UN4	Humic acids + fulvicos	6,000.00 /t	1,132.08 /t	Q
UN4	NaOH reagent (caustic soda, 99% flakes)	1,855.00 /t	350.00 /t	Q
UN4	KOH reagent (caustic potash, 90% flakes)	3,000.00 /t	566.04 /t	Q
UN4	HCl reagent (hydrochloric acid, 30-36%)	400.00 /t	75.47 /t	Q
UN4	Na_2S reagent (sodium sulfide, 60% flakes)	2,500.00 /t	471.70 /t	Q
UN5	Plastic additives (masterbatch/fillers)	18,000.00 /t	3,396.23 /t	Q
UN6	ACL energy (purchase reference)	233.00 /MWh	43.96 /MWh	t
UN7	Portland cement (bulk)	450.00 /t	84.91 /t	Q
UN7	Fine sand (bulk)	110.00 /t	20.75 /t	Q
UN7	Concrete admixtures (plasticizer/accelerator)	3.50 /kg	0.66 /kg	Q
UN8	Aerial mapping (input)	17.00 /ha	3.21 /ha	t

3. EXPLICIT AND RESEARCHED UNIT PRICES

3.1 Explicit TVD prices

Item	Price (BRL)	Price (US$)	Where it appears
Basic NPK minerals (06-14-16)	BRL 2,115.94/t	US$ 399.23/t	OPEX UN3.2
Basic NPK minerals (04-14-08) — UN4	BRL 1,705.43/t	US$ 321.78/t	OPEX UN4.2

APP 10-34-0 (polyphosphate) - UN4 Premium	BRL 4,800.00/t	US$ 905.66/t	OPEX UN4.2
Algae extract	BRL 8,000/t	US$ 1,509.43/t	OPEX UN3.2
ACL energy	BRL 233/MWh	US$ 43.96/MWh	OPEX UN6.3
Aerial mapping	BRL 17/ha	US$ 3.21/ha	OPEX UN8.3
Autonomous weeding	BRL 1,300/ha	US$ 245.28/ha	OPEX UN8.3
Soil NPK analysis	BRL 26/sample	US$ 4.91/sample	OPEX UN8.3
IoT monitoring	BRL 700/month	US$ 132.08/month	OPEX UN8.3
Agronomic consulting	BRL 1,800/month	US$ 339.62/month	OPEX UN8.3

3.2 Market-researched prices (gaps filled)

Item	Price (BRL)	Price (US$)	Source	UN
Ferrous scrap (HMS/mixed)	BRL 950/t	US$ 179.25/t	Sucatas.com (Apr/2026) FOB-adjusted	UN1
Aluminum scrap (cans)	BRL 6,500/t	US$ 1,226.42/t	Sucatas.com (Apr/2026)	UN1
Copper scrap (berry/mixed)	BRL 50,000/t	US$ 9,433.96/t	Sucatas.com (Apr/2026) −15% vs MSW fraction	UN1
Brass scrap	BRL 28,000/t	US$ 5,283.02/t	Sucatas.com (Apr/2026)	UN1
Recovered glass (cullet)	BRL 150/t	US$ 28.30/t	Valor Econômico / 100Entulho (Apr/2026)	UN1
Concrete block (14×19×39 cm)	BRL 3.50/unit	US$ 0.66/unit	Elo Pre-Molded / 333obra (average)	UN7
Micronized aggregate (crushed 0/1)	BRL 150/t	US$ 28.30/t	100Entulho (Apr/2026), density-adjusted	UN7
Azospirillum inoculant	BRL 120/L	US$ 22.64/L	ComprasNet tender Koppert/BioAgro (average)	UN3
Inoculant Bacillus	BRL 110/L	US$ 20.75/L	Derived Azospirillum parity (−8%)	UN3
Industrial NaOH (99% flakes)	BRL 1,855/t	US$ 350.00/t	Alibaba/Elchemy (international estimate)	UN4
Industrial KOH (90% flakes)	BRL 3,000/t	US$ 566.04/t	Alibaba (EUR 435–1,305/t) adjusted 1.6× NaOH	UN4
Industrial HCl (30–36%)	BRL 400/t	US$ 75.47/t	SunSirs China (RMB 175–192/t) + logistics	UN4
Industrial Na_2S (60% flakes)	BRL 2,500/t	US$ 471.70/t	Global Sources (US$ 300–600/t) + logistics	UN4
Plastic additives (masterbatch)	BRL 18,000/t	US$ 3,396.23/t	Global masterbatch market (US$ 16.35 bn/2026)	UN5
Concrete admixtures (bulk)	BRL 3.50/kg	US$ 0.66/kg	Mercado Livre/IsoComi adjusted for industrial volume	UN7

3.3 UN5 detail — fiber-grade resin selling price

The UN5 unit price (BRL 6,204.82/t = US$ 1,170.72/t) is anchored to international fiber-grade rPET references for Q2/2026 (US$ 1,055–1,342/t) and the Brazilian Q1/2026 spot (US$ 960/t — IMARC), priced at a 15–20% discount to virgin-resin parity (US$ 1,213–1,653/t) to guarantee full absorption of the contracted volume (annual offtake). The raffia/fiber-grade resin is destined for third-party packaging converters (big bags, bags and bottles), with contracted offtake.

Parametro	Value (BRL)	Value (US$)
Unit selling price	BRL 6,204.82/t	US$ 1,170.72/t
Annual volume	22,338 t	22,338 t
UN5 annual revenue	BRL 138,611,812	US$ 26.153.172

3.4 Step-by-step rebuild — organomineral 06-14-16

The 06-14-16 organomineral formula runs a volume of 108,625 t. Feedstock quotes: urea US$ 409/t, MAP US$ 865/t, KCl US$ 400/t (Aug/2026).

STEP 1 — Composition of Basic NPK 06-14-16 (per tonne of pure NPK)

Source	Calculation 06-14-16	Amount (kg)	Amount (t)
KCl (60% K2O)	16% / 60%	266.7	0.2667
MAP (52% P2O5 + 11% N)	14% / 52%	269.2	0.2692
→ N supplied by MAP	269.2 kg x 11%	29.6	0.0296
Ureia (46% N)	(60.0 - 29.6) / 46%	66.1	0.0661

TOTAL mineral feedstock: 602.0 kg (60.20%). Remaining 398.0 kg = organic compost (UN2).

STEP 2 — Feedstock cost per tonne of basic NPK.

Source	Amount (t)	Price (US$/t)	Cost (US$)
KCl	0.2667	400.00	106.67
MAP	0.2692	865.00	232.88
Ureia	0.0661	409.00	27.02
TOTAL COST OF BASIC NPK			366.57

STEP 3 — Market Price of Basic NPK

Parametro	04-14-08 (reference)	6-14-16
Market price (US$/t)	321.78	399.23
Source cost (US$/t)	295.45	366.57
Blending margin	1.0891 (8.91%)	1.0891 (8.91%)

Calculation 6-14-16: US$ 366.57 × 1.0891 = US$ 399.23/t = BRL 2,115.94/t

STEP 4 — Organomineral Selling Price

Formula	Price NPK basico (US$)	Calculation	Selling price (US$)
6-14-16	399.23	x 1.5 x 1.096 x 1.08	708.85

Selling price 6-14-16: US$ 708.85/t = BRL 3,756.89/t

3.5 Coherence check — UN4 standard liquid NPK 04-14-08

Consistency check of the standard Liquid NPK selling price (BRL 4,200/t) against production costs, including the basic NPK feedstock.

UN4 Blend composition:

Component	Proporcao	Origem
Basic NPK 04-14-08	60%	Market purchase
Pressing liquid	40%	UN2 transfer

Estimated Cost per Tonne of UN4 (Standard):

Item	Cost (BRL/t)	Remarks
NPK feedstock (60%)	1,023.26	BRL 1,705.43/t × 60%
Reagentes quimicos (NaOH, KOH, HCl, Na2S)	216.00	OPEX UN4 estimate
Energy, water, labor, logistics	350.00	OPEX UN4 estimate
TOTAL ESTIMATED COST	1,589.26	
SELLING PRICE	4,200.00	New-brand market ceiling

Gross margin: BRL 4,200.00 − BRL 1,589.26 = BRL 2,610.74/t (62.2%). CONCLUSION: The price of BRL 4,200/t is CONSISTENT for a new-brand liquid NPK, considering the added value (liquid formulation, better absorption, application practicality).

3.6 Premium reformulation — UN4 liquid NPK 04-14-08 + polyphosphate

The standard formulation of Liquid NPK 04-14-08 uses MAP (monoammonium phosphate, orthophosphate) as the P source, which causes calcium phosphate precipitation in hard water (Ca > 100 mg/L, pH > 6.5), clogging drippers and reducing efficiency. The premium proposal replaces MAP with APP (ammonium polyphosphate), adds chelated micronutrients, biostimulants and inoculants, turning the product into a high-value-added premium liquid fertilizer.

The Market Problem:

"Phosphate sources are rarely used via irrigation water because of their low solubility and, if the water is rich in calcium, calcium phosphate will precipitate inside the piping, mainly clogging the drippers." (Source: Embrapa Mandioca e Fruticultura). The technological solution is ammonium polyphosphate (APP), which sequesters calcium and prevents precipitation.

Technology #1 — Ammonium Polyphosphate (APP):

Benefit	Description
Calcium sequestration	Does not precipitate in hard water — compatible with 95% of Brazilian irrigation waters
Superior foliar absorption	Smaller molecule penetrates the leaf cuticle 3× faster than MAP
Tank stability	pH buffer 5.5–6.0, does not react with chelated micronutrients
Gradual release	30% of P remains as polyphosphate, extending nutrition for 15–20 days

Proposed Formula — TVD Premium Liquid NPK 04-14-08 +:

Component	Standard	Premium	Justification
P source	MAP (orthophosphate)	APP 10-34-0 (polyphosphate)	Sequesters Ca; does not precipitate
K source	KCl	KCl + 2% organic K_2O	Improves foliar absorption
Micronutrients	None	Zn 0.5% + B 0.3% + Mn 0.2% (EDTA)	Correction of hidden deficiencies
Biostimulant	None	Seaweed extract 2%	Stress resistance, rooting
Inoculant	None	Azospirillum brasilense 10^8 CFU/mL	Biological N fixation
Humic acids	None	Humic + fulvic acids 3%	Chelation, soil improvement
pH	6.0-6.5	Buffer pH 5.8–6.0	Maximum stability and uptake
Density	1.25 kg/L	1.35–1.40 kg/L	More nutrients per applied liter

Detailed Cost of the Premium Reformulation (per tonne):

Item	Additional cost (BRL/t)	Total cost (BRL/t)	Remarks
Standard base (NPK + reagents + operating)		1,589.26	Current scenario
APP instead of MAP	+1,200.00		APP BRL 4,800/t vs MAP BRL 865/t (diluted at 60% blend)
Chelated micronutrients (Zn, B, Mn) EDTA	+350.00		EDTA-Zn BRL 25/kg, 15 kg/t application
Seaweed extract 2%	+160.00		External purchase (BRL 8,000/t × 2% of blend)
Azospirillum inoculant	+80.00		UN3 vertical synergy — already produced internally
Humic acids 3%	+200.00		Market BRL 6,000/t, 30 kg/t application
TOTAL ADDITIONAL COST	+1,990.00		
TOTAL PREMIUM COST		3,579.26	
SUGGESTED SELLING PRICE		6,615.00	Market reference: Ruralphos Premium BRL 180/L = BRL 6,000–7,000/t
Gross margin		3,035.74	45.9% — healthy for a premium product

Note: the BRL 1,990/t additional cost already reflects the external purchase of algae extract at BRL 8,000/t. The remaining vertical synergies — UN3-produced Azospirillum inoculant and UN2 organomineral compound at transfer cost — partially reduce the real cost; this upside is not priced into the base.

Vertical Synergies with the TVD Chain:

Premium input	TVD source	Cost Reduction
Seaweed extract 2%	External purchase	Full cost: BRL 160/t — already

		included in the premium cost
Azospirillum inoculant	UN3 (own production)	Real cost: BRL 80/t → BRL 40/t (no commercial margin)
Organic compost (humic acids)	UN2 (transfer)	Real cost: BRL 200/t → BRL 80/t (no commercial margin)

Revenue impact UN4

Scenario	Price (BRL/t)	Volume (t)	Revenue (BRL)
Standard (MAP)	4,200.00	17,328	72,777,600
Premium (APP + additives)	6,615.00	17,328	114,625,920
Variation	+2,415.00	-	+41,848,320 (+57.5%)

Consolidated BP revenue with premium: BRL 601.6 mn.

ANNEX 3: DETAILED CAPEX — v7.3.9 REVISED | FX: BRL 5.30/US$ | September 2026

1. Assumptions and methodology

1.1 General parameters

Parameter	Value
Operating days	Reception 365 d/yr (collection suspended on 4 holidays: Christmas, New Year, mandatory holidays); operation 361 d = 289.75 d at 750 + 71.25 d at 600; heavy maintenance in campaign windows (1 machine in rotation); UN2/UN4 run 365 d
Days at 750 t/d (no heavy maintenance)	289.75 day-equivalents (80.3% of the 361 operating days)
Days at 600 t/d (1 machine in heavy maintenance, rotation)	71.25 day-equivalents (19.7% of the 361 operating days)
Change	BRL 5.30/US$ (fixed)
National transport (1,050 km)	FOB × 0.042
Engineering, FEED, management	6% on package subtotal
Contingency	20% on package subtotal
Estimate class	AACE Class 4 (±25%)

1.2 Landed-cost methodology by category

Differentiated factors by equipment category, based on 2026 tax research:

Category	Factor	Legal Basis
Capital machinery w/ ex-tariff	0.35 (35%)	II 0–2%, IPI 0–5%, PIS/COFINS 8.52% (Law 14.374/22), ICMS 18%
Capital machinery w/o ex-tariff	0.50 (50%)	II=14%, IPI=0–5%, PIS/COFINS=8.52%, ICMS=18%
Electronic equipment / Automation / IT	0.60 (60%)	II 0–14%, IPI 0–5%, PIS/COFINS 11.75%, ICMS 18%
Vehicles / Trucks / Forklifts	0.60 (60%)	II 0–35%, IPI 0–5%, PIS/COFINS 11.75%, ICMS 18%
Solar panels / inverters	0.45 (45%)	II=0–12%, IPI=0%, PIS/COFINS=11.75%, ICMS=18%
Civil works / Domestic / Services	0.00 (0%)	National items not subject to importation

1.3 Civil-construction unit values — 2026 market references

Unit values applied in the budget, based on market research:

Item	Applied unit value	Market Source
Industrial hall (steel structure, 10–12 m eaves)	BRL 1,500/m²	DiskGalpoes/Cronoshare: BRL 800–1,800/m²
Industrial floor with capture channels	BRL 250/m²	RCPisos: polished concrete BRL 40–90/m²; epoxy BRL 90–180/m²
Industrial yard (interlocked concrete/asphalt)	BRL 150/m²	Industrial paving market: BRL 100–200/m²

Administrative building (finishes, air-conditioning, installations)	BRL 3,500/m²	IBGE/SINAPI: BRL 1,946/m² national average; premium industrial building BRL 2,500–4,000/m²
Covered receiving bunker (light steel structure)	BRL 1,500/m²	Light steel structure for coverage
Earthworks + drainage + base paving	BRL 40/m²	Earthworks guide: BRL 20–50/m²
WTP + WWTP + fire system (industrial share)	BRL 8,000,000	TEGA Engineering: mid-size industrial WWTP BRL 5–20M
69 kV transmission line (towers + cables + substation)	BRL 1,200,000/km	TL construction market: BRL 0.8–1.5 mn/km
Industrial land (outside metro areas)	BRL 25/m²	Interior-SP industrial real estate market
Perimeter electric fence + gatehouses	BRL 500,000/km	Industrial perimeter-security market

2. UN 1 — FEEDSTOCK CLASSIFICATION

Capacity: 750 t/day of MSW

Item	Specification	FOB (US$)	Category	Factor	Total landed (US$)	Note
Plot of land (part UN1-7)	20 ha total	943,396	Civil works	0%	943,396	Domestic — BRL 25/m²
Earthworks, drainage, paving	1 site	1,509,434	Civil works	0%	1,509,434	Domestic — BRL 40/m²
Sorting industrial hall	~18,000 m², 12 m eave height	5,094,340	Civil works	0%	5,094,340	Domestic — BRL 1,500/m²
Special floor + capture channels	~8,000 m²	377,358	Civil works	0%	377,358	Domestic — BRL 250/m²
OVERSIZED yard	~12,000 m²	339,623	Civil works	0%	339,623	Domestic — BRL 150/m²
Covered receiving bunker (CRB)	1,000 m²	283,019	Civil works	0%	283,019	Domestic — BRL 1,500/m²
Electric fence + 2 gatehouses	2.2 km	207,547	Civil works	0%	207,547	Domestic — BRL 500K/km
Administrative building + ICC	~2,000 m²	1,320,755	Civil works	0%	1,320,755	Domestic — BRL 3,500/m²
Changing rooms, showers, laundry	~800 m²	528,302	Civil works	0%	528,302	Domestic — BRL 3,500/m²
Kitchen + restaurant	~900 m²	594,340	Civil works	0%	594,340	Domestic — BRL 3,500/m²
Recreation, gym, infirmary	~500 m²	330,189	Civil works	0%	330,189	Domestic — BRL 3,500/m²
Air-conditioned laboratories	~400 m²	264,151	Civil works	0%	264,151	Domestic — BRL 3,500/m²
Full accessibility (NBR 9050)	1 site	226,415	Civil works	0%	226,415	Domestic
Landscaping, reuse irrigation	~2 ha	150,943	Civil works	0%	150,943	Domestic
MSW Sorting — Line 1	Stadler + TOMRA STT 5000 + AUTOSORT NIR/XRF, 300 t/day	7,500,000	Ex-tariff machinery	35%	10,440,000	Imported — FOB US$ 7.5 mn
MSW Sorting — Line 2	Stadler + TOMRA STT 5000 + AUTOSORT NIR/XRF, 300 t/day	7,500,000	Ex-tariff machinery	35%	10,440,000	Imported — FOB US$ 7.5 mn
MSW Sorting — Line 3	Stadler + TOMRA STT 5000 + AUTOSORT NIR/XRF, 300 t/day	7,500,000	Ex-tariff machinery	35%	10,440,000	Imported — FOB US$ 7.5 mn
NIR decontamination + induction	TOMRA AUTOSORT with induction module, ~2 t/h	2,000,000	Ex-tariff machinery	35%	2,784,000	Imported
15t overhead crane — Segregation 1	Weihua QD 15t-22.5 m with hydraulic grab	450,000	Ex-tariff machinery	35%	626,400	Imported China

15t overhead crane — Segregation 2	Weihua QD 15t-22.5 m with hydraulic grab	450,000	Ex-tariff machinery	35%	626,400	Imported China
Ultrasonic-sensor automatic feeding	Plate feeder + frequency inverter	130,000	Electronics	60%	213,460	Imported
Automatic pneumatic scrapers	Sistema raspadores + jatos ar comprimido	195,000	Ex-tariff machinery	35%	271,440	Imported
Automatic rotary film cutter	Cortador rotativo + sensor torque (TRL 7)	270,000	Ex-tariff machinery	35%	375,840	Imported — TRL 7
NIR AI computer vision	Deep-learning module for thin/multilayer films	325,000	Electronics	60%	533,650	Imported — TRL 7
Internal-logistics AGVs/AMRs	3 internal-movement AGVs/AMRs	1,300,000	Electronics	60%	2,134,600	Imported — 6-month conditional pilot
20 MVA Transformer (45%)	Hitachi Energy + WEG	700,000	Ex-tariff machinery	35%	974,400	Imported
Industrial electrical installation (45%)	Siemens/ABB + nacional	1,392,682	Domestic	0%	1,392,682	Mixed
Additional electrical installations v7.0	Siemens/ABB + nacional	154,742	Domestic	0%	154,742	Mixed
WTP + WWTP + fire (45%)	Veolia + construtora nacional	1,509,434	Civil works	0%	1,509,434	Domestic — share of total WWTP/WTP
Fiber network + data center + Wi-Fi 6 (25%)	Cisco + Dell	403,000	Electronics	60%	661,726	Imported — IT
DCS/PLC/SCADA/ MES (25%)	Siemens + AVEVA	590,000	Electronics	60%	968,780	Imported — automation
Twin digital + IA preditiva (25%)	Siemens + AWS	403,000	Electronics	60%	661,726	Imported — software/IA
220 AI CCTV cameras + video wall (25%)	Axis + Bosch + Barco	134,000	Electronics	60%	220,028	Imported — safety
Unitree B2 quadruped robots (25%)	Unitree B2 (4 units)	107,000	Electronics	60%	175,694	Imported — robotics
Tablets + notebooks (25%)	Dell + Panasonic Latitude + Toughbook	80,000	Electronics	60%	131,360	Imported — IT
OT cybersecurity + SOC (25%)	Fortinet + Nozomi	107,000	Electronics	60%	175,694	Imported — software
3t electric forklifts (8 units)	BYD/Heli CPD30-AC4S electric	650,000	Vehicle	60%	1,067,300	Imported China
5t electric forklifts (2 units)	BYD/Heli CPD50-AC4S electric	162,500	Vehicle	60%	266,825	Imported China
3.4 m³ loaders (2 units)	XCMG/LiuGong LW500FN / CLG856H	650,000	Vehicle	60%	1,067,300	Imported China
12t electric trucks (4 units)	BYD/FNM T5D / V3 electric	650,000	Vehicle	60%	1,067,300	Imported China
GC-MS + HPLC + ICP-OES (25%)	Agilent/Thermo/ Elementar	107,000	Electronics	60%	175,694	Imported — analytical
Rotina: pH, CE, Kjeldahl, UV-Vis (25%)	INESA/Hanon	53,500	Electronics	60%	87,847	Imported — analytical
Complete microbiology (25%)	Memmert/Zeiss	80,000	Electronics	60%	131,360	Imported — analytical
Particle size, balances, glassware (25%)	Various	53,500	Electronics	60%	87,847	Imported — analytical

SUBTOTAL UN 1: FOB US$ 47,777,170 | Total landed US$ 62,222,341 | BRL 328,776,707

3. UN 2 — COMPOSTING

Capacity: 300 t/day of organic fraction | Cycle: 40 days | 34 windrows | MENART SP-60 turners × 2

Item	Specification	FOB (US$)	Category	Factor	Total landed (US$)	Note
Composting industrial hall	~8,000 m² (80m×100m), 34 windrows, 10 m eave height	2,264,151	Civil works	0%	2,264,151	Domestic — BRL 1,500/m²
Special floor + capture channels	~4,000 m²	188,679	Civil works	0%	188,679	Domestic — BRL 250/m²
Composting yard + access + turner maneuvering	~8,615 m²	243,868	Civil works	0%	243,868	Domestic — BRL 150/m²
Final curing / quarantine hall	4,000 m², 6 m eave height	1,132,075	Civil works	0%	1,132,075	Domestic — BRL 1,500/m²
Organic pressing	ANDRITZ ADuro QZ1600-BIO, 15 t/h	1,200,000	Ex-tariff machinery	35%	1,670,400	Imported
Composting — turners + aeration + biofilter	MENART SP-60 × 2 + aeration system + biofilter	1,800,000	Machinery without ex-tariff	50%	2,775,600	Imported — no ex-tariff
Automatic monitoring + turning adjustment	Wireless sensors (temp+hum+CO2+O2) + software	216,000	Electronics	60%	354,672	Imported — IoT
Proportional valve + aeration PID control	Proportional valve + O2/CO2 sensor + PID	86,000	Electronics	60%	141,212	Imported — automation
Automatic microbiological plate reading	Automatic incubators + MALDI-TOF (TRL 7)	378,000	Electronics	60%	620,676	Imported — TRL 7
IoT temperature sensors per windrow (34 units)	IP67 wireless probes + LoRaWAN gateway + dashboard	162,000	Electronics	60%	266,004	Imported — IoT
MAPA traceability software	SAP ERP module, per IN 63/2021	108,000	Electronics	60%	177,336	Imported — software
Pathogenicity laboratory	Salmonella PCR + helminths + thermotolerant coliforms	216,000	Electronics	60%	354,672	Imported — MAPA
Standby pasteurization oven	Closed reactor 70°C/1h, 5 t/cycle, 4 cycles/day	324,000	Ex-tariff machinery	35%	451,008	Imported — MAPA
Transformer (8%)	Hitachi Energy + WEG	124,500	Ex-tariff machinery	35%	173,304	Imported
Industrial electrical installation (8%)	Siemens/ABB + nacional	247,588	Domestic	0%	247,588	Mixed
WTP + WWTP + fire (8%)	Veolia + construtora nacional	268,302	Civil works	0%	268,302	Domestic — share of total WWTP/WTP
Fiber network + data center + Wi-Fi 6 (8%)	Cisco + Dell	129,000	Electronics	60%	211,818	Imported — IT
DCS/PLC/SCADA/ MES (8%)	Siemens + AVEVA	189,000	Electronics	60%	310,338	Imported — automation
Twin digital + IA preditiva (8%)	Siemens + AWS	129,000	Electronics	60%	211,818	Imported — software/IA
CFTV + videowall (8%)	Axis + Bosch + Barco	43,000	Electronics	60%	70,606	Imported — safety
Unitree B2 robots (8%)	Unitree B2 (4 units)	34,000	Electronics	60%	55,828	Imported — robotics
Tablets + notebooks (8%)	Dell + Panasonic	26,000	Electronics	60%	42,692	Imported — IT
OT cybersecurity + SOC (8%)	Fortinet + Nozomi	34,000	Electronics	60%	55,828	Imported — software
150-hp tractors + trailers (2 units)	John Deere 6E 1504D + reboque	400,000	Vehicle	60%	656,800	Domestic — assembled in Brazil
GC-MS + HPLC + ICP-OES (20%)	Agilent/Thermo/ Elementar	86,000	Electronics	60%	141,212	Imported — analytical
Rotina: pH, CE, Kjeldahl (20%)	INESA/Hanon	43,000	Electronics	60%	70,606	Imported — analytical
Microbiologia completa (20%)	Memmert/Zeiss	64,000	Electronics	60%	105,088	Imported — analytical
Particle size, balances (20%)	Various	43,000	Electronics	60%	70,606	Imported — analytical

SUBTOTAL UN 2: FOB US$ 10,179,163 | Total landed US$ 13,332,787 | BRL 70,663,771

4. UN 3 — SPECIAL ORGANOMINERAL FERTILIZERS

Capacity: 262.5 t/day | NPK 04-14-08 | Granulometry 2–4 mm

Item	Specification	FOB (US$)	Category	Factor	Total landed (US$)	Note
Fertilizer industrial hall	~6,000 m², 12 m eave height	1,698,113	Civil works	0%	1,698,113	Domestic — BRL 1,500/m²
Special floor + fertilizer channels	~2,500 m²	117,925	Civil works	0%	117,925	Domestic — BRL 250/m²
Fertilizer yard	~4,000 m²	113,208	Civil works	0%	113,208	Domestic — BRL 150/m²
Rotary dryer — Unit 1	ANDRITZ/FEECO Rotary dryer 6 t/h	3,100,000	Ex-tariff machinery	35%	4,315,200	Imported — ex-tariff
Rotary dryer — Unit 2	ANDRITZ/FEECO Rotary dryer 6 t/h	3,100,000	Ex-tariff machinery	35%	4,315,200	Imported — ex-tariff
OM granulation — Main	FEECO Disc granulator 8 t/h	3,100,000	Ex-tariff machinery	35%	4,315,200	Imported — ex-tariff
OM granulation — Standby	Concetti Granulator 4 t/h	1,490,000	Ex-tariff machinery	35%	2,074,080	Imported — ex-tariff
10t overhead crane — Fertilizer BU	Weihua QD 10t-16.5m w/ grab	420,000	Ex-tariff machinery	35%	584,640	Imported China — ex-tariff
Automatic drying-moisture control + inverter	Moisture sensor + speed inverter + PID	162,000	Electronics	60%	266,004	Imported — automation
Automatic granulation moisture/pressure control	Moisture sensor + roller pressure + disc speed	129,000	Electronics	60%	211,818	Imported — automation
Automatic NPK analyser + titrator	Automatic sampling + continuous NPK analyser + robot	486,000	Electronics	60%	798,012	Imported — analytical
Quality-control computer vision + AI	Computer vision + AI defect detection (size, color, cracks)	237,000	Electronics	60%	389,154	Imported — AI/vision
Transformer (20%)	Hitachi Energy + WEG	311,000	Ex-tariff machinery	35%	432,912	Imported
Industrial electrical installation (20%)	Siemens/ABB + nacional	618,970	Domestic	0%	618,970	Mixed
WTP + WWTP + fire (20%)	Veolia + construtora nacional	670,755	Civil works	0%	670,755	Domestic — share of total WWTP/WTP
Fiber network + data center + Wi-Fi 6 (15%)	Cisco + Dell	242,000	Electronics	60%	397,364	Imported — IT
DCS/PLC/SCADA/ MES (15%)	Siemens + AVEVA	355,000	Electronics	60%	582,910	Imported — automation
Twin digital + IA preditiva (15%)	Siemens + AWS	242,000	Electronics	60%	397,364	Imported — software/IA
CFTV + videowall (15%)	Axis + Bosch + Barco	81,000	Electronics	60%	133,002	Imported — safety
Unitree B2 robots (15%)	Unitree B2 (4 units)	65,000	Electronics	60%	106,730	Imported — robotics
Tablets + notebooks (15%)	Dell + Panasonic	48,000	Electronics	60%	78,816	Imported — IT
OT cybersecurity + SOC (15%)	Fortinet + Nozomi	65,000	Electronics	60%	106,730	Imported — software
44-seat buses (10 units)	Mercedes/Marcopolo OF-1721 BlueTec 5 +	1,500,000	Vehicle	60%	2,463,000	Domestic — assembled in

	Paradiso 1200					Brazil
GC-MS + HPLC + ICP-OES (30%)	Agilent/Thermo/ Elementar	129,000	Electronics	60%	211,818	Imported — analytical
Rotina: pH, CE, Kjeldahl (30%)	INESA/Hanon	64,000	Electronics	60%	105,088	Imported — analytical
Comprehensive microbiology (30%)	Memmert/Zeiss	97,000	Electronics	60%	159,274	Imported — analytical
Particle size, balances (30%)	Various	64,000	Electronics	60%	105,088	Imported — analytical
Feedstock conveying system	Belt conveyors, bucket elevators, screws, hoppers and chutes feeding the dryers and granulators	260,000	Ex-tariff machinery	35%	361,920	Imported China — estimated FOB
Big-bag bagging line	2 automatic DCS-1000 stations, 500–2,000 kg/big bag, with conveyors and dust collector	40,000	Ex-tariff machinery	35%	55,680	Imported China — estimated FOB
25/50 kg bagging line	2 automatic lines with weighing, sewing, check-weighing and metal detector	120,000	Ex-tariff machinery	35%	167,040	Imported China — estimated FOB
Palletizing system	2 complete robot cells, bag gripper, pallet dispenser, fences and safety	240,000	Ex-tariff machinery	35%	334,080	Imported China — estimated FOB
Dispatch and accumulation conveyors	Belts for bags, big bags, pallets and finished product for internal dispatch	150,000	Ex-tariff machinery	35%	208,800	Imported China — estimated FOB
Stretch wrappers	3 automatic units for fertilizer pallets	26,000	Ex-tariff machinery	35%	36,192	Imported China — estimated FOB
WMS and inventory traceability	WMS, barcode/RFID, SAP/IN 63/2021 integration, servers and workstations	100,000	Electronics	60%	164,200	Imported China — estimated FOB
Finished-product storage system	Selective racks for 3,800 pallet positions, average 1 t/position	285,000	Ex-tariff machinery	35%	396,720	Imported China — estimated FOB

SUBTOTAL UN 3: FOB US$ 19,926,971 | Total landed US$ 27,493,007 | BRL 145,712,937

UN 3 CAPACITY NOTE (750 scenario): for 108,625 t/yr (proxy formulation 06-14-16 — see Formulation Note), average output is 297.6 t/d over 365 days (300.9 t/d over the 361 operating days of granulation); the daily peak is 313.3 t/d (peak factor of 1.25 over the average). Dryers total 288 t/d. The 8 t/h and 4 t/h granulators must run simultaneously (288 t/d); at the 313.3 t/d peak, a capex-free regime would require 26.1 h/d (313.3 t/d ÷ 12 t/h) — above 24 h: not feasible; capex confirmed (third granulator, BRL 9.0 mn, Annex 5.2). Bagging lines total 60 t/h in big bags and 60 t/h in sacks, with redundancy.

5. UN 4 — LIQUID FERTILIZERS WITH FULL DECONTAMINATION

Capacity: 60 t/day | Source: press liquor from the MSW organic fraction (UN 2) | Decontamination: heavy metals + coliforms + salt

Item	Specification	FOB	Categor	Fact	Total	Note

		(US$)	y	or	landed (US$)	
Liquid-treatment industrial hall	~3,500 m², 10 m eave height	990,566	Civil works	0%	990,566	Domestic — BRL 1,500/m²
Impermeable special floor + containment	~2,000 m², epoxy concrete + containment basin	94,340	Civil works	0%	94,340	Domestic — BRL 250/m²
Operations yard + tanker maneuvering	~3,000 m²	84,906	Civil works	0%	84,906	Domestic — BRL 150/m²
Primary containment basin (leachate)	500 m³, impermeable concrete	188,679	Civil works	0%	188,679	Domestic
Chemical ventilation and exhaust system	Explosion-proof exhaust fans + scrubber	283,019	Civil works	0%	283,019	Domestic
MF/UF/OR liquid plant	SUEZ/Vontron/Bluestar 8 m³/h — MF, UF, OR	1,250,000	Ex-tariff machinery	35%	1,740,000	Imported — ex-tariff
8% KOH humic extraction	GN Separation decanter + reaction tanks + multilayer filtration	860,000	Ex-tariff machinery	35%	1,197,120	Imported — ex-tariff
Liquid silos 12×150 m³ + 4×500 m³	Epoxy/PE-coated carbon steel, 3,800 m³ total	845,000	Ex-tariff machinery	35%	1,176,240	Imported — ex-tariff
Heavy-metal chemical precipitation system	20 m³ reactors + automatic NaOH/Na_2S dosing + lamella clarifier + filter press	483,000	Ex-tariff machinery	35%	672,336	Imported — ex-tariff
Heavy-metal electrocoagulation	50 m³/h electrocoagulator — Al/Fe electrodes + rectifier + flotation	362,000	Ex-tariff machinery	35%	503,904	Imported — ex-tariff
UV-C + ozone coliform system	UV-C reactor 200 mJ/cm² + 2 kg/h ozone generator + 30-min contact	302,000	Electronics	60%	495,884	Imported — electrochemical
Reverse electrodialysis (EDR) salt removal	Reverse electrodialysis 15 m³/h — ion-exchange modules + automatic CIP	724,000	Ex-tariff machinery	35%	1,007,808	Imported — ex-tariff
Equalization + neutralization tanks	4 × 50 m³ stainless 316L tanks + agitators + pH/ORP sensors	241,000	Ex-tariff machinery	35%	335,472	Imported — ex-tariff
Chemical-reagent dosing system	Membrane dosing pumps + 5 m³ PE tanks + automation panel	121,000	Ex-tariff machinery	35%	168,432	Imported — ex-tariff
Activated-carbon polishing filter	10 m³/h activated-carbon pressure filters × 2 (duty + standby)	181,000	Ex-tariff machinery	35%	251,952	Imported — ex-tariff
Vacuum pump + transfer system	Liquid vacuum pump + stainless 316L piping + valves	90,000	Ex-tariff machinery	35%	125,280	Imported — ex-tariff
5t overhead crane — Liquids UN	Weihua QD 5t-10.5 m with tank-maintenance grab	241,000	Ex-tariff machinery	35%	335,472	Imported China — ex-tariff
Online heavy-metal analyser (ICP-MS)	PerkinElmer/Agilent online ICP-MS + automatic sampler	362,000	Electronics	60%	594,404	Imported — analytical
Online conductivity/salinity/TDS analyser	Hach/Endress+Hauser — conductivity meter + salinometer + TOC	121,000	Electronics	60%	198,682	Imported — analytical
Automatic pH/ORP/UV control	pH/ORP/UV sensors + PID controller + reagent dosing	145,000	Electronics	60%	238,090	Imported — automation
MAPA batch-traceability system	SAP ERP module — batch→date→certificate→customer, per IN 63/2021	181,000	Electronics	60%	297,202	Imported — software MAPA
Computer vision + AI quality control	Real-time color/turbidity/impurity visual inspection	181,000	Electronics	60%	297,202	Imported — AI/vision

Transformador (12%)	Hitachi Energy + WEG	187,000	Ex-tariff machinery	35%	260,304	Imported
Industrial electrical installation (12%)	Siemens/ABB + nacional	371,382	Domestic	0%	371,382	Mixed
WTP + WWTP + fire (12%)	Veolia + construtora nacional	402,453	Civil works	0%	402,453	Domestic — share of total WWTP/WTP
Fiber network + data center + Wi-Fi 6 (12%)	Cisco + Dell	181,000	Electronics	60%	297,202	Imported — IT
DCS/PLC/SCADA/MES (12%)	Siemens + AVEVA	266,000	Electronics	60%	436,772	Imported — automation
Twin digital + IA preditiva (12%)	Siemens + AWS	181,000	Electronics	60%	297,202	Imported — software/IA
CFTV + videowall (12%)	Axis + Bosch + Barco	60,000	Electronics	60%	98,520	Imported — safety
Unitree B2 robots (12%)	Unitree B2 (4 units)	48,000	Electronics	60%	78,816	Imported — robotics
Tablets + notebooks (12%)	Dell + Panasonic	36,000	Electronics	60%	59,112	Imported — IT
OT cybersecurity + SOC (12%)	Fortinet + Nozomi	48,000	Electronics	60%	78,816	Imported — software
20 m³ tanker trucks (2 units)	Mercedes-Benz Atego 1726 + tanque inox 316L 20 m³	344,000	Vehicle	60%	564,848	Domestic — assembled in Brazil
GC-MS + HPLC + ICP-OES (25%)	Agilent/Thermo/ Elementar	121,000	Electronics	60%	198,682	Imported — analytical
Rotina: pH, CE, Kjeldahl, UV-Vis (25%)	INESA/Hanon	60,000	Electronics	60%	98,520	Imported — analytical
Complete microbiology (25%)	Memmert/Zeiss	90,000	Electronics	60%	147,780	Imported — analytical
Heavy-metal + salinity analysis (25%)	AAS + Mohr titrator + conductivity meter	60,000	Electronics	60%	98,520	Imported — analytical

SUBTOTAL UN 4: FOB US$ 10,787,345 | Total landed US$ 14,765,919 | BRL 78,259,371

6. UN 5 — FIBER-GRADE RESINS

Capacity: 61.2 t/day of fiber-grade plastic resins (PET/HDPE/PP)

Item	Specification	FOB (US$)	Category	Factor	Total landed (US$)	Note
Resin industrial hall	~2,000 m², 12 m eave height	566,038	Civil works	0%	566,038	Domestic — BRL 1,500/m²
Special floor + resin channels	~1,000 m²	47,170	Civil works	0%	47,170	Domestic — BRL 250/m²
Resin yard	~1,500 m²	42,453	Civil works	0%	42,453	Domestic — BRL 150/m²
Flake washing line	Wuxi Beihai — flake washing + drying system	2,800,000	Ex-tariff machinery	35%	3,897,600	Imported China — ex-tariff
Gneuss MRS extruder	Gneuss MRS 130mm, reciclagem rPET/rPP/rPS	1,200,000	Ex-tariff machinery	35%	1,670,400	Imported — ex-tariff
Automatic washing + turbidity sensor	Automatic feed conveyor + thermostat + turbidity	99,000	Electronics	60%	162,558	Imported — automation
Computer-vision contamination detection	Computer vision + automatic contaminated-batch ejection (TRL 7)	198,000	Electronics	60%	325,116	Imported — TRL 7
Transformer(7%)	Hitachi Energy + WEG	109,000	Ex-tariff machinery	35%	151,728	Imported
Industrial electrical installation (7%)	Siemens/ABB + nacional	216,639	Domestic	0%	216,639	Mixed
WTP + WWTP + fire	Veolia + construtora	234,906	Civil works	0%	234,906	Domestic —

(7%)	nacional					share of total WWTP/WTP
Fiber network + data center + Wi-Fi 6 (10%)	Cisco + Dell	165,000	Electronics	60%	270,930	Imported — IT
DCS/PLC/SCADA/ MES (10%)	Siemens + AVEVA	242,000	Electronics	60%	397,364	Imported — automation
Twin digital + IA preditiva (10%)	Siemens + AWS	165,000	Electronics	60%	270,930	Imported — software/IA
CFTV + videowall (10%)	Axis + Bosch + Barco	55,000	Electronics	60%	90,310	Imported — safety
Unitree B2 robots (10%)	Unitree B2 (4 units)	44,000	Electronics	60%	72,248	Imported — robotics
Tablets + notebooks (10%)	Dell + Panasonic	33,000	Electronics	60%	54,186	Imported — IT
OT cybersecurity + SOC (10%)	Fortinet + Nozomi	44,000	Electronics	60%	72,248	Imported — software
Shared vehicles — resin logistics	Ford/Toyota Ranger/Hilux 4×4 + trailers (share)	173,000	Vehicle	60%	284,066	Domestic — assembled in Brazil
GC-MS + HPLC + ICP-OES (15%)	Agilent/Thermo/ Elementar	66,000	Electronics	60%	108,372	Imported — analytical
Rotina: pH, CE, Kjeldahl (15%)	INESA/Hanon	33,000	Electronics	60%	54,186	Imported — analytical
Microbiologia completa (15%)	Memmert/Zeiss	49,000	Electronics	60%	80,458	Imported — analytical
Particle size, balances (15%)	Various	33,000	Electronics	60%	54,186	Imported — analytical

SUBTOTAL UN 5: FOB US$ 6,615,206 | Total landed US$ 9,124,092 | BRL 48,357,688

7. UN 6 — SOLAR ENERGY AND PYROLYSIS

Capacity: 3 Beston BLL-30 reactors (2 operating + 1 standby) | 7.7 MWe thermal + 5.0 MWp solar | Total 12.7 MW

Item	Specification	FOB (US$)	Category	Factor	Total landed (US$)	Note
Pyrolysis industrial hall	~4,000 m², 12 m eave height	1,132,075	Civil works	0%	1,132,075	Domestic — BRL 1,500/m²
Special floor + pyrolysis channels	~1,500 m²	70,755	Civil works	0%	70,755	Domestic — BRL 250/m²
Pyrolysis + solar yard	~3,500 m²	99,057	Civil works	0%	99,057	Domestic — BRL 150/m²
Pyrolysis — Reactor 1	Beston BLL-30 fully continuous, 6 t/h	689,000	Ex-tariff machinery	35%	959,088	Imported China — FOB US$ 689K (bestonpyrolysisplant.com)
Pyrolysis — Reactor 2	Beston BLL-30 fully continuous, 6 t/h	689,000	Ex-tariff machinery	35%	959,088	Imported China — FOB US$ 689K
Pyrolysis — Reactor 3 (standby)	Beston BLL-30 fully continuous, 6 t/h	689,000	Ex-tariff machinery	35%	959,088	Imported China — FOB US$ 689K
5.5 MWe gas turbine	Dongfang F-class modified, 5.5 MWe	3,500,000	Ex-tariff machinery	35%	4,872,000	Importado China — ~US$ 636/kW
2.2 MWe steam turbine	Harbin Back-pressure, 2.2 MWe	1,200,000	Ex-tariff machinery	35%	1,670,400	Imported China — ~US$ 545/kW
25 t/h steam heat-recovery boiler	Dongfang Waste heat boiler	800,000	Ex-tariff machinery	35%	1,113,600	Imported China — ~US$ 32,000/tph
5.0 MWp solar panels	LONGi/Jinko/ Trina Hi-MO X6	475,000	Solar	45%	708,700	Imported China — FOB US$ 0,095/W (Made-in-

	580W × 8,600 units					China 2026)
Inverters + mounting + cables	Sungrow/ Huawei SG250HX + aluminum + DC/AC cables	180,000	Solar	45%	268,560	Imported China — ~US$ 0,036/W
30 km 69 kV interconnection line	National contractor + SRN — towers + cables + 69/13.8 kV substation	6,792,453	Civil works	0%	6,792,453	Domestic — BRL 1,200,000/km
Transformador (15%)	Hitachi Energy + WEG	234,000	Ex-tariff machinery	35%	325,728	Imported
Industrial electrical installation (15%)	Siemens/ABB + nacional	464,227	Domestic	0%	464,227	Mixed
WTP + WWTP + fire (15%)	Veolia + construtora nacional	503,208	Civil works	0%	503,208	Domestic — share of total WWTP/WTP
Fiber network + data center + Wi-Fi 6 (12%)	Cisco + Dell	198,000	Electronics	60%	325,116	Imported — IT
DCS/PLC/SCADA/ MES (12%)	Siemens + AVEVA	290,000	Electronics	60%	476,180	Imported — automation
Twin digital + IA preditiva (12%)	Siemens + AWS	198,000	Electronics	60%	325,116	Imported — software/IA
CFTV + videowall (12%)	Axis + Bosch + Barco	66,000	Electronics	60%	108,372	Imported — safety
Unitree B2 robots (12%)	Unitree B2 (4 units)	53,000	Electronics	60%	87,026	Imported — robotics
Tablets + notebooks (12%)	Dell + Panasonic	40,000	Electronics	60%	65,680	Imported — IT
OT cybersecurity + SOC (12%)	Fortinet + Nozomi	53,000	Electronics	60%	87,026	Imported — software
Mobile ICU ambulance	Mercedes Sprinter 416 CDI + conversion	200,000	Vehicle	60%	328,400	Domestic — assembled in Brazil
Shared vehicles — personnel transport	Ford/Toyota Ranger/Hilux 4×4 + trailers (share)	414,330	Vehicle	60%	680,330	Domestic — assembled in Brazil

SUBTOTAL UN 6: FOB US$ 19,030,105 | Total landed US$ 23,381,273 | BRL 123,920,747

8. UN 7 — CONSTRUCTION MATERIALS

Capacity: 72 t/day of finely shredded inerts | 100% valorization (zero landfill)

Item	Specification	FOB (US$)	Category	Factor	Total landed (US$)	Note
Artifacts industrial hall	~1,500 m², 12 m eave height	424,528	Civil works	0%	424,528	Domestic — BRL 1,500/m²
Special floor + artifact channels	~500 m²	23,585	Civil works	0%	23,585	Domestic — BRL 250/m²
Artifact yard	~1,000 m²	28,302	Civil works	0%	28,302	Domestic — BRL 150/m²
Concrete artifacts	QGM/Zenith 1500C, 20,000 blocks/day	300,000	Ex-tariff machinery	35%	417,600	Imported China — ex-tariff
Concrete-artifact palletizing robot	KUKA/ABB/Fanuc — industrial robot palletizing + automatic stacking	340,000	Ex-tariff machinery	35%	473,280	Imported — ex-tariff industrial robot
Transformador (5%)	Hitachi Energy + WEG	78,000	Ex-tariff machinery	35%	108,576	Imported
Industrial electrical	Siemens/ABB +	154,742	Domestic	0%	154,742	Mixed

installation (5%)	nacional					
WTP + WWTP + fire (5%)	Veolia + construtora nacional	167,736	Civil works	0%	167,736	Domestic — share of total WWTP/WTP
Fiber network + data center + Wi-Fi 6 (5%)	Cisco + Dell	83,000	Electronics	60%	136,286	Imported — IT
DCS/PLC/SCADA/ MES (5%)	Siemens + AVEVA	121,000	Electronics	60%	198,682	Imported — automation
Twin digital + IA preditiva (5%)	Siemens + AWS	83,000	Electronics	60%	136,286	Imported — software/IA
CFTV + videowall (5%)	Axis + Bosch + Barco	28,000	Electronics	60%	45,976	Imported — safety
Unitree B2 robots (5%)	Unitree B2 (4 units)	22,000	Electronics	60%	36,124	Imported — robotics
Tablets + notebooks (5%)	Dell + Panasonic	17,000	Electronics	60%	27,914	Imported — IT
OT cybersecurity + SOC (5%)	Fortinet + Nozomi	22,000	Electronics	60%	36,124	Imported — software
Shared vehicles — artifact handling	Ford/Toyota Ranger/Hilux 4×4 + trailers (share)	173,000	Vehicle	60%	284,066	Domestic — assembled in Brazil

SUBTOTAL UN 7: FOB US$ 2,065,893 | Total landed US$ 2,699,807 | BRL 14,308,977

9. UN 8 — PRECISION AGRICULTURE AND DIGITAL TWIN FARM

Capacity: Differentiation and accountability service | 1 operational hub | Monitoring of 80 pilot clients | PC-12 aircraft: CHARTERED on demand (not purchased) | 11 months/yr

STRATEGIC NOTE: UN 8 has been reconfigured as a TECHNICAL-MARKETING AND FIELD-R&D COST CENTER. It is not an independent profit-making business unit.

Description	Supplier	Qty.	Unit FOB (US$)	Total FOB (US$)	Landed-cost factor	Total landed (US$)	Total landed (BRL)
Drone Matrice 300 RTK (RGB + multispectral + LiDAR)	DJI (China)	3	85,000	255,000	418,710	2,219,163	1,881,288
Sensor multispectral (MicaSense RedEdge-P)	MicaSense (EUA)	3	18,000	54,000	88,668	469,940	398,390
Sensor LiDAR (Zenmuse L1)	DJI (China)	1	45,000	45,000	73,890	391,617	331,992
Sensor termal (Zenmuse H20T)	DJI (China)	1	28,000	28,000	45,976	243,673	206,573
Soil-data UGV (NPK, pH, moisture, compaction)	Naïo Technologies (France)	2	68,000	136,000	0.35	189,312	1,003,354
Soil/climate/ moisture IoT sensor (installed)	Sentek (Australia)	80	1,200	96,000	157,632	835,450	708,250
IoT gateway + communication (LoRa/4G)	Dragino (China)	10	850	8,500	13,957	73,972	62,710
4x4 support vehicle (Ranger/S10)	Ford (Brasil)	1	34,000	34,000	55,828	295,888	250,838
Trailer (adapted for drones/UGVs)	Domestic (Brasil)	1	4,500	4,500	0.00	4,500	23,850

Operations hub (converted 40-ft container)	Domestic (Brasil)	1	22,000	22,000	0.00	22,000	116,600
Off-grid solar (5 kWp + batteries)	Domestic (Brasil)	1	8,500	8,500	0.00	8,500	45,050
Processing workstation (NVIDIA GPU)	Dell (EUA)	2	4,500	9,000	0.60	14,778	78,323
Pix4Dmapper software (annual license)	Pix4D (Switzerland)	1	8,500	8,500	0.60	13,957	73,972
Agisoft Metashape software (license)	Agisoft (Russia)	1	3,500	3,500	0.60	5,747	30,459
ArcGIS Pro software (license)	ESRI (EUA)	1	5,500	5,500	0.60	9,031	47,864
TVD dashboard (custom development)	Domestic (Brasil)	1	12,000	12,000	0.00	12,000	63,600
AWS cloud server (initial setup)	AWS (EUA)	1	8,500	8,500	0.60	13,957	73,972
Drone/UGV maintenance bench	Domestic (Brasil)	1	4,500	4,500	0.00	4,500	23,850
Tools and initial spare parts	Domestic (Brasil)	1	3,500	3,500	0.00	3,500	18,550
Initial team training (ANAC + operations)	Domestic (Brasil)	1	4,500	4,500	0.00	4,500	23,850

TOTAL UN 8: FOB US$ 751,000 | Total landed US$ 1,160,943 | BRL 6,152,998

Note: Team air travel is provided through AIRCRAFT CHARTER by flight hour (BRL 30,000/h charter), funded in the operating OPEX (~30 flight h/yr = BRL 900,000/yr).

10. UN 9 — CORPORATE PLANT + CORPORATE SP

Corporate headquarters in São Paulo | 8 PJ shareholders | Pro-labore US$ 8,000/month (BRL 42,400) each + international health insurance

Item	Specification	FOB (US$)	Category	Factor	Total landed (US$)	Note
Itaim Bibi office fit-out	Coworking/ commercial space — 2 meeting rooms + video wall + partitioning + furniture	350,000	Civil works	0%	350,000	Domestic — realistic value for corporate room in São Paulo coworking/commercial leased space
Office IT	Dell/HP — 6 laptops + 6 tablets + 2 printers	55,000	Electronics	60%	90,310	Imported — IT
Videowall central	Barco/Samsung Barco UniSee 3×3 55"	88,000	Electronics	60%	144,496	Imported — videowall
Administrative building + ICC (corporate share — 37%)	National civil construction — ~1,200 m²	792,453	Civil works	0%	792,453	Domestic — BRL 3,500/m²

SUBTOTAL UN 9: FOB US$ 1,285,453 | Total landed US$ 1,377,259 | BRL 7,299,473

11. UN 10 — PRE-OPERATIONAL COMPOSTING AND LIQUID FERTILIZERS

Objective: Two 40-ft containers operating throughout the 24 months of construction for route validation and MAPA product approval

Item	Specification	FOB (US$)	Category	Factor	Total landed (US$)	Note
Container 1 — MAPA segregation & composting	Dezhou Qunfeng / Zhengzhou Shunxin / Siemens — Ø1.2×4.5 m trommel + 2 m³ reactor + instrumentation	350,000	Ex-tariff machinery	35%	487,200	Imported China — ex-tariff
Container 2 — MAPA pressing & filtration	Jingjin / Deefine / Siemens — Ø300 mm press + multilayer filtration + instrumentation	300,000	Ex-tariff machinery	35%	417,600	Imported China — ex-tariff
Shared laboratory — pre-operational analysis	Agilent/Thermo/INESA — GC-MS + Rotina + Microbiologia (10% do Pacote 6)	126,000	Electronics	60%	206,892	Imported — analytical

SUBTOTAL UN 10: FOB US$ 776,000 | Total landed US$ 1,111,692 | BRL 5,891,968

12. Mass balance

Capacity: 750 t/day of residues (Scenario 750 = 600 base × factor 1.1875 — Annex 5, 5.1 calendar) | engineering basis 365 days/yr | 260,062.5 t/yr processed (average 712.5 t/day)

12.1 Mass inputs

Description	t/day	t/yr
Municipal solid waste (MSW)	712.500	260,062.5
External NPK minerals — UN3 (60% of organomineral)	178.562	65,175.2
NPK/APP minerals — UN4 (60% of premium liquid)	33.825	12,346.2
Concrete inputs (cement, sand and additives)	26.612	9,713.8
TOTAL INPUTS (SCENARIO 750)	951.499	347,297.7

12.2 Marketable outputs (mass)

Product	t/day	t/yr	UN
Special organomineral	297.578	108,625.4	UN 3

fertilizers (NPK 06-14-16 proxy)			
Premium liquid organic fertilizers (04-14-08)	56.375	20,578.3	UN 4
Fiber-grade plastic resins (PET/HDPE/PP)	72.675	26,526.4	UN 5
Ferrous scrap	14.666	5,353.3	UN 1
Non-ferrous scrap (Al, Cu, brass)	6.282	2,293.1	UN 1
Color-sorted recycled glass	20.306	7,412.4	UN 1
Concrete blocks and pavers	72.675	26,526.4	UN 7
Micropicked aggregate (construction surplus)	37.727	13,770.3	UN 7
Commercialized excess compost (BRL 800/t)	39.800	17,249.5	UN 2/3
SUBTOTAL PRODUCTS (mass) — SCENARIO 750	625.572	228,333.6	—

12.3 Electricity generation

Source	Capacity	Annual generation	Unit
5.5 MWe gas turbine + 2.2 MWe steam turbine (island sized on the 600 base — generation CAPPED in the 750 scenario)	7.7 MWe	60,675	MWh/yr
5.0 MWp solar panels (LONGi/Jinko/Trina)	5.0 MWp	10,197	MWh/yr
TOTAL GENERATION (CAPPED — energy island of the 600 base)	12.7 MW	70,872	MWh/yr
→ Plant internal consumption (33,957 MWh/yr of nominal operation — effective KPI 130.6 kWh/t × 260,062.5 t)	—	33,957	MWh/yr
→ Surplus sold on the ACL (BRL 233/MWh) — nominal operation	—	36,915	MWh/yr

12.4 Process losses, rejects and routing

Item	t/day	t/yr	Destination
Composting losses (H_2O evaporation, CO_2, respiration)	214.659	61,100.8	Atmosphere
Biochar recirculated to reactor (closed loop)	21.375	7,801.9	Return to process
Pyrolytic oil burned in turbines → $CO_2 + H_2O$	48.094	17,553.6	Atmosphere
Syngas burned in turbines → $CO_2 + H_2O$	26.719	9,751.8	Atmosphere
Pyrolysis losses (ash, water, unconverted)	10.688	3,900.9	Atmosphere
Plastic recycling losses (contamination, scrap)	12.825	4,681.1	Inertization
Metal losses (impurities, scrap)	0.428	155.6	Inertization
Glass losses (breakage,	1.069	390.7	Inertization

scrap)			
Micropicking inert losses (dust, scrap)	1.710	624.6	Inertization
Hazardous waste (licensed special disposal)	3.563	1,300.3	External
Operational losses (return to process or inertization)	32.063	11,702.8	Process
Note: commercialized excess compost (BRL 800/t) moved to the products table — deducted from composting losses, zeroing the closure	—	—	Product
SUBTOTAL LOSSES/REJECTS — SCENARIO 750	325.929	118,964.1	—

BALANCE CHECK (SCENARIO 750 = 600 × 1.1875): Total input (347,297.7 t/yr) = Total output (228,333.6 t/yr of products — incl. commercialized compost 17,249.5 t — + 118,964.1 t/yr of losses/rejects = 347,297.7 t/yr — EXACT closure, 0.0 t residual) → BALANCE CLOSED AND ZEROED

BALANCE ENGINEERING NOTE (line by line — SCENARIO 750: 600 base × 1.1875 calendar factor): (1) GLOBAL CLOSURE ZEROED — inputs 347,297.7 t/yr = products 228,333.6 t/yr + losses/rejects 118,964.1 t/yr, residual 0.0 t; (2) INTERNAL ROUTING 100% TIED TO ANNEX 2 GRAVIMETRY (table 1) — MSW 260,062.5 t = organics 130,031 t (50%) + plastics 39,009.4 t (15%) + paper/cardboard 31,207.5 t (12%) + metals 7,801.9 t (3%) + glass 7,801.9 t (3%) + inerts 31,207.5 t (12%) + hazardous 1,300.3 t (0.5%) + operational losses 11,702.8 t (4.5%) — item-by-item rounded fractions sum to 260,062.3 t, with a 0.2 t (0.0008%) rounding residual; (3) PYROLYSIS AND PAPER: the paper/cardboard fraction (31,207.5 t/yr) has conditional economic routing — IF market conditions allow resale at a value above its energy value, the fraction will be commercialized; resale conditions are normally poor (contamination by moisture and organics, low mixed-paper quotations, costly reverse logistics), keeping PYROLYSIS as the default destination; pyrolysis feed of 39,008.2 t = paper 31,207.5 t + non-recyclable plastics 7,800.7 t, with unchanged yields (oil 45%, gas 25%, biochar 20%, losses 10%); (4) REDUNDANCY AND ENERGY CEILING — YES, REDUNDANCY ALLOWS AN INCREASE, WITH A PHYSICAL LIMIT: the pyrolysis line scales with redundancy (feed 39,008 t/yr at 750 vs 32,849 t on the 600 base, +18.75%), producing 27,305 t/yr of oil+gas vs 22,994 t on the base — BUT redundancy does NOT include additional turbines: the physical ceiling of the existing island (5.5 MWe gas + 2.2 MWe steam + 5.0 MWp solar) is 77,649 MWh/yr (turbines at 100% capacity factor + solar), vs 70,872 MWh of

nominal operation (turbines at 90%); internal consumption 33,957 MWh; CEILING SURPLUS: 43,692 MWh/yr → potential UN6 revenue of BRL 10.2 mn/yr (+BRL 1.6 mn/yr vs the BRL 8.6 mn of nominal operation, +6,777 MWh). Full ×1.1875 scaling (84,164 MWh) would exceed the physical ceiling by 6,515 MWh and require additional turbines — not physical without new CAPEX; (5) UPSIDE ON RECORD FOR THE COMMITTEE, NOT APPLIED TO THE INDICATORS: the plan remains at nominal operation (revenue BRL 780.8 mn; UN6 = 36,915 MWh × BRL 233 = BRL 8.6 mn); releasing the turbine ceiling (raising the capacity factor from 90% to up to 100%, no new CAPEX) is an investment-committee decision and, if approved, raises revenue to BRL 782.4 mn with marginal positive impact on EBITDA and DSCR. Revenue is volume × price in every scenario.

12.5 Performance indicators

Indicator	Value
MSW capacity	750 t/day (annual average 712.5 t/d × 365 d) = 260,062.5 t/yr
Operating days	Reception 365 d/yr (collection suspended on 4 holidays: Christmas, New Year, mandatory holidays); operation 361 d = 289.75 d at 750 + 71.25 d at 600; heavy maintenance in campaign windows (1 machine in rotation); UN2/UN4 run 365 d
External inputs (NPK minerals)	239.0 t/day avg = 87,235.2 t/yr
Total mass processed	951.5 t/day avg = 347,297.7 t/yr
Marketable products (mass)	228,333.6 t/yr (incl. compost 17,249.5 t)
Mass recovery rate	65.7% (excl. composting/biological losses)
Electricity generated	70,872 MWh/yr (capped — island of the 600 base)
Surplus for sale (ACL)	36,915 MWh/yr in the 750 Scenario (70,872 MWh generated − 33,957 MWh internal consumption at the effective 130.6 kWh/t; KPI cap ≤132 kWh/t)
Reject / final disposal	118,964.1 t/yr (34.3%)
Inert landfill	0 t/yr (100% valorized)

13. General consolidation — group CAPEX

13.1 Consolidation by Business Unit

Business unit	FOB (US$)	Total landed (US$)	Total (BRL)	% of subtotal
2. UN 1 — FEEDSTOCK CLASSIFICATION	47,777,170	62,033,341	328,776,707	39.6%
3. UN 2 — COMPOSTING	10,179,163	13,332,787	70,663,771	8.5%
4. UN 3 — SPECIAL ORGANOMINERAL FERTILIZERS	19,926,971	27,493,007	145,712,937	17.6%
UN 4 — Liquid Fertilizers	10,787,345	14,765,919	78,259,371	9.4%

6. UN 5 — FIBER-GRADE RESINS	6,615,206	9,124,092	48,357,688	5.8%
UN 6 — Solar Energy & Pyrolysis	19,030,105	23,381,273	123,920,747	14.9%
UN 7 — CONSTRUCTION MATERIALS INPUTS	2,065,893	2,699,807	14,308,977	1.7%
UN 8 — Precision Agriculture & Twin Farm Digital	751,000	1,160,943	6,152,998	0.7%
UN 9 — Corporate SP	1,285,453	1,377,259	7,299,473	0.9%
UN 10 — MAPA pre-operational	776,000	1,111,692	5,891,968	0.7%
SUBTOTAL PACOTES 1-10	119,194,306	156,291,121	829,344,637	100.0%
Engineering, FEED, management (6%)	—	9,388,807	49,760,678	—
Supplier technical supervision (75 days — commissioning)	—	943,396	5,000,000	—
Contingency (20%)	—	31,296,024	165,868,927	—
Captured CAPEX optimization (negotiation, phasing, anchor package)	—	-9,811,321	-52,000,000	—
GROUP TOTAL CAPEX	—	188,297,026	997,974,242	—

13.2 Consolidated Indicators

Indicator	Value
CAPEX TOTAL	US$ 188,297,026 | BRL 997,974,242 (optimized — subtotal with engineering, contingency and supervision: 1,049,974,242)
CAPEX per t/yr of MSW (219,000 t/yr)	BRL 4,557/t
CAPEX per installed MWe (12.7 MW total)	78.580.649/MW
Total import FOB (Packages 2–10)	~US$ 49.818.330 — FOB imported Packs 2-10
System operating days/yr	365 days (0 days of complete shutdown)
Total land area (UN1–7)	20 ha (200,000 m²)
Built hall area (UN1–7)	47,000 m², including 4,000 m² final curing

14. Chinese suppliers — summary

Equipment	Chinese suppliers	Location	Unit capacity (Annex 3 / 5.2)
Trommel separador	Dezhou Qunfeng / Zhengzhou Aite / Zhengzhou ZA ECOTECH	Shandong / Henan	250 t/day (3 units)
Pilot composting reactor	Zhengzhou Shunxin (SEEC)	Henan	pilot — 35–40-day cycle
Organic-fraction press	Jingjin Equipment / Furui Machinery / Jiangsu Sanshine	Shandong / Jiangsu	—
Multilayer filtration	Deefine Filtration (Suzhou)	Jiangsu	—
40-ft container modification	Suzhou Stars / Lian Sheng / YL Steel Container	Jiangsu	—
PLC instrumentation	Siemens China / Omron China / Shenzhen Inovance	Shanghai / Shenzhen	—
Pyrolysis — reactors	Beston	Henan	~28 t/day (4 units; 112.5 t/d peak)
Gas turbine / boiler	Dongfang	Sichuan	5.5 MW (gas) + boiler

Steam turbine	Harbin	Heilongjiang	2.2 MW (steam)
Solar panels	LONGi / Jinko / Trina	Shaanxi / Jiangsu	5.0 MWp
Solar inverters	Sungrow / Huawei	Anhui / Guangdong	—
Flake washing line	Wuxi Beihai	Jiangsu	3.5–4.0 t/h (2 units)
Concrete artifacts	QGM/Zenith	Fujian	—
Pontes rolantes	Weihua	Henan	—
Electrocoagulation / EDR	Jiangsu Jiuwu / Suzhou Bojie / Beijing OriginWater	Jiangsu / Beijing	—

ANNEX — MAPPING OF THE 10 BUSINESS UNITS

Complete structure of the business units:

UN	Business unit	Capacity	SUBTOTAL (US$)	SUBTOTAL (BRL)
UN 1	Segregation, Industrial Inputs & Decontamination	750 t/day MSW	62,222,341	328,776,707
UN 2	Composting	300 t/day organic fraction	13,332,787	70,663,771
UN 3	Special organomineral fertilizers	262.5 t/day installed | 108,625 t/year commercial | NPK 06-14-16	27,493,007	145,712,937
UN 4	Liquid Fertilizers	60 t/day installed | 20,578 t/yr commercial	14,765,919	78,259,371
UN 5	Fiber-Grade Resins	61.2 t/day PET/PEAD/PP	9,124,092	48,357,688
UN 6	Solar Energy & Pyrolysis	12.7 MW (7.7 MWe + 5.0 MWp)	23,381,273	123,920,747
UN 7	Construction materials inputs	72 t/day inerts (zero landfill)	2,699,807	14,308,977
UN 8	Precision Agriculture & Twin Farm Digital	1 operational hub	1,160,943	6,152,998
UN 9	Corporate SP	São Paulo corporate headquarters	1,377,259	7,299,473
UN 10	MAPA pre-operational	2 × 40-ft containers	1,111,692	5,891,968

TOTAL CAPEX: US$ 188,297,026 | BRL 997,974,242 | Total investment per plant in the financial model: US$ 256.5 mn (BRL 1,359.4 mn)

ANNEX 4: DETAILED OPEX — v7.3.8 REVISED | FX: BRL 5.30/US$ | September 2026

PRELIMINARY NOTE — DAY BASIS

The financial projections adopt the definitive Scenario 750 calendar (Annex 5 section 5.1): 361 operating days/yr — 289.75 day-equivalents at 750 t/d + 71.25 day-equivalents at 600 t/d (heavy maintenance in campaign windows within the 600 t/d regime, with no calendar shutdown) — and 4 non-operating holidays (Christmas, New Year and mandatory holidays), totaling 260,062.5 t/yr; the 365-day basis remains only an engineering reference for installed-capacity sizing (tonnage difference of 0.01%, immaterial).

The engineering mass balance uses 365 days for installed-capacity sizing.

EXECUTIVE SUMMARY

Complete OPEX of the 10 business units of the TVD project, updated with CAPEX v7.3.8, Prices v7.3.7, premium technical sales team, marketing and advertising, Corporate SP, Corporate Plant, 5×2 roster, 365 operating days and operational ramp-up.

General Assumptions

FX: BRL 5.30 / US$ (fixed across the entire budget)

Operating days: 361 days/yr (289.75 day-equivalents at 750 t/d; 71.25 day-equivalents at 600 t/d in rotation — heavy maintenance within the rotation window) + 4 non-operating holidays; reception contracted 365 d/yr

Work schedule: 40 hours per week, 5×2 roster; continuous units operate in 3 shifts; headcount coverage calculated using the 365/261 factor (staggered vacations).

HR calculation basis: base salary, 13.5 salaries, 80% payroll charges and allowances; base salaries and obligations presented separately. PJ shareholders receive pro-labore without employer charges, plus international health insurance.

Annual cost factor: monthly salary × 13.5 × 1.80 = monthly salary × 24.3; PJ shareholders: pro-labore × 12 + health insurance.

NOTE ON THE TWO "ADMINISTRATIVE" (3%) LINE ITEMS OF THE UNITS — (i) "Administrative: 3% of operating OPEX (centralized in UN9)" is an INTERNAL COST REALLOCATION (cost recharge): each unit pays for the shared corporate services provided by UN9 (finance, HR, IT, legal, occupational health, Corporate University). The sum of these reallocations (≈ BRL 9.6 mn/yr) partially funds UN9 OPEX (BRL 29.3 mn/yr); as an internal transfer, it is eliminated on consolidation ("Consolidation eliminations") and does not inflate group OPEX. (ii) "Administrative (3%): 3% of total OPEX" is the unit's LOCAL ADMINISTRATIVE PROVISION (office supplies, telephony, unit management expenses); because it is levied on a total that already contains item (i), it generates a small cascade effect (3% × 3% ≈ 0.09% of the base). The convention exists for unit-level management transparency (enabling

the per-unit EBITDA in section 7.7.1) and for budgetary robustness; what matters for the financial model is consolidated OPEX (Annex 5 §5.3).

Estimate class: AACE Class 4 (±25%)

General OPEX consolidation

UN	Unit	Employees	Base OPEX (BRL) — pre-elasticities	OPEX (US$)	% of total
UN 1	Feedstock Classification	179	40,719,105	7,682,850	9.1%
UN 2	Composting	76	15,147,584	2,858,035	3.4%
UN 3	Granular fertilizers	225	206,132,058	38,892,841	46.0%
UN 4	Premium liquid fertilizer	90	87,221,320	16,456,853	19.5%
UN 5	Resins	84	26,991,405	5,092,718	6.0%
UN 6	Energy	49	13,266,836	2,503,177	3.0%
UN 7	Construction	38	14,777,626	2,788,232	3.3%
UN 8	Precision agriculture	37	10,804,268	2,038,541	2.4%
UN 9	Corporate SP + Plant Corporate	138	29,362,897	5,540,169	6.5%
UN 10	MAPA pre-operational	17	3,123,750	589,387	0.7%
—	Consolidation eliminations (inter-unit transfers)		349,997	65,999	0.1%
TOTAL		933	447,896,846	84,508,839	100.0%

UN 1 — FEEDSTOCK CLASSIFICATION

Capacity: 750 t/day of MSW | OPEX: BRL 40,719,105/yr | Employees: 179 | MARGIN LEVER (§7.7.4) APPLIED TO THE 750 SCENARIO: +BRL 1.5 mn/yr of EBITDA — predictive maintenance (fewer unplanned stoppages) and indexed-price sale of recyclables

UN 1.1 Human-Resources Structure by Shift (179 employees)

Operation: 24h × 7 days — 3 continuous shifts | Workweek: 40h/week | Roster: 5×2 | Basis: 13.5 months/yr × 80% payroll charges

Role / function	Work shift 1	Work shift 2	Work shift 3	Workstations/day	Base salary (BRL/mo)	5x2	Base salaries (BRL/yr)	Payroll charges (BRL/yr)	Total cost (BRL/yr)
Feedstock-segregation operator	12	12	8	32	4,500.00	45	2,430,000	2,490,750	4,920,750
Conveyor operator	8	8	6	22	4,500.00	31	1,674,000	1,715,850	3,389,850
Decontamination operator	4	4	3	11	4,500.00	16	864,000	885,600	1,749,600
Mechanical-maintenance technician	4	4	3	11	4,500.00	16	864,000	885,600	1,749,600
Electrical-maintenance technician	2	2	2	6	4,500.00	9	486,000	498,150	984,150
Instrumentation technician	1	1	1	3	5,500.00	5	330,000	338,250	668,250

Overhead-crane operator	2	2	2	6	4,500.00	9	486,000	498,150	984,150
Forklift operator	3	3	2	8	4,500.00	12	648,000	664,200	1,312,200
Truck operator	2	2	2	6	4,500.00	9	486,000	498,150	984,150
Laboratory technician	2	2	1	5	4,500.00	7	378,000	387,450	765,450
Operations supervisor	2	2	2	6	8,000.00	9	864,000	885,600	1,749,600
Process engineer	1	0	1	2	15,000.00	3	540,000	553,500	1,093,500
Mechanical engineer	1	0	0	1	15,000.00	2	360,000	369,000	729,000
Safety engineer	1	0	0	1	15,000.00	2	360,000	369,000	729,000
Unit manager	1	0	0	1	20,000.00	2	480,000	492,000	972,000
Premium technical seller — scrap and glass				2	12,000.00	2	288,000	295,200	583,200
Total direct labor				123			11,538,000	11,826,450	23,364,450

UN 1.2 Raw Materials and Other Line Items

Item	Annual Value (BRL)	Note
Reagents (pH, flocculation, disinfection)	450,000	Operating consumables
Maintenance	7,239,600	2% of CAPEX (BRL 361.9 mn) — Stadler/TOMRA/Weihua preventive maintenance contract
Electricity	3,500,000	Grid purchase + own surplus
Industrial water	180,000	Own WTP + reuse
Internal logistics	800,000	Electric-vehicle fuel
Insurance	1,266,916	0.35% of CAPEX (BRL 361.9 mn) — TVD Group package
Administrative	1,172,486	3% of operating OPEX (centralized in UN 9)
PPE and uniforms	340,080	166 employees × BRL 160/mo × 12
Operating reserve	500,000	Operating contingency
Marketing and advertising	500,000	
Business trips — São Paulo / state capitals / interior of ES, BA, TO, and MG	144,000	
Promotional material	40,000	
Administrative (3%)	1,221,573	3% do OPEX total
TOTAL OPEX UN 1	40,719,105	

SUBTOTAL UN 1: OPEX BRL 40,719,105/yr | US$ 7,682,850/yr | 179 employees

3. UN 2 — COMPOSTING

Capacity: 300 t/day of organic fraction | OPEX: BRL 15,147,584/yr | Employees: 76 | MARGIN LEVER (§7.7.4) APPLIED TO THE 750 SCENARIO: +BRL 5.0 mn/yr of EBITDA — commercialization of excess compost as a product

UN 2.1 Human-Resources Structure by Shift (76 employees)

Operation: 24h × 7 days — 3 continuous shifts | Workweek: 40h/week | Roster: 5×2 | Basis: 13.5 months/yr × 80% payroll charges

Role / function	Work shift 1	Work shift 2	Work shift 3	Workstations/day	Base salary (BRL/mo)	5x2	Base salaries (BRL/yr)	Payroll charges (BRL/yr)	Total cost (BRL/yr)
Composting operator	4	4	3	11	4,500.00	16	864,000	885,600	1,749,600
MENART turner operator	3	3	2	8	4,500.00	12	648,000	664,200	1,312,200
Press operator	2	2	2	6	4,500.00	9	486,000	498,150	984,150
Mechanical-maintenance technician	2	2	1	5	4,500.00	7	378,000	387,450	765,450
Electrical-maintenance technician	1	1	1	3	4,500.00	5	270,000	276,750	546,750
Instrumentation technician	1	0	0	1	5,500.00	2	132,000	135,300	267,300
Tractor operator	2	2	1	5	4,500.00	7	378,000	387,450	765,450
Laboratory technician (MAPA)	2	2	1	5	4,500.00	7	378,000	387,450	765,450
Operations supervisor	1	1	1	3	8,000.00	5	480,000	492,000	972,000
Agronomist	1	0	0	1	15,000.00	2	360,000	369,000	729,000
Environmental engineer	1	0	0	1	15,000.00	2	360,000	369,000	729,000
Unit manager	1	0	0	1	20,000.00	2	480,000	492,000	972,000
Total direct labor				50			5,214,000	5,344,350	10,558,350

UN 2.2 Raw Materials and Other Line Items

Item	Annual Value (BRL)	Note
Reagents (pH, aeration, biofilter)	180,000	Operating consumables
Maintenance	1,413,276	2% of CAPEX (BRL 70.6 mn) — preventive maintenance contract
Electricity	1,200,000	Grid purchase + own surplus
Industrial water	120,000	Own WTP + reuse
Internal logistics	300,000	Tractor/trailer fuel
Insurance	247,323	0.35% of CAPEX (BRL 70.6 mn) — TVD Group package
Administrative	328,287	3% of operating OPEX (centralized in UN 9)
PPE and uniforms	145,920	60 employees × BRL 160/mo × 12
Operating reserve	200,000	Operating contingency
Administrative (3%)	454,428	3% do OPEX total
TOTAL OPEX UN 2	15,147,584	

SUBTOTAL UN 2: OPEX BRL 15,147,584/yr | US$ 2,858,035/yr | 76 employees

UN 3 — GRANULAR FERTILIZERS

Installed capacity: 262.5 t/day | Commercial output: 108,625 t/yr | NPK 06-14-16 | OPEX: BRL 206,132,058/yr | Employees: 225 | MARGIN LEVER (§7.7.4) APPLIED TO THE 750 SCENARIO: +BRL 10.0 mn/yr of EBITDA — annual indexed price reset and energy/reagent efficiency

UN 3.1 Human-Resources Structure by Shift (225 employees)

Operation: 24h × 7 days — 3 continuous shifts | Workweek: 40h/week | Roster: 5×2 | Basis: 13.5 months/yr × 80% payroll charges

Role / function	Work shift 1	Work shift 2	Work shift 3	Workstations/day	Base salary	5x2	Base salaries	Payroll charges	Total cost (BRL/yr)

					(BRL/mo)		(BRL/yr)	(BRL/yr)	
Dryer operator	8	8	6	22	4,500.00	31	1,674,000	1,715,850	3,389,850
Granulator operator	6	6	5	17	4,500.00	24	1,296,000	1,328,400	2,624,400
Overhead-crane operator	4	4	3	11	4,500.00	16	864,000	885,600	1,749,600
Bagging operator	6	6	5	17	4,500.00	24	1,296,000	1,328,400	2,624,400
Mechanical-maintenance technician	5	5	4	14	4,500.00	20	1,080,000	1,107,000	2,187,000
Electrical-maintenance technician	3	3	2	8	4,500.00	12	648,000	664,200	1,312,200
Instrumentation technician	2	2	1	5	5,500.00	7	462,000	473,550	935,550
Forklift operator	4	4	3	11	4,500.00	16	864,000	885,600	1,749,600
Truck operator	3	3	2	8	4,500.00	12	648,000	664,200	1,312,200
Laboratory technician (NPK)	3	3	2	8	4,500.00	12	648,000	664,200	1,312,200
Operations supervisor	3	3	2	8	8,000.00	12	1,152,000	1,180,800	2,332,800
Process engineer	2	0	1	3	15,000.00	5	900,000	922,500	1,822,500
Mechanical engineer	1	0	1	2	15,000.00	3	540,000	553,500	1,093,500
Chemical engineer	1	0	0	1	15,000.00	2	360,000	369,000	729,000
Safety engineer	1	0	0	1	15,000.00	2	360,000	369,000	729,000
Unit manager	1	0	0	1	20,000.00	2	480,000	492,000	972,000
Agronomist seller — organomineral (25, production target)				2	10,000.00	25	3,000,000	3,075,000	6,075,000
Total direct labor				139			16,272,000	16,678,800	32,950,800

UN 3.2 Raw Materials and Other Line Items

Item	Annual Value (BRL)	Note
Organomineral feedstock (compost + NPK minerals)	116,132,097	40% MSW + 60% minerals | implicit price US$ 399.23/t
Seaweed extract (1% of product)	2,772,480	346.6 t/yr × BRL 8,000/t (external purchase — Option B; 2% of the UN4 blend)
Inoculants (Azospirillum, Bacillus)	1,200,000	Biological additives
Target commission (6 salaries/yr, paid quarterly — 1.5 salary/quarter per production target)	1,537,500	25 sellers × BRL 60,000/yr
Reagents (pH, granulation)	850,000	Operating consumables
Maintenance	2,914,259	2% of CAPEX (BRL 136.6 mn) — FEECO/ANDRITZ/Concetti preventive maintenance contract
Electricity	8,500,000	Grid purchase + own surplus
Industrial water	250,000	Own WTP + reuse
Logistics (distribution)	12,000,000	National road freight
Packaging (big bags, pallets)	4,500,000	Embalagem industrial
Insurance	509,995	0.35% of CAPEX (BRL 136.6 mn) — TVD Group package
Administrative	4,966,498	3% of operating OPEX (centralized in UN 9)
PPE and uniforms	459,000	annual PPE and uniforms provision (stock + replacement)
Operating reserve	1,500,000	Operating contingency

Marketing and advertising	2,000,000	
Business trips — São Paulo / state capitals / interior of ES, BA, TO, and MG	1,800,000	25 sellers × 12 trips/yr × BRL 6,000 (airfare, rental, lodging, meals)
Agricultural fairs	320,000	
Field days — cooperatives and large farms	200,000	
Events with large distributors	40,000	
Promotional material	180,000	
Administrative (3%)	6,003,989	3% do OPEX total
TOTAL OPEX UN 3	206,132,058	

SUBTOTAL UN 3: OPEX BRL 206,132,058/yr | US$ 38,892,841/yr | 225 employees

UN 4 — PREMIUM LIQUID FERTILIZER

Installed capacity: 60 t/day | Commercial output: 20,578 t/yr | Premium liquid NPK 04-14-08 + polyphosphate | OPEX: BRL 87,221,320/yr | Employees: 90 | MARGIN LEVER (§7.7.4) APPLIED TO THE 750 SCENARIO: +BRL 6.5 mn/yr of EBITDA — broader Phase-2 specialty mix and bulk additive sourcing

UN 4.1 Human-Resources Structure by Shift (90 employees)

Operation: 24h × 7 days — 3 continuous shifts | Workweek: 40h/week | Roster: 5×2 | Basis: 13.5 months/yr × 80% payroll charges

Role / function	Work shift 1	Work shift 2	Work shift 3	Workstations/day	Base salary (BRL/mo)	5x2	Base salaries (BRL/yr)	Payroll charges (BRL/yr)	Total cost (BRL/yr)
Liquid-treatment operator	4	4	3	11	4,500.00	16	864,000	885,600	1,749,600
Filtration operator (MF/UF/OR)	3	3	2	8	4,500.00	12	648,000	664,200	1,312,200
Humic-extraction operator	2	2	2	6	4,500.00	9	486,000	498,150	984,150
Chemical-dosing operator	2	2	1	5	4,500.00	7	378,000	387,450	765,450
Mechanical-maintenance technician	2	2	1	5	4,500.00	7	378,000	387,450	765,450
Electrical-maintenance technician	1	1	1	3	4,500.00	5	270,000	276,750	546,750
Instrumentation technician	1	1	1	3	5,500.00	5	330,000	338,250	668,250
Tanker-truck operator	2	2	1	5	4,500.00	7	378,000	387,450	765,450
Laboratory technician (MAPA)	2	2	1	5	4,500.00	7	378,000	387,450	765,450
Operations supervisor	1	1	1	3	8,000.00	5	480,000	492,000	972,000
Chemical engineer	1	0	0	1	15,000.00	2	360,000	369,000	729,000
Environmental engineer	1	0	0	1	15,000.00	2	360,000	369,000	729,000
Unit manager	1	0	0	1	20,000.00	2	480,000	492,000	972,000
Agronomist seller — organomineral (25, production target)				2	10,000.00	4	480,000	492,000	972,000
Total direct labor				61	40		3,654,000	3,745,350	8,407,350

UN 4.2 Raw Materials and Other Line Items

Item	Annual Value (BRL)	Note
Press liquor (UN2)	0	Internal transfer at zero cost
Basic NPK 04-14-08 feedstock — 10,397 t/yr	17,731,056	60% of product | BRL 1,705.43/t
Premium additives v7.3.7 — APP, micronutrients, seaweed, inoculant and humic acids	34,482,720	BRL 1,990/t × 17,328 t | synergy not deducted
Target commission (6 salaries/yr, quarterly)	246,000	4 sellers × BRL 60,000/yr
Chemical reagents (NaOH, Na_2S, KOH, HCl)	2,400,000	Decontamination and pH adjustment
Reagents (MF/UF/OR membranes, CIP)	1,800,000	Membrane replacement and cleaning
Reagents (electrocoagulation, EDR)	950,000	Electrodes and ion-exchange resins
Reagents (UV-C, ozone)	320,000	UV lamps and ozone generator
Maintenance	1,565,187	2% of CAPEX (BRL 78.3 mn) — SUEZ/Vontron/Bluestar preventive maintenance contract
Electricity	2,100,000	Grid purchase + own surplus
Industrial water	80,000	Own WTP + reuse
Logistics (tanker trucks)	3,200,000	National road freight
Packaging (IBCs, drums, pallets)	1,500,000	Embalagem industrial
Insurance	273,908	0.35% of CAPEX (BRL 78.3 mn) — TVD Group package
Administrative	1,648,023	3% of operating OPEX (centralized in UN 9)
PPE and uniforms	177,120	55 employees × BRL 160/mo × 12
Operating reserve	800,000	Operating contingency
Marketing and advertising	1,500,000	
Business trips — São Paulo / state capitals / interior of ES, BA, TO, and MG	576,000	
Agricultural fairs	240,000	
Field days — cooperatives and large farms	120,000	
Events with large distributors	40,000	
Promotional material	140,000	
Administrative (3%)	2,632,156	3% do OPEX total
TOTAL OPEX UN 4	87,221,320	

SUBTOTAL UN 4: OPEX BRL 87,221,320/yr | US$ 16,456,853/yr | 90 employees

UN 5 — POLYMERS

Capacity: 61.2 t/day | OPEX: BRL 26,991,405/yr | Employees: 84 | MARGIN LEVER (§7.7.4) APPLIED TO THE 750 SCENARIO: +BRL 3.0 mn/yr of EBITDA — use of redundancy and mechanical availability

UN 5.1 Human-Resources Structure by Shift (84 employees)

Operation: 24h × 7 days — 3 continuous shifts | Workweek: 40h/week | Roster: 5×2 | Basis: 13.5 months/yr × 80% payroll charges

Role / function	Work shift	Work shift	Work shift	Workstations/day	Base salary	5x2	Base salaries	Payroll charges	Total cost (BRL/yr)

	1	2	3		(BRL/mo)		(BRL/yr)	(BRL/yr)	
Flake-washer operator	3	3	2	8	4,500.00	12	648,000	664,200	1,312,200
Gneuss extruder operator	3	3	2	8	4,500.00	12	648,000	664,200	1,312,200
Conveyor/sorting operator	2	2	2	6	4,500.00	9	486,000	498,150	984,150
Mechanical-maintenance technician	2	2	1	5	4,500.00	7	378,000	387,450	765,450
Electrical-maintenance technician	1	1	1	3	4,500.00	5	270,000	276,750	546,750
Instrumentation technician	1	1	1	3	5,500.00	5	330,000	338,250	668,250
Forklift operator	2	2	1	5	4,500.00	7	378,000	387,450	765,450
Truck operator	2	2	1	5	4,500.00	7	378,000	387,450	765,450
Laboratory technician (rheology)	2	2	1	5	4,500.00	7	378,000	387,450	765,450
Operations supervisor	1	1	1	3	8,000.00	5	480,000	492,000	972,000
Materials engineer	1	0	0	1	15,000.00	2	360,000	369,000	729,000
Mechanical engineer	1	0	0	1	15,000.00	2	360,000	369,000	729,000
Unit manager	1	0	0	1	20,000.00	2	480,000	492,000	972,000
Premium technical seller — resins				2	15,000.00	2	360,000	369,000	729,000
Total direct labor				56			5,934,000	6,082,350	12,016,350

UN 5.2 Raw Materials and Other Line Items

Item	Annual Value (BRL)	Note
Plastic flakes (UN1)	0	Internal transfer at zero cost
Additives (stabilizers, colorants)	1,200,000	Industrial additives
Reagents (washing, drying)	450,000	Operating consumables
Maintenance	967,154	2% of CAPEX (BRL 48.4 mn) — Gneuss/Wuxi Beihai preventive maintenance contract
Electricity	2,800,000	Grid purchase + own surplus
Industrial water	150,000	Own WTP + reuse
Logistics (distribution)	4,500,000	National road freight
Packaging (bags, pallets)	1,800,000	Embalagem industrial
Insurance	169,252	0.35% of CAPEX (BRL 48.4 mn) — TVD Group package
Administrative	527,467	3% of operating OPEX (centralized in UN 9)
PPE and uniforms	157,440	64 employees × BRL 160/mo × 12
Operating reserve	400,000	Operating contingency
Marketing and advertising	800,000	
Business trips — São Paulo / state capitals / interior of ES, BA, TO, and MG	144,000	
Events with large distributors	20,000	
Promotional material	80,000	
Administrative (3%)	809,742	3% do OPEX total
TOTAL OPEX UN 5	26,991,405	

SUBTOTAL UN 5: OPEX BRL 26,991,405/yr | US$ 5,092,718/yr | 84 employees

UN 6 — ENERGY & PYROLYSIS

Capacity: 12.7 MW | OPEX: BRL 13,266,836/yr | Employees: 49 | MARGIN LEVER (§7.7.4) APPLIED TO THE 750 SCENARIO: +BRL 1.5 mn/yr of EBITDA — solar PPA and optimized self-consumption

UN 6.1 Human-Resources Structure by Shift (49 employees)

Operation: 24h × 7 days — 3 continuous shifts | Workweek: 40h/week | Roster: 5×2 | Basis: 13.5 months/yr × 80% payroll charges

Role / function	Work shift 1	Work shift 2	Work shift 3	Workstations/day	Base salary (BRL/mo)	5x2	Base salaries (BRL/yr)	Payroll charges (BRL/yr)	Total cost (BRL/yr)
Thermal-plant operator	3	3	2	8	4,500.00	12	648,000	664,200	1,312,200
Pyrolysis-reactor operator	2	2	2	6	4,500.00	9	486,000	498,150	984,150
Substation operator (SCADA)	1	1	1	3	4,500.00	5	270,000	276,750	546,750
Mechanical-maintenance technician	2	2	1	5	4,500.00	7	378,000	387,450	765,450
Instrumentation technician (outsourced)	1	0	0	1	5,500.00	2	132,000	135,300	267,300
Operations supervisor	1	1	1	3	8,000.00	5	480,000	492,000	972,000
Energy engineer	1	0	1	2	15,000.00	3	540,000	553,500	1,093,500
Mechanical engineer	1	0	0	1	15,000.00	2	360,000	369,000	729,000
Unit manager	1	0	0	1	20,000.00	2	480,000	492,000	972,000
Premium technical seller — energy				2	15,000.00	2	360,000	369,000	729,000
Total direct labor				32			4,134,000	4,237,350	8,371,350

UN 6.2 Raw Materials and Other Line Items

Item	Annual Value (BRL)	Note
Reagents (calcium carbonate, calcium hydroxide, water treatment)	350,000	Operating consumables (reduced 30% via closed-loop recirculation)
Maintenance	2,478,000	2% CAPEX (BRL 123.9M) — Dongfang/Harbin/Beston preventive contract, predictive maintenance via digital twin
Logistics	200,000	Transport of ash/by-products
Insurance	433,723	0.35% CAPEX (BRL 123.9M) — TVD group package with shared claims experience
Administrative	451,758	3% of operational OPEX (centralizado na UN 9 Corporate SP)
Marketing and advertising	400,000	
Business trips — São Paulo / state capitals / interior of ES, BA, TO, and MG	144,000	
Promotional material	40,000	
Administrative (3%)	398,005	3% do OPEX total
TOTAL OPEX UN 6	13,266,836	

8. UN 7 — CONSTRUCTION MATERIALS

Capacity: 72 t/day of inerts | OPEX: BRL 14,777,626/yr | Employees: 38 (2-shift operation) | MARGIN LEVER (§7.7.4) APPLIED TO THE 750 SCENARIO: +BRL 4.0 mn/yr of EBITDA — sale of certified recycled aggregate (DNIT compliance)

UN 7.1 Human-Resources Structure by Shift (38 employees)

Operation: 16h × 6 days (daytime) — 2 shifts | Workweek: 40h/week | Roster: 5×2 | Basis: 13.5 months/yr × 80% payroll charges

Role / function	Work shift 1	Work shift 2	Work shift 3	Workstations/day	Base salary (BRL/mo)	5x2	Base salaries (BRL/yr)	Payroll charges (BRL/yr)	Total cost (BRL/yr)
Artifact-machine operator	3	3	-	6	4,500.00	9	486,000	498,150	984,150
Palletizing-robot operator	1	1	-	2	4,500.00	3	162,000	166,050	328,050
Micronization operator	2	1	-	3	4,500.00	5	270,000	276,750	546,750
Mechanical-maintenance technician	1	1	-	2	4,500.00	3	162,000	166,050	328,050
Electrical-maintenance technician	1	-	-	1	4,500.00	2	108,000	110,700	218,700
Forklift operator	1	1	-	2	4,500.00	3	162,000	166,050	328,050
Truck operator	1	1	-	2	4,500.00	3	162,000	166,050	328,050
Laboratory technician (strength)	1	-	-	1	4,500.00	2	108,000	110,700	218,700
Operations supervisor	1	-	-	1	8,000.00	2	192,000	196,800	388,800
Civil engineer	1	-	-	1	15,000.00	2	360,000	369,000	729,000
Unit manager	1	-	-	1	20,000.00	2	480,000	492,000	972,000
Premium technical seller — construction materials				2	12,000.00	2	288,000	295,200	583,200
Total direct labor				24		38	2,940,000	3,013,500	5,953,500

UN 7.2 Raw Materials and Other Line Items

Item	Annual Value (BRL)	Note
Micronized inerts (UN1)	0	Internal transfer at zero cost
Portland cement	2,000,000	Main feedstock
Fine sand	400,000	Agregado
Additives (plasticizers, retardants)	350,000	Industrial additives
Maintenance	367,333	2% of CAPEX (BRL 14.3 mn) — QGM/Zenith/KUKA preventive maintenance contract
Electricity	1,200,000	Grid purchase + own surplus
Industrial water	100,000	Own WTP + reuse
Logistics (distribution)	1,500,000	National road freight
Packaging (pallets, stretch film)	600,000	Embalagem industrial
Insurance	64,283	0.35% of CAPEX (BRL 14.3 mn) — TVD Group package
Administrative	239,136	3% of operating OPEX (centralized in UN 9)
PPE and uniforms	72,960	38 employees × BRL 160/mo × 12
Operating reserve	300,000	Operating contingency
Marketing and advertising	600,000	
Business trips — São Paulo / state capitals / interior of ES, BA, TO, and MG	144,000	
Events with large distributors	20,000	

Promotional material	60,000	
Administrative (3%)	806,414	3% do OPEX total
TOTAL OPEX UN 7	14,777,626	

SUBTOTAL UN 7: OPEX BRL 14,777,626/yr | US$ 2,788,232/yr | 38 employees

UN 8 — PRECISION AGRICULTURE (HR, services and OPEX)

Structure: 1 operational hub + on-demand CHARTERED PC-12 aircraft + fleet of drones, robots and sensors | OPEX: BRL 10,804,268/yr | Employees: 37 | MARGIN LEVER (§7.7.4) APPLIED TO THE 750 SCENARIO: +BRL 1.8 mn/yr of EBITDA — recurring annual service/expertise contracts

STRATEGIC NOTE: UN 8 has been reconfigured as a TECHNICAL-MARKETING AND FIELD-R&D COST CENTER. It is not an independent profit-making business unit. The PC-12 aircraft has been REMOVED from CAPEX — it is chartered by flight hour (BRL 30,000/h) when needed to transport teams to remote areas.

UN 8.1 Human-Resources Structure (37 employees)

Operation: 12h × 6 days (daytime) — 2 shifts at the hub + floating shift for field missions | Workweek: 40h/week | Roster: 5×2 | Basis: 13.5 months/yr × 80% payroll charges

Role / function	Headcount	Base salary (BRL/mo)	Base salaries (BRL/yr)	Payroll charges (BRL/yr)	Total cost (BRL/yr)
Drone operator (Matrice 300 RTK)	7	4,500.00	378,000	387,450	765,450
UGV operator (Naïo Oz V4)	3	4,000.00	144,000	147,600	291,600
Agricultural-data analyst	5	6,000.00	360,000	369,000	729,000
Agronomist (hub)	5	12,000.00	720,000	738,000	1,458,000
IoT/sensor technician	3	5,000.00	180,000	184,500	364,500
Drone/UGV maintenance technician	3	5,000.00	180,000	184,500	364,500
Operations supervisor	3	8,000.00	288,000	295,200	583,200
Operations manager	2	18,000.00	432,000	442,800	874,800
Data-processing specialist (Pix4D/Agisoft)	3	7,000.00	252,000	258,300	510,300
Premium agronomist seller — agriculture	3	18,000.00	648,000	664,200	1,312,200
TOTAL LABOR		37	3,582,000	3,671,550	7,253,550

UN 8.2 Fuel, Operation and Other Line Items

Item	Annual Value (BRL)	Note
Aircraft rental (PC-12 charter)	900,000	~30 flight h/yr × BRL 30,000/h (remote-area team transport)
Drone/UGV/sensor maintenance	153,825	2.5% of CAPEX (BRL 6.48 mn) — preventive maintenance contract with Chinese suppliers
Energy (hub, drone charging)	50,000	Electricity and drone charging (1 operations hub)
Logistics (hub travel)	80,000	Ground-vehicle fuel
Software/cloud + workstations	250,000	Pix4D, Agisoft, ArcGIS Pro, ERP, AWS cloud licenses (TVD corporate licenses)
Insurances (0,5% CAPEX)	30,765	Equipment and Liability Insurance — TVD Group Package
Administrative (3%)	250,000	Based at UN 9 Corporate SP
Operating reserve	200,000	Operating contingency
Marketing and advertising	700,000	
Business trips — São Paulo / state capitals / interior of ES, BA, TO, and MG	432,000	
Agricultural fairs	80,000	
Field days — cooperatives and large farms	40,000	
Promotional material	60,000	
Administrative (3%)	324,128	3% do OPEX total
TOTAL OPEX UN 8	10,804,268	

UN 8.3 Revenue — Feasible Services

Note: The PC-12 aircraft is a CORPORATE LOGISTICS asset (transporting teams, samples and executives between the hub and headquarters), not an agricultural mapping tool. It has no integrated multispectral cameras and no ANAC/DECEA certification for commercial remote sensing.

Service	Clients/Volume	Price	Annual revenue (BRL)
Aerial mapping (Matrice 300 RTK drones)	200 farms × 500 ha × 3 drones	BRL 17/ha	5,100,000
Drone spraying (Agras T40)	150 farms × 300 ha × 0 drones	BRL 90/ha	0
Autonomous mowing (Naïo Oz V4)	100 clients × 4 ha × 2 UGVs	BRL 1,300/ha	1,040,000
Soil NPK analysis + report (Xmobots)	150 farms × 500 samples	BRL 26/sample	1,950,000
IoT monitoring (assinatura)	40 sensors	BRL 700/month	336,000
Digital agronomic consulting	50 clients	BRL 1,800/month	1,080,000
Training/certification	8 classes/yr	BRL 3,800	30,400
Data processing (Pix4D/Agisoft)	—	—	400,000
B2B data sales (insurers/banks)	—	—	500,000
Third-party drone maintenance	—	—	300,000
TOTAL POTENCIAL			10,736,400
ADOPTED REVENUE (85% maturity)			9,125,940

UN 8.4 Results — UN 8 EBITDA

Metric	Value
Revenue (Year 3, 85% utilization)	BRL 9,125,940
OPEX	BRL 10,804,268
EBITDA	−BRL 1,678,328
EBITDA Margin	-18.4%

OPEX coverage by own revenue	84.5% (BRL 9.1 mn of BRL 10.8 mn)
Status	— (. . : − . ;

Note: UN 8 operates as a technical-marketing and field-R&D cost center, per the reconfiguration recorded in UN 8.1: service revenue (BRL 9,125,940/yr in Year 3, 85% utilization) covers 84.5% of OPEX (BRL 10,804,268/yr), leaving a net cost of BRL 1,678,328/yr — the same figure consolidated in section 7.7.1 (EBITDA of −BRL 1.7 mn; margin of −18.7%, or −13.7% after the 4% automation saving on OPEX). The structure reflects the removal of the PC-12 aircraft from CAPEX and the consolidation of 5 hubs into 1 operational hub.

10. UN 9 — CORPORATE PLANT + CORPORATE SP

Corporate headquarters in São Paulo + Corporate Plant | 8 PJ shareholders | Pro-labore US$ 8,000/month per shareholder + international health insurance | OPEX: BRL 29,362,897/yr | Employees: 138

UN 9.1 Human-Resources Structure (138 employees)

Operation: Daytime (08h–18h) — 1 shift | Workweek: 40h/week | Basis: 13.5 months/yr × 80% payroll charges

Role / function	Headcount	Base salary (BRL/mo)	Base salaries (BRL/yr)	Payroll charges (BRL/yr)	Total cost (BRL/yr)
Chief Financial Officer	1	25,000.00	300,000	307,500	607,500
Commercial Director	1	25,000.00	300,000	307,500	607,500
Technical director	1	25,000.00	300,000	307,500	607,500
Senior financial analyst	2	10,000.00	240,000	246,000	486,000
Controllership analyst	2	8,000.00	192,000	196,800	388,800
HR analyst	1	6,000.00	72,000	73,800	145,800
Legal analyst	1	8,000.00	96,000	98,400	194,400
Administrative assistant	2	4,000.00	96,000	98,400	194,400
Receptionist	1	3,500.00	42,000	43,050	85,050
Driver	1	4,000.00	48,000	49,200	97,200
Interns	4	2,000.00	96,000	98,400	194,400
PJ shareholder — pro-labore	8	42,400.00	4,070,400	0	4,070,400
Occupational physician — Corporate Plant	3	18,000.00	648,000	664,200	1,312,200
Nurse — Corporate Plant	3	8,000.00	288,000	295,200	583,200
Fitness instructor — Corporate Plant	3	6,000.00	216,000	221,400	437,400
Cook — Corporate Plant	15	4,500.00	810,000	830,250	1,640,250
Kitchen assistant — Corporate Plant	9	3,500.00	378,000	387,450	765,450
Catering supervisor — Corporate Plant	3	8,000.00	288,000	295,200	583,200
Contracted-cleaning assistant — equivalent cost	57	3,500.00	2,394,000	2,453,850	4,847,850
Cleaning supervisor —	3	6,000.00	216,000	221,400	437,400

equivalent cost					
Internal-security/ gatehouse officer	6	4,500.00	324,000	332,100	656,100
Patrol security guard	3	4,500.00	162,000	166,050	328,050
Safety supervisor	3	8,000.00	288,000	295,200	583,200
Janitor/caretaker	3	4,000.00	144,000	147,600	291,600
Receivables-origination analysts (trade finance)	2	12,000.00	288,000	295,200	583,200
TOTAL LABOR		138	12,296,400	8,431,650	20,728,050

Closing note (de-risking condition 6): the 138-position headcount includes the 2 receivables-origination analysts (trade finance); their annual compensation (BRL 583.2 thousand) is absorbed within the UN 9.2 corporate provisions (BRL 500 thousand corporate reserve and 3% administrative provision of BRL 879.7 thousand), so consolidated UN 9 OPEX remains BRL 29,362,897/yr.

UN 9.2 Other Line Items

Item	Annual Value (BRL)	Note
Itaim Bibi office rent	420,000	Coworking premium
Condominium fees + property tax (IPTU)	84,000	Proportional
Electricity	36,000	Corporate office
Telefonia/internet	24,000	Links dedicados
IT maintenance	120,000	Technical support and hardware
Marketing and events	600,000	Feiras, roadshows, materiais
Corporate trips	480,000	Executive and team travel
Legal advisory	240,000	Contracts, corporate, regulatory
Accounting advisory	180,000	Accounting, tax, fiscal
Independent auditing	300,000	Big 4 (KPMG/Deloitte/EY/PwC)
Insurance (D&O, RC, patrimonial)	180,000	Corporate pack
Corporate software licenses	360,000	ERP, CRM, BI, Office 365
Corporate reserve — includes TVD Corporate University (LMS, content and certifications, BRL 0.5 mn/yr)	500,000	Contingency
International health insurance — 8 families, up to 4 dependents	1,272,000	US$ 30,000/family/yr
Corporate Plant — catering	3,542,325	647 meals/day × 365 days × BRL 15/meal
Administrative (3%)	879,722	3% do OPEX total
TOTAL OPEX UN 9	29,362,897	

SUBTOTAL UN 9: OPEX BRL 29,362,897/yr | US$ 5,540,169/yr | 138 employees

11. UN 10 — PRE-OPERATIONAL COMPOSTING AND LIQUID FERTILIZERS

Objective: two 40-ft containers operating throughout the 24 months of construction | OPEX: BRL 3,123,750/yr | Employees: 17

UN 10.1 Human-Resources Structure (17 employees)

Operation: Daytime (08h–18h) — 1 shift | Workweek: 40h/week | Basis: 13.5 months/yr × 80% payroll charges

Role / function	Headcount	Base salary	Base salaries	Payroll charges	Total cost

		(BRL/mo)	(BRL/yr)	(BRL/yr)	(BRL/yr)
Process technician (composting)	3	4,500.00	162,000	166,050	328,050
Process technician (filtration)	3	4,500.00	162,000	166,050	328,050
Laboratory technician (MAPA)	3	4,500.00	162,000	166,050	328,050
Regulatory analyst (MAPA)	2	6,000.00	144,000	147,600	291,600
Agronomist	2	12,000.00	288,000	295,200	583,200
Operations supervisor	2	8,000.00	192,000	196,800	388,800
Project manager	2	15,000.00	360,000	369,000	729,000
TOTAL LABOR		17	1,470,000	1,506,750	2,976,750

UN 10.2 Other Line Items

Item	Annual Value (BRL)	Note
Reagents (pH, nutrients, analysis)	45,000	Laboratory consumables
Electricity	36,000	Containers + laboratory
Industrial water	12,000	Local supply
Logistics (samples, documents)	24,000	Transporte terrestre
Operating reserve	30,000	Contingency
TOTAL OPEX UN 10	3,123,750	

SUBTOTAL UN 10: OPEX BRL 3,123,750/yr | US$ 589,387/yr | 17 employees

INCOME STATEMENT (EBITDA)

Consolidation by Business Unit

UN	Unit	Product / Service	Revenue (BRL)	Revenue (US$)
UN 1	Periodical sales	Scrap + metals + glass	19,050,413	3,594,417
UN 3	Granular fertilizers	Organomineral 06-14-16	343,657,572	64,841,051
UN 4	Premium liquid fertilizer	NPK premium	114,624,720	21,627,306
UN 5	Resins	Fiber-grade resins	138,611,812	26,153,172
UN 6	Energy	ACL surplus	9,777,612	1,844,833
UN 7	Construction	Blocks + aggregate	10,655,954	2,010,557
UN 8	Precision agriculture	Services	9,856,015	1,859,626
TOTAL			646,234,098	121,930,962

Consolidated Income Statement

Item	Value (BRL)	Value (US$)
TOTAL REVENUE	646,234,098	121,930,962
OPEX TOTAL YEAR 5 AND UP	431,743,029	81,460,949
EBITDA	214,491,069	40,469,862
EBITDA Margin	33.2%	33.2%

16. ANNUAL OPEX, PRE-OPERATIONAL AND RAMP-UP

Year	Phase	Industrial units	Corporate SP	Corporate Plant	Containers	OPEX (BRL)	OPEX (US$)	OPEX/ Revenue
1	Pre-operational	0%	100%	0%	0%	21,284,523	4,015,948	3.4%
2	Pre-operational	0%	100%	0%	0%	21,284,523	4,015,948	3.4%
3	Ramp-up	30%	100%	30%	0%	230,895,446	43,565,178	30.5%
4	Ramp-up	60%	100%	60%	0%	275,747,435	52,027,818	41.4%
5	Full operation	100%	100%	100%	0%	439,602,612	82,943,889	100.0%
6	Full operation	100%	100%	100%	0%	439,602,612	82,943,889	100.0%
7	Full operation	100%	100%	100%	0%	439,602,612	82,943,889	100.0%

8	Full operation	100%	100%	100%	0%	439,602,612	82,943,889	100.0%
9	Full operation	100%	100%	100%	0%	439,602,612	82,943,889	100.0%
10	Full operation	100%	100%	100%	0%	439,602,612	82,943,889	100.0%

AUTOMATION NOTE: CAPEX includes AGVs/AMRs, vision AI, DCS/SCADA/MES, WMS and a digital twin. These assets raise output per employee and create OPEX-efficiency potential in non-labor lines (energy, maintenance, quality/rework and internal logistics). In the model, the −4% automation factor is applied exclusively to non-labor OPEX lines: no position elimination is assumed and the 933-employee establishment is fully retained (jobs thesis preserved).

ANNEX 5 — SCENARIO 750 (600 WITH REDUNDANCY UTILIZATION): FULL REVISION OF CAPEX, OPEX AND LABOR

FX: R$ 5.30/US$ | September 2026 | Revision basis: Annex 3 (CAPEX v7.3.9) and Annex 4 (OPEX v7.3.8)

GOVERNANCE OF THIS REVISION — Originals Annexes 3 and 4 are fully preserved for traceability. This Annex 5 records, item by item, the revisions required by the definitive operating scenario of 750 t/d of RSU — configured as 600 t/d of dignified base plus the productive utilization of sorting redundancy during the nine months of the year without heavy maintenance, keeping 365 operating days/year. This annex was prepared under ESG fund manager supervision: every additional piece of equipment was verified against manufacturer specifications, every variable cost was decomposed by driver (elasticity method), and labor was revised by job post — not by tonnage pro-rata. Where this annex diverges from Annexes 3-4, it prevails for the 750 scenario.

5.1 — OPERATING CALENDAR OF SCENARIO 750 (600 WITH REDUNDANCY UTILIZATION)

Period (365 contracted days; 361 operating + 4 holiday non-operating days)	Sorting configuration	RSU intake
Normal operation — 289.75 day-equivalents at 750 t/day (3 machines × 250 t/day; no machine in heavy maintenance)	3 machines × 250 t/d (83.3% of nameplate)	750 t/d
Heavy-maintenance windows — 71.25 day-equivalents at 600 t/day (1 machine in rotation; 2 × 300)	2 machines × 300 t/d	600 t/d
ANNUAL TOTAL	weighted average	260,062.5 t/yr = +18.75% over the base of 219,000 t (600 t/day × 365 days)

Integrity principle: the additional volume is received at ZERO GATE FEE — the ESG-layer anti-corruption covenant applies to 100% of the volume, including the increment, and is reinforced by it. The plan base remains wholly free of gate-fee payments; the capacity to absorb any eventual B2B fee to the private landfill operator (up to BRL 14.84/t at DSCR ≥ 1.20x; up to BRL 59/t at 1.15x DSCR) is sensitivity only, documented in the executive summary.

5.1.1 — PARTIAL UTILIZATION OF REDUNDANCY CAPEX AND THE 361-DAY OPERATING CALENDAR (installed-capacity verification — method no. 2)

MSW is contracted 365 days a year, but municipal collection is suspended on 4 mandatory dates — Christmas, New Year and mandatory holidays —:

361 operating days and 4 non-operating days. Over the 361 operating days, the equivalent annual pattern is 289.75 days at 750 t/day + 71.25 days at 600 t/day, totaling 260,062.5 t/yr (average 720.4 t/day per operating day = 95% of the 750 t/day nominal; 712.5 t/day on the receiving calendar). Maintenance is organized in three layers: (i) BASIC revisions — daily, within the shift (cleaning, inspection, lubrication, wear parts), with no capacity impact; (ii) HEAVY revisions — concentrated in campaign windows, with ONE main machine in revision at a time (rotation), when the plant runs at 600 t/day (2 × 300 t/day); absorbing those windows without stopping is EXACTLY why the CAPEX carries machine redundancy (sorting 3 × 300 = 900 t/day installed vs 750 nominal); (iii) the 4 holidays, with no operation. Continuous biological units (UN2 composting, UN4 liquids) do not stop — they operate even on holidays, since stopping would mean losing the batch. The economic logic is PARTIAL utilization of redundancy CAPEX: the plant was sized with installed capacity above nominal, and the 750 Scenario uses that margin up to 118.75% of the 600 base nameplate — with no new CAPEX, because the redundancy is already paid for in the base project. The cost of that margin appears as depreciation and maintenance of assets operating on average at 80–96% of installed capacity — the deliberate price of availability: 361 operating days per year. Cross-check (method no. 2): for every unit, required annual output divided by operating days never exceeds scenario capacity (base nameplate × 1.1875), and the consolidated OPEX of BRL 476.6 mn/yr equals BRL 1,832.6 per tonne of MSW processed (BRL 1.32 mn per operating day).

Unit	Installed capacity (600 base nameplate)	Scenario capacity (× 1.1875)	Required output (average t/day)	Utilization of scenario capacity
UN1 — Sorting	900 t/day (3 × 300)	900 t/day (already redundant)	720.4 (361 d) · 750 peak · 600 in heavy-maintenance windows (N-1 rotation)	80.0% avg · 83.3% peak
UN2 — Composting	300 t/day	356.25 t/day	356.2 (365 d — continuous biological process)	100.0% — tightest point; rotation of 34 windrows
UN3 —	262.5 t/day	311.7 t/day	297.6 (365 d)	95.5% —

Granulation				extended-hours regime documented
UN4 — Liquids	60 t/day	71.25 t/day	56.4 (365 d)	79.2%
UN5 — Resins	61.2 t/day	72.7 t/day	72.7 (365 d)	100.0% — extended shifts
UN6 — Energy	600 island (70,872 MWh/yr)	limited by own generation	36,915 MWh/yr sold = physical surplus	—
UN7 — Construction	72 t/day of micronized inertes	blocks + aggregate	110.4 t/day of products (365 d)	inertes 100% used in blocks + aggregate
TOTAL MSW	900 t/day installed	750 t/day nominal	260,062.5 t/yr = 712.5 t/day average (95% of nominal)	80.0% of installed

5.2 — REVISED CAPEX BY UNIT (delta over Annex 3)

UN 1 — RAW MATERIAL CLASSIFICATION

No CAPEX adjustment. No CAPEX adjustment. The three sorting lines (3 × 300 t/d = 900 t/d) absorb the 750 t/d peak at 83.3% load; the yard is already oversized in the base project.

UN 2 — COMPOSTING

Adjustment item	Amount (R$)	Technical justification
Ampliação de leiras — +1.000 m² (piso, drenagem, biofiltro ampliado)	1.000.000	Peak mass in process: 375 t/d × 35 days = 13,125 t; windrow area 8,000 → 9,000 m²; pad required by seasonal buffer
Pátio de cura/tampão — 6.000 a 9.000 m²	800.000	Peak mass in process: 375 t/d × 35 days = 13,125 t; windrow area 8,000 → 9,000 m²; pad required by seasonal buffer
Sensores IoT de leira — 34 → 40 unidades	200.000	Peak mass in process: 375 t/d × 35 days = 13,125 t; windrow area 8,000 → 9,000 m²; pad required by seasonal buffer
SUBTOTAL OF ADJUSTMENTS	2.000.000	
REVISED TOTAL UN 2	72.663.771	base 70.663.771

UN 3 — ORGANOMINERAL FERTILIZER

Adjustment item	Amount (R$)	Technical justification
Granulador principal 8 → 10 t/h (pico 313,3 t/d > 288 t/d)	9.000.000	Peak output 313.3 t/d vs. 288 t/d of the 8+4 t/h granulators (24 h). Capex-free alternative: 26.1 h/d regime (313.3 t/d ÷ 12 t/h) — above 24 h: not feasible; capex confirmed
SUBTOTAL OF ADJUSTMENTS	9.000.000	
REVISED TOTAL UN 3	154.712.937	base 145.712.937

UN 4 — PREMIUM LIQUID

No CAPEX adjustment. Peak requirement is 59.3 t/d vs. 60 t/d installed (99% occupancy — no headroom for future growth; the +20% debottleneck in the plan remains as pipeline).

UN 5 — PET RECYCLING

Adjustment item	Amount (R$)	Technical justification

Segunda extrusora Gneuss MRS (pico 3,2 t/h > 2,0-2,2 t/h de uma máquina)	8.850.000	Peak 76.5 t/d = 3.2 t/h vs. 2.0-2.2 t/h of the single Gneuss MRS extruder and 3.0 t/h standard washers
Lavadora de flakes 3,0 → 3,5-4,0 t/h	4.050.000	Peak 76.5 t/d = 3.2 t/h vs. 2.0-2.2 t/h of the single Gneuss MRS extruder and 3.0 t/h standard washers
SUBTOTAL OF ADJUSTMENTS	12.900.000	
REVISED TOTAL UN 5	61.257.688	base 48.357.688

UN 6 — PYROLYSIS

Adjustment item	Amount (R$)	Technical justification
Fourth Beston BLL-30 reactor (3 in line + 1 standby; peak 112.5 t/d > 90 t/d of the 3 in line)	5.080.000	Peak feed 112.5 t/d (90 × 1.25) vs. 90 t/d of the three BLL-30 reactors in line; adjustment keeps 3 in line + 1 standby (112.5 > 90)
SUBTOTAL OF ADJUSTMENTS	5.080.000	
REVISED TOTAL UN 6	129.000.747	base 123.920.747

UN 7 — AGGREGATES

Adjustment item	Amount (R$)	Technical justification
Segunda unidade de micropicação (inertes pico 111 t/d > 72 t/d)	2.500.000	Peak inert material 90 t/d (72 × 1.25) vs. 72 t/d installed
SUBTOTAL OF ADJUSTMENTS	2.500.000	
REVISED TOTAL UN 7	16.808.977	base 14.308.977

UN 8 — PRECISION AGRICULTURE

No CAPEX adjustment. Cost center for technical marketing and R&D — does not scale with RSU volume.

UN 9 — CORPORATE

No CAPEX adjustment. Corporate — does not scale with RSU volume.

UN 10 — PRE-OPERATIONAL

No CAPEX adjustment. MAPA pre-operational — does not scale with RSU volume.

CAPEX CONSOLIDATION — 750 SCENARIO (auditable rewrite)	Value (BRL)
Industrial CAPEX — Annex 3 TOTAL (packages 1–10 + engineering/FEED 49.8 mn + supervision 5.0 mn + 20% contingency 165.9 mn − captured optimization −52.0 mn)	997,974,242
750 scenario adjustments (Annex 5, 5.2: UN2 2.0 + UN3 9.0 + UN5 12.9 + UN6 5.1 + UN7 2.5 mn)	31,480,000
Adjustments ABSORBED BY THE BRL 165.9 mn CONTINGENCY (Annex 3) — no CAPEX increase	0
Model industrial CAPEX (Cap 7 — rounded)	998,000,000
Working capital — 9 months of cash OPEX ex-payroll (auditable bridge in the reconciliation note)	250,800,000
Pre-operational CAPEX and OPEX	42,600,000
Subtotal (excl. commission)	1,291,400,000
Structuring commission — 5% of the total (T = 1,291.4 + 0.05T)	68,000,000
TOTAL FINANCED INVESTMENT (per plant)	1,359,400,000

5.3 — REVISED OPEX BY UNIT (elasticity method over Annex 4)

Method: each line receives an elasticity to volume — 1.00 (consumed per tonne: raw materials, reagents, energy, water, logistics, packaging, PPE), 0.90 (energy — fixed base load), 0.60 (maintenance — constant hours, higher wear), 0.50 (commissions), 0.30 (administrative; PPE — driver is headcount), 0.20 (marketing, travel, reserve), 0.05 (insurance). Labor kept, except the 8 additional posts in section 5.4. Volume factor: 1.1875 (+18.75% annual).

UN 1 — RAW MATERIAL CLASSIFICATION

Item	Base (R$/yr)	Elasticity	Revised (R$/yr)
Reagentes (pH, floculação, desinfecção)	450.000	1.00	534.375
Manutenção (contrato preventivo — atrelada a CAPEX)	7.239.600	0.60	8.054.055
Electric power	3.500.000	0.90	4.090.625
Água industrial	180.000	1.00	213.750
Logística interna	800.000	1.00	950.000
Insurance	1.266.916	0.05	1.278.793
Administrative	1.172.486	0.30	1.238.438
EPIs e uniformes	340.080	0.30	359.209
Reserva operacional	500.000	0.20	518.750
Marketing e advertising	500.000	0.20	518.750
Viagens comerciais	144.000	0.20	149.400
Material promocional	40.000	0.20	41.500
Items subtotal	16.133.082		17.947.645
Administrative (3%)	483.992		538.429
Human resources (kept)	24.586.023	—	24.586.023
REVISED TOTAL	40.719.105		43.072.097

UN 2 — COMPOSTING

Item	Base (R$/yr)	Elasticity	Revised (R$/yr)
Reagentes (pH, aeração, biofiltro)	180.000	1.00	213.750
Manutenção MENART/ANDRITZ (2% CAPEX)	1.413.276	0.60	1.572.270
Energia elétrica (aeração forçada do ciclo 35 d)	1.200.000	0.90	1.402.500
Água industrial	120.000	1.00	142.500
Logística interna	300.000	1.00	356.250
Insurance	247.323	0.05	249.642
Administrative	328.287	0.30	346.753
EPIs e uniformes	145.920	0.30	154.128
Reserva operacional	200.000	0.20	207.500
Items subtotal	4.134.806		4.645.293
Administrative (3%)	124.044		139.359
Human resources (kept)	11.012.778	—	11.012.778
Additional labor (2 posts)	—	—	400.000
REVISED TOTAL	15.147.584		16.197.430

UN 3 — ORGANOMINERAL FERTILIZER

Item	Base (R$/yr)	Elasticity	Revised (R$/yr)
Matéria-prima organomineral (composto + minerais NPK)	116.132.097	1.00	137.906.865
Extrato de algas (1% do produto)	2.772.480	1.00	3.292.320
Inoculantes (Azospirillum, Bacillus)	1.200.000	1.00	1.425.000
Reagentes (pH, granulação)	850.000	1.00	1.009.375
Maintenance	2.914.259	0.60	3.242.113
Electric power	8.500.000	0.90	9.934.375
Água industrial	250.000	1.00	296.875
Logística (distribuição)	12.000.000	1.00	14.250.000
Embalagens (sacos BIG BAG, paletes)	4.500.000	1.00	5.343.750
Insurance	509.995	0.05	514.776
Administrative	4.966.498	0.30	5.245.864
EPIs e uniformes	459.000	0.30	484.819
Reserva operacional	1.500.000	0.20	1.556.250
Marketing e advertising	2.000.000	0.20	2.075.000
Viagens comerciais	1.800.000	0.20	1.867.500
Feiras agropecuárias	320.000	0.20	332.000
Dias de campo	200.000	0.20	207.500
Eventos com distribuidores	40.000	0.20	41.500
Material promocional	180.000	0.20	186.750
Items subtotal	161.094.329		189.212.632
Administrative (3%)	4.832.830		5.676.379
Human resources (kept)	45.037.729	—	45.037.729
Additional labor (3 posts)	—	—	600.000

REVISED TOTAL	206.132.058		240.526.740

UN 4 — PREMIUM LIQUID

Item	Base (R$/yr)	Elasticity	Revised (R$/yr)
Matéria-prima NPK básico 04-14-08	17.731.056	1.00	21.055.629
Aditivos premium (APP, algas, húmicos)	34.482.720	1.00	40.948.230
Comissão de meta	246.000	0.50	269.062
Reagentes químicos (NaOH, Na_2S, KOH, HCl)	2.400.000	1.00	2.850.000
Reagentes (membranas MF/UF/OR, CIP)	1.800.000	1.00	2.137.500
Reagentes (eletrocoagulação, EDR)	950.000	1.00	1.128.125
Reagentes (UV-C, ozônio)	320.000	1.00	380.000
Maintenance	1.565.187	0.60	1.741.271
Electric power	2.100.000	0.90	2.454.375
Água industrial	80.000	1.00	95.000
Logística (caminhões-tanque)	3.200.000	1.00	3.800.000
Embalagens (IBC, tambores)	1.500.000	1.00	1.781.250
Insurance	273.908	0.05	276.476
Administrative	1.648.023	0.30	1.740.724
EPIs e uniformes	177.120	0.30	187.083
Reserva operacional	800.000	0.20	830.000
Marketing e advertising	1.500.000	0.20	1.556.250
Viagens comerciais	576.000	0.20	597.600
Feiras agropecuárias	240.000	0.20	249.000
Dias de campo	120.000	0.20	124.500
Eventos com distribuidores	40.000	0.20	41.500
Material promocional	140.000	0.20	145.250
Items subtotal	71.890.014		84.388.825
Administrative (3%)	2.156.700		2.531.665
Human resources (kept)	15.331.306	—	15.331.306
Additional labor (1 posts)	—	—	200.000
REVISED TOTAL	87.221.320		102.451.796

UN 5 — PET RECYCLING

Item	Base (R$/yr)	Elasticity	Revised (R$/yr)
Aditivos (estabilizantes, corantes)	1.200.000	1.00	1.425.000
Reagentes (lavagem, secagem)	450.000	1.00	534.375
Maintenance	967.154	0.60	1.075.959
Electric power	2.800.000	0.90	3.272.500
Água industrial	150.000	1.00	178.125
Logística (distribuição)	4.500.000	1.00	5.343.750
Embalagens (sacos, paletes)	1.800.000	1.00	2.137.500
Insurance	169.252	0.05	170.839
Administrative	527.467	0.30	557.137
EPIs e uniformes	157.440	0.30	166.296
Reserva operacional	400.000	0.20	415.000
Marketing e advertising	800.000	0.20	830.000
Viagens comerciais	144.000	0.20	149.400
Eventos com distribuidores	20.000	0.20	20.750
Material promocional	80.000	0.20	83.000
Items subtotal	14.165.313		16.359.631
Administrative (3%)	424.959		490.789
Human resources (kept)	12.826.092	—	12.826.092
Additional labor (1 posts)	—	—	200.000
REVISED TOTAL	26.991.405		29.876.512

UN 6 — PYROLYSIS

Item	Base (R$/yr)	Elasticity	Revised (R$/yr)
Reagentes (carbonato cálcio, hidróxido cálcio)	350.000	1.00	415.625
Maintenance	2.478.000	0.60	2.756.775
Logistics	200.000	1.00	237.500
Insurance	433.723	0.05	437.789
Administrative	451.758	0.30	477.169
Marketing e advertising	400.000	0.20	415.000

Viagens comerciais	144.000	0.20	149.400
Material promocional	40.000	0.20	41.500
Items subtotal	4.497.481		4.930.758
Administrative (3%)	134.924		147.923
Human resources (kept)	8.769.355	—	8.769.355
REVISED TOTAL	13.266.836		13.848.036

UN 7 — AGGREGATES

Item	Base (R$/yr)	Elasticity	Revised (R$/yr)
Cimento Portland	2.000.000	1.00	2.375.000
Areia fina	400.000	1.00	475.000
Aditivos (plastificantes)	350.000	1.00	415.625
Maintenance	367.333	0.60	408.658
Electric power	1.200.000	0.90	1.402.500
Água industrial	100.000	1.00	118.750
Logística (distribuição)	1.500.000	1.00	1.781.250
Embalagens (paletes, stretch)	600.000	1.00	712.500
Insurance	64.283	0.05	64.886
Administrative	239.136	0.30	252.587
EPIs e uniformes	72.960	0.30	77.064
Reserva operacional	300.000	0.20	311.250
Marketing e advertising	600.000	0.20	622.500
Viagens comerciais	144.000	0.20	149.400
Eventos com distribuidores	20.000	0.20	20.750
Material promocional	60.000	0.20	62.250
Items subtotal	8.017.712		9.249.970
Administrative (3%)	240.531		277.499
Human resources (kept)	6.759.914	—	6.759.914
Additional labor (1 posts)	—	—	200.000
REVISED TOTAL	14.777.626		16.487.383

UN 8 — PRECISION AGRICULTURE | UN 9 — CORPORATE | UN 10 — PRE-OPERATIONAL

No adjustment — cost centers without variable items per RSU volume. Totals kept: UN 8: R$ 10,804,268; UN 9: R$ 29,362,897; UN 10: R$ 3,123,750.

OPEX CONSOLIDATION	Base (R$)	Revised — Scenario 750 (R$)
UN 1 to UN 7	404.255.934	462.459.994
UN 8 + UN 9 + UN 10	43.252.095	43.252.095
TOTAL OPEX ANNEX 4/5	447.508.029	505.712.089
Variation		+58.204.060 (+13.0%)

5.4 — ADDITIONAL HUMAN RESOURCES (REVISION BY JOB POST)

Revision by post — not by pro-rata. Loaded cost per post: R$ 200,000/yr (average salary R$ 94,000 × 2.13 burden factor from Annex 4), shared across shifts. 8 new posts:

Unit	Post	Justification
UN 2	Windrow turner operator (MENART)	Cycle 40 → 35 days: more turns/day and 6 new windrows
UN 2	Composting/curing operator	New curing/buffer pad of 6,000-9,000 m²
UN 3	Granulation line operator	Output 288 → 313.3 t/d at 24 h
UN 3	Palletizing/forklift operator	Output 288 → 313.3 t/d
UN 4	Filling line operator	Output 48 → 59.3 t/d
UN 5	Extrusion line operator	Output 61.2 → 76.5 t/d
UN 6	Pyrolysis line operator	Feed 72 → 90 t/d (peak 90 = 72 × 1.25)
UN 7	Screening/crushing operator	Output 89.4 → 111.8 t/d
TOTAL	8 posts	1.600.000/yr

5.5 — VOLUMES AND PRODUCTS BY UNIT (600 base × 1.1875 factor of the 750 calendar)

365-day annual base per 5.1; '750 annual' column = weighted annual average (base × 1.1875). Gravimetric data from Annex 3 at the 750 t/d capacity.

Unit	Product/Service	Base volume (600)	750 annual volume	Variation
UN 1	Processed RSU	219,000 t/yr	260,062.5 t/yr	+18.75%
UN 1	Scrap + metals + glass	12,681 t/yr	15,059 t/yr	+18.75%
UN 2	Processed organic fraction	109,500 t/yr	130,031 t/yr	+18.75%
UN 3	Special organomineral 06-14-16 (proxy)	91,474 t/yr	108,625 t/yr	+18.75%
UN 4	Premium liquid 04-14-08	17,328 t/yr	20,578 t/yr	+18.75%
UN 5	Fiber-grade resins	22,338 t/yr	26,527 t/yr	+18.75%
UN 6	ACL energy sold	41,964 MWh/yr	36,915 MWh/yr	limited by generation — see §12.3
UN 7	Blocks + micro-crushed aggregate	33,934 t/yr	40,297 t/yr	+18.75%
UN 8	Precision agriculture services	unchanged	unchanged	—

5.6 — ASSUMPTIONS, DILIGENCE FLAGS AND CONSOLIDATED RESULT

Diligence flags (ESG management): (i) confirmation of a 26.1 h/d regime on UN 3 granulators before approving capex — gating item (26.1 h/d > 24 h: not feasible; capex confirmed); (ii) heavy maintenance contract with guaranteed 3-month rotation, on pain of losing the 1.1875 factor; (iii) MENART SP-60: windrow stability test at 375 t/d in progress; (iv) UN 4 at 99% occupancy — +20% debottleneck recommended; (v) zero gate fee reinforced on 100% of the volume.

Consolidated result of the definitive 750 t/day scenario (DSCR calculated on the actual cash flows — unit-level price and efficiency, section 7.7.5, and margin levers, section 7.7.4): revenue BRL 780.8 mn; OPEX BRL 476.6 mn; EBITDA BRL 337.5 mn; margin 43.2%; project IRR 20.2% p.a. real; equity IRR ≈20.7% p.a.; 4-year grace and 8-year amortization (repaid CALCULATED on Y12 by the sweep; contractual ceiling reached); calculated DSCR minimum 1.22x (Y6), series Y5-Y12: 1.23/1.22/1.26/1.30/1.35/1.40/1.46/48.7; 5% dividend floor paid in all years (purely indicative — distribution policy to be defined with the funder); debt capacity at 1.20 calculated: ≈BRL 1,100 mn (above the BRL 1,084.7 mn contracted); 6-month DSRA kept as prudence. The unlevered reference remains in the data room.

Statement of responsibility: revision prepared under ESG fund manager supervision. Annexes 3 and 4 preserved; divergences explained line by line; no financial assumption changed without documented technical justification.

18. ANNEX — MANDATORY ASSUMPTIONS

Operation and 5×2 roster: the plant operates 365 days/yr. Under the 5×2 roster, each employee works approximately 261 days/yr; with staggered vacations ensuring continuous coverage of every position, the headcount was calculated per position using the 365/261 = 1.398 factor.

Salaries and obligations: For CLT employees, the annual cost was split into base salaries and obligations/allowances, keeping the budgetary factor monthly salary × 13.5 × 1.80. PJ shareholders were treated via pro-labore, without employer charges, with health insurance shown separately.

Corporate SP: Eight PJ (private-entity) shareholders, pro-labore of US$ 8,000/month per shareholder and international health insurance for up to four dependents. References from major international insurers indicate approximate ranges of US$ 25,000 to US$ 35,000/family/yr; US$ 30,000/family/yr was adopted.

Corporate Plant: Includes physicians, nurses, fitness instructors, kitchen, catering, equivalent contracted cleaning, internal/property security and janitorial services across three shifts. Cleaning was budgeted by the headcount required for 47,000 m² of built area; the definitive contract may include the supplier's BDI.

Catering: A total of 647 meals/day over 365 days was considered. As CAPEX and Prices do not state a unit meal price, the explicit assumption of BRL 15/meal was adopted.

Premium sales team: Includes technical salespeople and agronomic engineers for UNs 1, 3, 4, 5, 6, 7 and 8. Travel covers SP–state capitals of ES, BA, TO and MG, commercial flights, car rental, fuel, lodging, meals, trade fairs, field days, distributors and promotional material.

Business travel: Average cost per trip: BRL 6,000, composed of airfare BRL 1,200, car rental BRL 1,750, fuel BRL 500, lodging BRL 1,600, meals BRL 750 and transport/miscellaneous BRL 200.

Pre-operational marketing: US$ 1,000,000/yr in each of the two pre-operational years, equivalent to BRL 5,300,000/yr.

Operational ramp-up: feedstock comes in at 750 t/day from Year 3 — UN1, UN2, UN5, UN6 and UN7 operate at 100% with no ramp-up. In UN3/UN4, the 30%/60% ramp applies to fertilizer FORMULATION; the lines operate with a fixed-cost floor (30% of UN3 OPEX and 25% of UN4 — team, maintenance, insurance and administrative costs do not scale), and the surplus compost is GRANULATED in-house on the lines themselves and sold at BRL 800/t (32.5 thousand t in Year 3 = BRL 26.0 mn; 21.6 thousand t in Year 4 = BRL 17.3 mn of UN2's own revenue — booked in the plan's statements) — the organomineral ramp is naturally complemented by granulated composting. See the Ramp-up Composition Note in Chap. 7: the Y2-Y3 EBITDA already embeds these sales and the fixed-cost floors.