ALKEMYA METACORE SCSp

(ALKN)

Tokenised Industrial Nickel Wire Assets

Research Litepaper

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1 Executive Overview

Alkemya Metacore SCSp presents a pioneering tokenisation of industrial assets through ALKN, representing limited partnership interests in a Luxembourg special limited partnership (Partnership) that owns approximately 7 million linear metres of 99.99% pure nickel wire (0.025mm diameter) valued at USD 1.64 billion (RID, p. 44). The Partnership combines physical asset ownership with a 70% equity stake in Green Transitional Metals Pte. Ltd. (GTX), a Singapore-based entity focused on research, development, and commercialisation of nickel wire applications.

The ALKN token represents legally and economically limited partnership interests under Luxembourg law, tokenised in compliance with El Salvador's Digital Asset Law on Canton Network and Liquid Network, to be eventually listed and traded on exchanges (to be announced at the Management Team's discretion). The token will also be able to be purchased through various regulated custodians (RID, p 15). With an initial offering of USD 50-200 million targeting a total capitalisation of USD 800 million, ALKN bridges traditional industrial and scientific materials markets with blockchain-enabled capital markets.

2 Investment Thesis

2.1 The Asymmetric Opportunity

The investment proposition for ALKN offers a unique proposition relative to traditional industrial and scientific materials exposure by combining verified physical assets with next-generation industrial applications and blockchain-enabled liquidity. At its core, the offering presents an immediate value arbitrage: tokens issued at USD 1.00 possess an intrinsic value of USD 2.05 based on the independently verified nickel wire valuation of USD 1.64 billion divided across 800 million tokens (RID, p. 49). This 105% premium to the issue price represents not a speculative markup, but a mathematical reality grounded in the ownership of physical assets.

The asymmetry deepens when considering the unique properties of the material and its position on the market. Ultrapure, ultrafine nickel wire of 0.025mm diameter with 99.99% purity represents a highly specialised product with limited global production capacity. The complex cold-drawing process required to achieve these specifications creates substantial barriers to entry, while the Partnership's existing stock of 7 million linear metres provides immediate market presence without the capital expenditure and time required for production. As detailed in the independent market analysis by Aranca (RID, pp. 116-171), the global market for high-purity nickel wire is projected to grow at 6% annually, reaching more than 3000 million metres by 2029, while supply constraints limit the growth of production to 2-3% annually.

2.2 Value Creation Through Industrial Transformation

The Partnership's strategy extends beyond passive asset holding to active value creation through industrial transformation. Green Transitional Metals, the Singapore subsidiary to be owned 70% by the Partnership through an intermediate holding company, will convert raw nickel wire into high-margin mesh products that target seven validated application sectors. This transformation leverages the material's exceptional surface-to-volume ratio—four times superior to 100-micron wire while occupying only one-sixteenth the volume—making it ideal for applications requiring maximum surface area with minimal weight penalty (RID, p. 112).

The commercialisation strategy is based on extensive scientific validation across three continents. Laboratory testing under Professor Upadrasta Ramamurty (a materials scientist with more

than 250 peer-reviewed publications) at Nanyang Technological University confirmed the wire's suitability for aerospace applications where weight reduction and electromagnetic properties are critical. Independent verification at IIT Delhi validated mechanical and electrical properties, while Lectromec, a NASA certified laboratory for satellite mission wire testing, confirmed that the material meets specifications for the most demanding aerospace applications at its purity level of 99.99% and had it verified by NSL Analytical, a leading metallurgical laboratory in the United Stated based in Cleveland, Ohio.

2.3 Structured Returns in a Tokenised Framework

The investment structure provides multiple paths to the realisation of value through a sophisticated waterfall mechanism that aligns stakeholder interests. Token holders benefit from a preferred return threshold of 6%, ensuring that capital is returned and minimum yield expectations are met before profit sharing begins. Above this hurdle, 80% of the distributions flow to the limited partners while 20% carried interest incentivises the sponsors of the partnership to maximise returns (RID, p. 13). This structure, common in institutional alternative investments, provides downside protection through the preferred return while maintaining upside participation through the profit-sharing arrangement.

The tokenisation framework improves these traditional private equity structures with blockchain-enabled liquidity and transparency. Trading on public exchanges provides price discovery and exit options unavailable in traditional limited partnerships, while the Liquid Network's immutable ledger ensures transparent record-keeping. The dual registration system, which integrates blockchain records with Luxembourg's LP Interest Register, provides legal certainty while maintaining the efficiency benefits of digital securities.

2.4 Market Timing and Structural Tailwinds

The offering arrives at an inflection point for high-purity nickel demand driven by converging megatrends. The energy transition accelerates electrolyser deployment for green hydrogen production, where nickel mesh electrodes offer superior Faradaic efficiency compared to alternatives. Defence modernisation programmes increasingly specify advanced materials for electromagnetic shielding and radar absorption, applications where the Partnership's material has been validated for use in F-22 and F-35 fighter aircraft. Environmental regulations restricting chlorination in cooling systems create replacement demand for nickel mesh filtration in thermal power plants and desalination facilities.

These demand drivers intersect with structural supply constraints that favour existing stockholders. Indonesia's export ban on nickel ore, representing 40% of global production, aims to capture value-added processing domestically but limits raw material availability for ultra-pure wire production. The technical complexity of cold-drawing processes to achieve a diameter of 0.025mm at 99.99% purity restricts production to a handful of European manufacturers. Capital requirements for new production capacity—estimated at tens of millions for a single production line—create multiyear lead times for supply response.

The current global trading environment of precious metals further underscores the investment appeal of nickel. While gold trades near historical highs above USD 4,200 per ounce and silver approaches USD 50 per ounce (driven primarily by geopolitical uncertainty, central bank accumulation and de-risking mechanisms, and inflation hedging), industrial nickel offers a compelling alternative value proposition. Unlike precious metals whose prices increasingly reflect monetary debasement and speculative demand rather than industrial utility, nickel's valuation remains an-

chored to real-world applications with quantifiable economic benefits. The Partnership's ultrapure nickel wire, 99.99% purity valued at approximately USD 260 per linear metre, derives its worth from demonstrated performance superiority in critical applications rather than sentiment-driven investment flows. This industrial grounding provides both downside protection during risk-off periods and upside potential as technological adoption accelerates, offering diversification benefits distinct from traditional precious metal holdings while maintaining exposure to supply-constrained physical assets.

3 The Material: Scientific Validation and Properties

3.1 Comprehensive Physical and Chemical Characterisation

The Partnership's nickel wire asset represents not merely a commodity holding but a precisely characterised industrial material validated through rigorous scientific analysis across multiple independent laboratories. The comprehensive testing regime undertaken provides confidence in both the quantity and quality of the asset, establishing a foundation for industrial applications that demand consistent and reproducible properties.

The material exhibits exceptional purity with 99.99% nickel content, which puts it in the NP1 classification under GOST 492 standards, the highest purity grade recognised for industrial applications (RID, p. 133). This purity level, verified through spectrographic analysis in three independent laboratories, ensures uniform electrical, mechanical, and chemical properties essential for high-performance applications. The absence of impurities eliminates performance variability, a critical requirement for aerospace, defence, and precision electronics applications where component failure carries catastrophic consequences.

Table 1: Verified Material Specifications (RID, pp. 112-115)

Property	Specification	Testing Institution
Chemical Purity	99.99%+ Ni	Lectromec / NSL Analytical, Allkema Engineering, NTU, IIT Delhi
Wire Diameter	0.025mm ± 0.001mm	ASACERT UK
Tensile Strength	900 MPa	IIT Delhi
Elastic Modulus	200 GPa	NTU Singapore
Melting Point	1,455°C	Laboratory confirmed
Electrical Resistivity	6.84×10 ·m	Lectromec USA
Density	8.908 g/cm^3	Multiple laboratories
Total Quantity	7,026,904.76 metres	ASACERT physical inspection

The ultrafine diameter of 0.025mm represents a critical value proposition multiplier. At this dimension, the surface-to-volume ratio increases exponentially compared to conventional wire gauges. Mathematical analysis demonstrates that compared to standard 100-micron wire, the Partnership's 25-micron material provides four times the surface area while consuming only one-sixteenth the volume and weight (RID, p. 112). This relationship proves transformative for applications where surface interactions dominate performance, such as catalysis, filtration, and electromagnetic shielding, while weight constraints limit material usage.

3.2 Laboratory Validation Programme

The validation programme undertaken represents one of the most comprehensive characterisation efforts for an industrial metal asset, involving leading research institutions across three continents.

Each laboratory brought specific expertise, creating a multidimensional understanding of the material's properties and potential applications.

Professor Upadrasta Ramamurty at Nanyang Technological University, Singapore, led the materials science investigation. With credentials including a fellowship in the Indian National Academy of Sciences and over 9,000 citations in peer-reviewed journals, Professor Ramamurty's analysis focused on aerospace applications. The testing of his team confirmed that the nickel wire maintains structural integrity under extreme temperature cycling from -196°C (liquid nitrogen) to 1,000°C, demonstrating phase stability essential for aerospace applications. The high Curie temperature ensures that magnetic properties remain stable during composite manufacturing processes where curing temperatures exceed 350°C.

The Indian Institute of Technology, Delhi, under the direction of Professor Suresh Neelakantan, supported by Dr. Nirat Ray, conducted comprehensive mechanical and electrical characterisation. Their testing regime included tensile strength measurements that confirmed the maximum strength of 900 MPa—critical for mesh weaving operations where the wire must withstand mechanical stress without fracture. Electrical conductivity measurements validated consistency across production lots, ensuring uniform electromagnetic shielding performance. Magnetic permeability testing confirmed the material's effectiveness for both electric and magnetic field attenuation, a dual capability uncommon in shielding materials.

Lectromec's validation carries particular significance given their role in NASA's Jet Propulsion Laboratory wire certification programmes. Their ISO/IEC 17025:2017 certified laboratory confirmed that the material meets specifications for satellite and spacecraft applications where component reliability over decades-long missions proves essential. The tests included accelerated ageing protocols that simulate 20-year operational lifespans, with no degradation in electrical or mechanical properties observed.

3.3 Breakthrough Applications in Energy Transition

The most significant scientific validation emerged from electrochemical testing for water electrolysis applications, positioning the material at the forefront of the hydrogen economy. Laboratory trials at the Indian Institute of Sciences in Bangalore under the supervision of an electrochemist and a nanotechnologist demonstrated exceptional performance in the oxygen evolution reaction (OER), the limiting step in the separation of water for hydrogen production. The data reveals transformative potential for next-generation electrolyser design:

Table 2: Oxygen Evolution Reaction Performance Metrics (RID, pp. 113-114)

Configuration	Faradaic Efficiency	Current Stability (24hr)
Bare Nickel Mesh	89.7%	98.5%
Nickel Mesh + RuO_2 Coating	94.3%	99.2%
Industry Standard (Pt-based)	85-90%	95-97%
Theoretical Maximum	100%	100%

The 94.3% Faradaic efficiency achieved with ruthenium oxide coating exceeds platinum-based systems while costing substantially less. The mesh structure's high surface area enables uniform current distribution, preventing hot spots that degrade conventional electrodes. Twenty-four hour stability testing showed less than 1% performance degradation, suggesting operational lifespans exceeding 50,000 hours—a five-fold improvement over current commercial systems.

The implications extend beyond laboratory metrics to industrial economics. Current electrolyser systems require platinum-group metals costing USD 30,000-50,000 per kilogram. The Partnership's nickel mesh alternative, even with rare earth oxide coating, costs less than USD 1,000 per kilogram while delivering superior performance. For a 1 MW electrolyser requiring 10 square metres of electrode surface, material cost savings exceed USD 200,000 while improving hydrogen production efficiency by 5-10%.

3.4 Electromagnetic Shielding and Stealth Applications

Electromagnetic interference shielding represents a rapidly expanding application domain driven by electronic device proliferation and defence modernisation. Laboratory testing demonstrated exceptional shielding effectiveness across the electromagnetic spectrum, with particular strength in frequencies critical for modern electronics and communications:

Table 3: Electromagnetic Shielding Effectiveness (RID, p. 112)

Frequency Range	Shielding Effectiveness	Application Domain
30 MHz - 1 GHz	65-70 dB	Mobile communications
1 GHz - 6 GHz	70-75 dB	WiFi, Bluetooth
6 GHz - 16 GHz	68-72 dB	Satellite, radar

The 70 dB average attenuation represents a 10,000-fold reduction in electromagnetic field strength, exceeding requirements for most commercial and military specifications. The mesh format provides advantages over solid shielding through selective frequency filtering while maintaining optical transparency—critical for display applications—and airflow for thermal management.

Military applications extend beyond conventional shielding to radar absorption for stealth technology. The material's magnetic properties, combined with precise mesh geometry, enable tuned absorption at specific radar frequencies. Testing confirmed absorption coefficients exceeding -20 dB at X-band frequencies (8-12 GHz) used by military radar systems. The ultra-thin profile—meshes less than 100 microns thick—enables integration into composite structures without weight penalties that compromise aircraft performance. Validation includes successful integration into carbon fibre composites used in F-35 fighter aircraft, where the nickel mesh provides both electromagnetic shielding and lightning strike protection.

3.5 Corrosion Resistance and Environmental Durability

Long-term durability testing reveals exceptional corrosion resistance that surpasses alternative materials in multiple environmental conditions. The salt spray test according to ASTM B117 standards did not show visible corrosion after 2,000 hours of exposure—equivalent to 20 years in marine environments. This performance enables deployment in offshore applications where conventional materials require frequent replacement.

The material's immunity to mineral oils, confirmed through 1,000-hour immersion testing at elevated temperatures, opens applications in petroleum processing where microbial contamination causes reservoir souring. Laboratory trials demonstrated that nickel mesh filters remove 99.9% of sulphate-reducing bacteria from injection water, preventing hydrogen sulphide generation that corrodes infrastructure and reduces oil quality. With offshore platforms injecting millions of gallons daily, effective filtration prevents losses exceeding USD 10 million annually per platform from production downgrades and equipment replacement.

4 Corporate Structure

4.1 Legal Framework

The Partnership operates through a multijurisdictional structure optimised for regulatory compliance and operational efficiency:

1. **Alkemya Metacore SCSp** (Luxembourg): Asset-holding entity issuing LP interests
2. **Green Transitional Metals Pte. Ltd.** (Singapore): 70% owned operating subsidiary for R&D and commercialisation
3. **Token Issuance** (El Salvador): Digital asset compliance under CNAD registration

4.2 Asset Custody

Physical nickel wire secured at Helvetic Securgest vaults in Lugano, Switzerland, with safe keeping receipts issued (RID, p. 16).

5 Token Economics

5.1 Token Logic and Value Participation

The ALKN token represents digital instrument of limited partnership interest backed by nickel asset ownership and investment in GTX, an operational value creation entity. Unlike traditional security tokens that merely digitise ownership, ALKN integrates operational mechanics that enable real-time value accretion and transparent distribution mechanisms. Token holders participate in the Partnership's success through three distinct value creation channels: asset appreciation as nickel wire converts to high-margin meshes, operational earnings from commercialisation activities, and ultimate liquidation proceeds from the underlying physical assets.

The tokenisation structure ensures that value flows transparently to token holders through net asset value (NAV) calculations conducted quarterly. As GTX converts raw nickel wire into specialised meshes commanding 3-4× pricing premiums, this value multiplication directly increases the Partnership's NAV, which underpins token valuation. This mechanism creates a direct link between industrial operations and token price discovery, distinguishing ALKN from purely speculative digital assets.

5.2 Distribution Waterfall and Institutional Protection

The Partnership employs a sophisticated distribution waterfall that prioritises investor protection while incentivising performance. Token holders benefit from a preferred return calculated at 6% per annum on outstanding capital contributions, ensuring that capital is returned and minimum yield expectations are met before any profit sharing begins. This preferred return accumulates if unpaid, providing cumulative protection during the initial development phase when the Partnership reinvests earnings for growth.

Above the 6% hurdle rate on returned capital, the distributions follow an 80/20 split: 80% flows to Limited Partners (token holders) while 20% carried interest rewards the sponsors for performance exceeding the minimum threshold (RID, p. 13). This structure, standard in institutional private equity, aligns sponsor incentives with investor outcomes while providing downside protection through the preferred return floor. The carried interest only activates after investors receive

their preferred return, ensuring that management participates in upside only after delivering hurdle returns to token holders.

Distributions maintain flexibility through multiple payment mechanisms, including USDT stablecoin transfers directly to whitelisted wallets or USD equivalent bank transfers for qualified institutional investors. This optionality accommodates different investor preferences and regulatory requirements while ensuring efficient capital returns. The Partnership targets cash distributions after year 3 from dividends received from GTX and from nickel wire sales.

5.3 Token Metrics and Issuance Structure

Parameter	Value
Total Supply Cap	800,000,000 ALKN
Initial Offering	50,000,000 (minimum)
Offering Cap (this round)	200,000,000
Issue Price	USD 1.00
Intrinsic Value at Inception	USD 2.05
Minimum Purchase	USD 100
ISIN	LU3192257148

*For more information, please refer to the separate Token Economics write-up.

5.4 Custody of the ALKN Token

Custody of the ALKN token will be primarily handled by Hydra X, a Singapore headquartered tech infrastructure provider for the future tokenised capital markets. They are able to provide DLT-ready white label platforms across the asset lifecycle, and hold 6 licenses, which allows them to issue, distribute, trade and custodize tokenised assets in Singapore.

Institutional interest in DLT is growing rapidly and Hydra X works closely with Canton Network - a blockchain that the ALKN team firmly believes has the technology, feature set and ecosystem to drive institutional adoption.

5.5 Value Accretion Mechanisms

The appreciation of the token value derives from multiple compounding factors that create sustained growth beyond the initial backing of the asset. The conversion of nickel wire into precision meshes represents the primary value driver, transforming USD 260 per metre raw material into products commanding USD 800-1,000 per metre for specialised applications. This 3-4× value multiplication occurs progressively as GTX scales production, with each converted metre directly increasing Partnership NAV.

Secondary value accretion emerges from market dynamics as supply constraints intensify. With Class 1 nickel facing a 710,000-ton deficit by 2029 and NP1 wire representing only 4% of pure nickel wire volume, scarcity premiums compound base asset appreciation. Historical pricing analysis indicates 10% annual appreciation for ultra-pure nickel wire, providing underlying value growth independent of operational performance.

The Partnership's listing on centralised and decentralised exchanges enables price discovery beyond NAV calculations, potentially capturing market premiums for scarce industrial assets with validated applications. Comparable specialty materials companies trade at 3-5× revenue multiples

in public markets, suggesting substantial valuation upside as commercial traction develops. The combination of NAV growth, operational earnings, and market multiples creates multiple paths to the projected 6× token appreciation over seven years.

6 Use of Proceeds

Capital allocation follows strategic priorities (RID, p. 42):

Allocation	Amount (USD)
GTX Initial Investment	60,000,000
Operating Expenses & GP Fees	4,000,000
Alkemya Liability Repayment	Balance

GTX deployment includes:

- R&D facility establishment
- CAPEX equipment procurement
- Scientific research team
- Mesh production infrastructure
- Working capital requirements

7 Commercialisation Strategy

7.1 Target Markets and Applications

GTX targets seven high-value sectors with validated applications (RID, p. 46):

Sector	Application	Market Size (2029F)
EMI Shielding	Aviation, electronics, telecom	USD 22-24 billion
Defence	Radar absorption, electronics	USD 12-14 billion
Thermal Power	Filtration systems	USD 5-6 billion
Shipping	BWMS, cooling systems	USD 8-9 billion
Desalination	Filtration media	USD 3.7 billion
Electrolysers	Hydrogen production	USD 0.5-1 billion
Offshore Oil & Gas	Microbial filtration	USD 0.5-1 billion

7.2 Manufacturing Partnership

Strategic collaboration with BOPP Switzerland for mesh conversion, leveraging their century-old expertise and global distribution network (RID, p. 109).

8 Financial Projections

8.1 Seven-Year Forecast

The Partnership projects robust growth driven by mesh conversion and commercialisation (RID, p. 49):

USD Million	Y1	Y2	Y3	Y4	Y5	Y6	Y7
Revenue	-	188.8	633.0	755.9	903.4	1,080.6	1,293.9
Gross Profit	-	70.9	229.2	310.2	410.5	534.2	686.7
EBITDA	-	69.9	226.0	306.4	405.9	528.8	680.3
Net Income	-	46.3	155.6	211.9	281.5	367.6	473.6
Intrinsic Value/Token	2.05	2.12	2.32	2.51	2.74	3.06	4.02
Token Price Target	1.00	1.35	1.82	2.45	3.30	4.45	6.00

8.2 Value Drivers

Token appreciation from USD 1.00 to USD 6.00 supported by:

- **Asset liquidation**: Progressive conversion of 7 million metres into high-margin meshes
- **Margin expansion**: Gross margins improving from 38% to 53%
- **Reinvestment strategy**: 80-100% earnings retention in early years
- **Distribution growth**: USD 396.5 million cumulative distributions by Year 7

9 Market Outlook

9.1 Supply Constraints and Structural Deficits

The global nickel market faces an unprecedented supply-demand imbalance that fundamentally reshapes pricing dynamics for high-purity products. Class 1 nickel, representing only 46% of global production, confronts a widening deficit projected to reach 710,000 tons by 2029 as battery demand accelerates while supply growth remains constrained at 2-3% CAGR (RID, pp. 122-127). Within this already constrained market, NP1-grade wire at 99.99% purity commands premium pricing due to its scarcity—representing merely 4% of pure nickel wire volume—and the technical complexity of production.

The Partnership's 7 million linear metres of NP1 wire represents a strategic stockpile during this supply crunch. Production bottlenecks stem from multiple factors: the complex cold-drawing process requires specialised equipment costing tens of millions per production line, technical expertise remains concentrated among a handful of European manufacturers, and capacity expansion timelines extend 3-5 years from planning to production. These constraints create asymmetric pricing power for existing stockholders as demand accelerates across seven validated industry verticals.

Indonesia's nickel ore export ban, implemented to capture downstream processing value, paradoxically tightens supply for ultra-pure products. While Indonesian capacity targets nickel pig iron and battery-grade materials, the specialised refining required for 99.99% purity remains technically challenging and capital intensive. This structural gap between commodity nickel abundance and ultra-pure scarcity underpins the Partnership's value proposition, positioning ALKN to capture both scarcity premiums and industrial transformation value.

9.2 Demand Catalysts Across Seven Industry Verticals

The Partnership targets a USD 50+ billion total addressable market by 2030, with validated applications across seven high-growth sectors experiencing convergent demand catalysts. Each vertical represents distinct value propositions and growth trajectories, providing portfolio diversification while maintaining focus on high-margin specialty applications.

EMI/EMC Shielding (USD 22-24 billion, 10-12% CAGR): The largest addressable market emerges from electromagnetic interference shielding requirements across 5G infrastructure, IoT device proliferation, and automotive electronics. The Partnership's material delivers 70 dB attenuation—a 10,000× field reduction—while maintaining optical transparency and thermal management capability. With electronic device density doubling every 18 months and 5G rollout accelerating globally, shielding demand grows exponentially. The Partnership's NASA-certified performance specifications position it to capture premium market segments where failure carries catastrophic consequences.

Aerospace & Defence (USD 12-14 billion, 6-8% CAGR): Defence modernisation cycles drive adoption of advanced materials for AESA radar circuits, RAM stealth technology, and satellite electronics. The material's operational stability to 1,000°C and validated integration in F-22/F-35 composites creates immediate qualification advantages. With global defence spending exceeding USD 2 trillion annually and next-generation fighter programmes accelerating, the Partnership addresses critical supply chain requirements for strategic materials. Each F-35 requires approximately 5,500 linear metres of specialised mesh for stealth applications, representing USD 1.4 million in material value per aircraft.

Green Hydrogen Electrolysers (USD 0.5-1 billion, 25% CAGR): The fastest-growing segment emerges from the hydrogen economy's acceleration, driven by European Green Deal mandates requiring 10 million tons of green hydrogen production by 2030. The Partnership's breakthrough 94.3% Faradaic efficiency exceeds platinum-based systems while reducing costs by 95%. Each 1 MW electrolyser saves USD 200,000 in material costs while improving efficiency 5-10%, fundamentally altering project economics. With global electrolyser capacity targeted to reach 100 GW by 2030, nickel mesh electrodes become enabling technology for economically viable green hydrogen.

Marine & Desalination (USD 8-9 billion, 10-14% CAGR): Maritime applications span ballast water management systems (BWMS) and cooling system filtration, addressing IMO 2020 compliance requirements. The material's 2,000-hour salt spray resistance—equivalent to 20-year marine lifespan—combined with 99.9% microbial removal efficiency positions it as the optimal solution for harsh marine environments. With 90,000 vessels requiring BWMS retrofits and global desalination capacity expanding 8% annually to address water scarcity affecting 2 billion people, filtration demand accelerates.

Thermal Power & Industrial Filtration (USD 5-6 billion, 7-9% CAGR): Environmental regulations banning chlorination in cooling systems create replacement demand across 30,000 thermal power plants globally. The Partnership's nickel mesh provides zero toxic discharge filtration while maintaining high-temperature corrosion resistance essential for nuclear applications. With 60% of nuclear plants targeting mesh adoption by 2029 and industrial facilities facing stringent discharge regulations, regulatory compliance drives adoption beyond economic considerations.

Rare Earth & Precious Metal Recovery (USD 0.5-1 billion, 5-6% CAGR): The Partnership's 400-mesh grade enables efficient extraction of rare earth elements and platinum group metals, addressing critical material supply chain diversification. With global REE demand exceeding 250,000 MT annually and supply concentrated in geopolitically sensitive regions, recovery technologies gain strategic importance. Nickel mesh's chemical inertness and precise pore control

enable 95%+ recovery rates for materials worth USD 100,000+ per kilogram.

Microelectronics & Semiconductors (USD 3-4 billion, 5-7% CAGR): Advanced packaging applications including flip chip, wire bonding, and thin film deposition require 99.99% purity to eliminate variability in increasingly complex 3D architectures. As semiconductor geometries shrink below 3nm and packaging density increases, material purity becomes paramount. The Partnership's validated specifications meet requirements for next-generation packaging technologies essential for AI chips and quantum computing applications.

The convergence of these demand catalysts creates multiple inflection points during the 2025-2029 investment horizon. Defence procurement cycles, hydrogen infrastructure buildout, and 5G deployment timelines align to drive accelerating adoption across verticals. This multi-sector exposure reduces concentration risk while enabling cross-selling as initial penetration validates GTX manufacturing capabilities. The combination of immediate addressable markets and long-term structural growth positions ALKN to capture value across the industrial transformation spectrum.

10 Governance Structure

10.1 Management

- **General Partner**: Alkemya Partners GP S.À R.L.
- **GP Manager**: Carlo Guido Della Peruta (25+ years financial services)
- **Ultimate Shareholder**: Ahmet Oren (Executive Chairman, Ihlas Holding AS)
- **GTX Director**: Arvinder Sood (CEO, Hanover Square Capital UK)

10.2 Service Providers

- **Auditors**: Deloitte Luxembourg, Ria Grant Thornton S.p.A.
- **Administrator**: Essedi & Partners Sarl
- **Custodian**: Helvetic Securgest SA
- **Legal Counsel**: CMS DeBacker (Luxembourg), CNPLaw (Singapore), Foley & Lardner (US), DM Legal El Salvador (Dentons El Salvador)
- **Certifier**: Digital Assets Solutions S.A. de C.V. (CNAD: CERT-0004)

11 Technology Stack

11.1 Blockchain Infrastructure

ALKN leverages Bitcoin Layer 2 technology for security and efficiency (RID, pp. 62-64):

- **Network**: Liquid Network by Blockstream
- **Tokenisation Platform**: Hadron by Tether
- **Consensus**: Strong Federation model
- **Smart Contracts**: Covenants for automated rule enforcement
- **KYC/AML**: Blockstream Asset Management Platform (AMP)

11.2 Legal-Technical Bridge

Dual registration ensures enforceability:

- On-chain: Immutable blockchain record on Liquid Network
- Off-chain: Luxembourg LP Interest Register mirroring transfers
- Compliance: Whitelist-only transfers to KYC-verified addresses of eligible investors

12 Risk Factors and Mitigation

12.1 Principal Risks

Key risk categories identified (RID, pp. 65-84):

Risk Category	**Description**	**Mitigation**
Industrial	Production scaling, market acceptance	Validated technology, Swiss partner
Regulatory	Multi-jurisdiction compliance	Legal structuring, expert counsel
Technology	Blockchain security, custody	Liquid Network, insured custody
Liquidity	Secondary market depth	Exchange listing, ISIN issuance
Concentration	Single asset exposure	Diversified applications, R&D pipeline

12.2 Asset Verification

Independent validation provides confidence:

- Physical inspection by Ria Grant Thornton (Jan 2023)/Studio Rayneri (Sept 2025)
- Valuation affirmed by Big Four accounting firm (Aug 2023)/Studio Rayneri (Sept 2025)
- Laboratory testing by four independent institutions
- Safe custody receipts from Helvetic Secugest SA (Sept 2025)

13 Development Roadmap

13.1 Phase 1: Foundation (2025-2026)

- Token issuance and exchange listing
- GTX laboratory establishment in Singapore
- Pilot mesh production with BOPP
- Initial customer engagements

13.2 Phase 2: Commercialisation (2027-2028)

- Scale mesh production to 1.5M metres annually
- Revenue generation across 5 sectors
- Gross margin expansion to 40%+
- First distributions to token holders

13.3 Phase 3: Expansion (2029+)

- Full production capacity utilisation
- New application development
- Strategic partnership expansion
- Optional token buyback programme

14 Conclusion

ALKN represents a convergence of physical commodity ownership, scientific innovation, and blockchain capital markets. By tokenising USD 1.64 billion of validated industrial nickel wire assets, the Partnership creates a unique investment opportunity combining immediate value arbitrage with long-term growth potential through industrial transformation.

The Partnership bridges traditional industrial materials with emerging technologies, offering investors exposure to the energy transition, defence modernisation, and advanced manufacturing sectors through a regulated, asset-backed digital security. As global demand for high-purity nickel accelerates amid supply constraints, ALKN provides fractionalised access to an industrial asset previously unavailable to institutional and retail investors.

The combination of physical backing, operational upside, and blockchain liquidity creates an asymmetric opportunity at the intersection of commodities, technology, and finance—one that offers both the stability of real assets and the growth potential of technological innovation.

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ALKN Token Economics Appendix Summary

ALKN: Asset-Backed Security Token for Nickel Wire and its Applications

Alkemya Metacore SCSp

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Abstract

ALKN represents tokenised limited partnership interests in Alkemya Metacore SCSp, a Luxembourg special limited partnership. The token is backed by approximately 7,000,000 linear meters of ultra-pure nickel wire valued at $1.64 billion and the economic upside from converting this material into precision meshes for hydrogen, defence, aerospace and EMI shielding applications. This document outlines the token structure, distribution mechanics, value creation model, and governance framework designed to align stakeholder interests with sustainable value generation.

1 Token Structure and Asset Foundation

ALKN is a regulated digital security issued by a Luxembourg special limited partnership (SCSp), backed by approximately 7 million linear meters of 99.99 % pure nickel wire (0.025mm diameter). The underlying asset has been independently verified and is securely held in Swiss custody. ALKN is expected to be listed on several exchanges and will employ the Canton Network as well as other cross-chain bridges to allow for seamless custody and transfer management.

The digital security represents tokenised limited partnership interests (LP Interests) governed by Luxembourg law and tax regulations. Under this structure, the general partner bears unlimited liability, whilst limited partners benefit from zero taxation at the Luxembourg level on distributions.

Each ALKN token confers economic rights as defined in the Partnership Agreement, reflecting ownership of the underlying asset. The intrinsic value of ALKN is calculated as follows:

$$\text{Intrinsic Value}_{\text{per token}} = \frac{\text{Asset Value}}{\text{Total Supply}} = \frac{\$1.64 \times 10^9}{800 \times 10^6} = \$2.05 \tag{1}$$

The offering price represents a 51% discount to intrinsic value:

$$\text{Discount to Intrinsic} = \frac{2.05 - 1.00}{2.05} = 0.512 = 51.2\% \tag{2}$$

Additionally, Limited Partners (LPs) hold consent rights on fundamental structural matters affecting the Partnership. Under the Limited Partnership Agreement, LPs have voting rights requiring simple majority approval on eight critical categories:

(1) amendments to the Partnership's corporate purpose, (2) changes to the Partnership's nationality, (3) dissolution or liquidation of the Partnership, (4) issuance of new partnership interests or securities and any capital increases or reductions, (5) changes to rights attached to Partnership Interests, (6) reorganization, consolidation, sub-division or conversion of the Partnership's capital, (7) consolidation with or conversion into another entity, and (8) delegation of management to any person other than the General Partner. Voting decisions are made by simple majority of votes cast, with each LP holding one vote per LP Interest.

While LPs retain these protective voting rights on structural matters, they have no participation in day-to-day management or operational control. The General Partner maintains sole authority over business operations, investment decisions, and all management matters not explicitly reserved to LPs under Schedule 2 of the Limited Partnership Agreement (LPA). LPs cannot interfere in the conduct or management of the Partnership's business affairs, cannot bind the Partnership, and have no authority to act on behalf of the Partnership in operational matters. This structure is optimal in the sense that it preserves the limited liability status of LPs while providing meaningful consent rights on fundamental changes that could materially affect their investment.

In partnership structures, the General Partner (GP) bears unlimited liability, whilst LPs face risk only up to the capital they have invested. In this case, the GP is responsible not only for managing the nickel wire asset on its books (whose intrinsic value accrues directly to the LPs), but also for holding a controlling interest in GTX, which executes the industrial plan and meeting distribution projections. The arrangement strikes a fair balance: the GP retains the freedom to operate, generate returns for both the LPs and himself, and assume unlimited liability, while structural matters that materially affect the LPs require their consent through votes outlined in Schedule 2 of the LPA.

2 Distribution Architecture

The token distribution strategy balances immediate market liquidity with long-term alignment through a structured allocation framework:

Allocation	**Tokens**	**Percentage**	**Restrictions**
Public Offering	50M–200M	6.25%–25%	Freely tradeable
Treasury (Locked)	600M–750M	75%–93.75%	5-year lock-up with vesting
Total Supply	**800M**	**100%**	Fixed cap

Table 1: Token Distribution Structure

ALKN benefits from El Salvador's Digital Asset Issuance Law (Art. 36), which exempts the token

and its profits/gains from taxes (including income, transfer, and municipal taxes) and extends those exemptions to the issuer, certifier, and registered service providers involved in the issuance.

At the issuer level in Luxembourg, the SCSp is tax-transparent (no corporate income or net worth tax, generally no withholding on distributions, and no VAT if it remains a passive holder), so taxation typically occurs only at the investor's home-jurisdiction level, with municipal business tax applying in Luxembourg only if the partnership is deemed commercially active.

Alkemya Luxembourg S.à r.l., which contributed the nickel assets and received the initial token issuance, maintains majority control through direct and affiliated holdings. The ownership structure creates clear accountability lines with Ahmet Oren controlling both the token holder entity and the General Partner through ORN Holdings Ltd.

3 Vesting Framework

The Partnership implements comprehensive five-year vesting schedules to ensure sustained alignment. The vesting function for standard linear schedules with cliff period c and total term T follows:

$$V(t) = \begin{cases} 0 & \text{if } t < c \\ G \cdot \min\left(1, \frac{t-c}{T-c}\right) & \text{if } t \geq c \end{cases} \tag{3}$$

where G represents the grant size and t represents elapsed months.

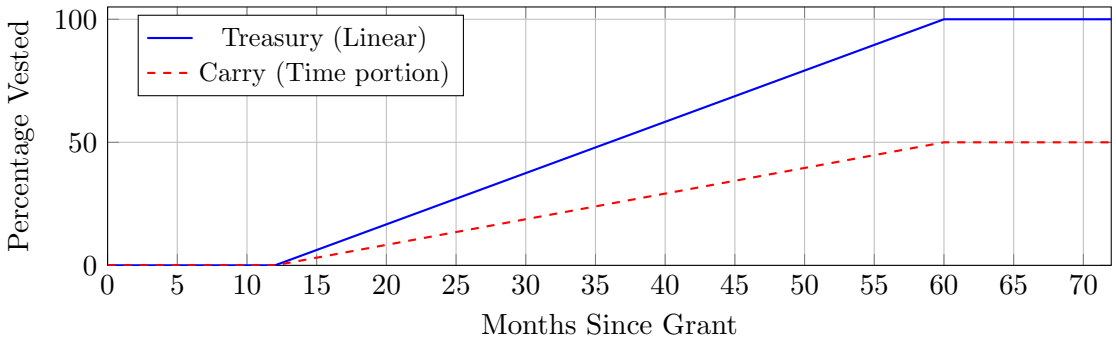

Figure 1: Vesting Schedules by Stakeholder Category

Category	Schedule	Cliff	Special Provisions
Treasury	Linear Monthly	12 months	ADV-based disposal limits
Carry Partner	Linear Monthly	12 months	ADV-based disposal limits
Core Team	Linear Monthly/Quarterly	12 months	Good/bad leaver provisions
Advisors	Linear Monthly	6 months	2-3 year total term

Table 2: Vesting Parameters by Stakeholder

Supply protection measures include daily disposal limits calculated as a percentage of 30-day average daily volume (ADV), pre-programmed selling plans, and blackout periods during material non-public information windows.

4 Value Creation and Distribution

The Partnership generates value through industrial transformation of nickel wire into precision meshes. The value creation model operates through GTX Singapore, which converts raw materials into products commanding significant premiums:

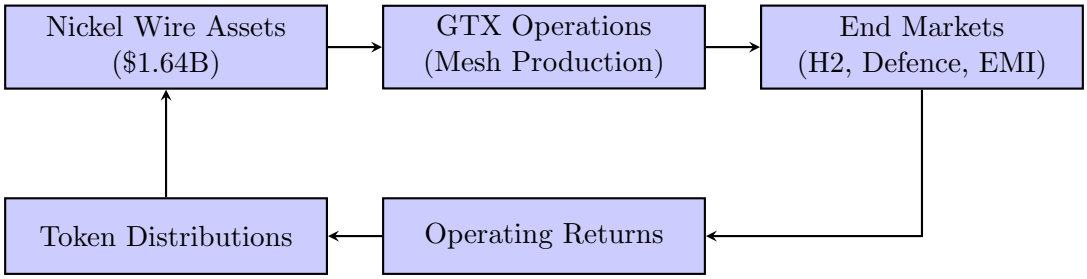

Figure 2: Value Creation Cycle

Distribution mechanics follow a structured waterfall once initial capital is repaid, ensuring investor protection:

$$D_{\text{tokenholder}} = \min(D, \text{Pref}) + 0.8 \times \max(0, D - \text{Pref}) \tag{4}$$

where D represents distributable cash and Pref represents cumulative 6% preferred return.

Priority	**Recipient**	**Allocation**	**Cumulative**
1	Tokenholders (Preferred)	return of capital	capital
2	Tokenholders (Preferred)	First 6% of p.a	6%
3	Carry Partner (Catch Up)	An amount equal to 20% of the amounts distributed under 2 and 3	
4	Tokenholders (Residual)	80% of excess above pref	80% above pref
5	Carry Partner (Residual)	20% of excess above pref	20% above pref

Table 3: Distribution Waterfall Structure

Operating margins from mesh production benefit from significant value uplift. Raw nickel wire valued at commodity prices transforms into specialized meshes commanding premiums of 3-10x depending on application specifications and market dynamics.

5 Operational Framework and Risk Management

The Partnership maintains institutional governance standards with comprehensive reporting and oversight mechanisms. Financial reporting follows IFRS standards with annual audits and quarterly statements. A public transparency dashboard tracks key metrics:

Metric Category	**Frequency**	**Key Indicators**
Supply Metrics	Real-time	Circulating supply, locked tokens, vesting schedule
Asset Verification	Quarterly	Custody attestations, quantity confirmations
Operating KPIs	Monthly	Production volumes, revenue run-rate, margins
Financial Performance	Quarterly	IFRS statements, NAV calculations, distributions

Table 4: Transparency Framework

Risk factors span industrial execution, market dynamics, regulatory compliance, and technology infrastructure. The Partnership addresses these through diversified end markets, conservative financial planning, multi-jurisdictional compliance programs, and robust security protocols.

Investment eligibility excludes U.S. Persons, with tokens available only to qualified investors meeting regulatory requirements. The multi-jurisdictional structure leverages Luxembourg partnership law for governance, El Salvador's digital asset framework for tokenisation, and Swiss law for asset custody.

6 Investment Value Proposition

ALKN offers sophisticated investors a unique exposure mechanism to the nickel industry and its applications through a combination of value-based assets and technological infrastructure to support their use and development. In mathematical terms, the token structure currently provides the following:

$$\text{Total Return}_{\text{potential}} = \underbrace{\frac{P_{\text{intrinsic}} - P_{\text{offer}}}{P_{\text{offer}}}}_{\text{Initial Discount}} + \underbrace{\text{Preferred}}_{\text{6\% p.a.}} + \underbrace{\text{Growth}}_{\text{Industrial Upside}} \tag{5}$$

The combination of asset backing, operational leverage through mesh conversion, and aligned governance creates a balanced and differentiated investment opportunity. The fixed supply cap, transparent vesting schedules, and investor-first preferred distribution waterfall establish a framework for sustainable value creation grounded in real economic activity.

Through disciplined execution of its industrial transformation strategy, the Partnership aims to deliver competitive returns that combine the stability of asset backing with the growth potential of value-added manufacturing in multiple critical technology sectors.

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