# TCu29: Physically-Backed Copper Token

# Executive Summary & Core Whitepaper

## 1. Executive Summary

TCu29 ($TCU29) by Tempestas Copper Inc tokenizes copper as a Real World Asset (RWA). Each token equals one (1) pound (lb) of physically-backed, audited copper. This solution addresses the growing strategic demand and constrained supply of copper, driven by rapid AI infrastructure growth, renewable energy adoption, electric mobility, and the global electrification trend. TCu29's architecture delivers verifiable, audited, geographically diversified backing, operational resilience, and blockchain-based efficiency for B2B, industrial, financial, and DeFi users.

## 2. Copper Market Context

**Demand Supercycle:**

- **AI & Data Centers:** Modern AI data centers require 20-40 metric tons of copper per MW, 2-3x the needs of older facilities.
- **Renewable Energy:** Solar and wind power use 4-5x more copper per MW than traditional power, led by global decarbonization.
- **Electric Vehicles:** EVs use ~183 lbs of copper each, quadruple internal combustion vehicles, plus additional for charging infrastructure.
- **Robotics & Electrification:** Large-scale deployment of robotics and accelerating electrification (esp. in developing markets) both boost copper demand.

**Supply Constraints:**

- **Long Lead Times:** New mines take 12-18 years from discovery to output.
- **Ore Grade Decline:** Global ore grades have fallen 30% since 2000, lowering new supply economics.
- **Geopolitical & Water Stress:** 65% of untapped resources are in regions with water scarcity or political risks.

**Strategic Commodity Shift:**

- Growing consensus among governments and markets sees copper shifting from a pure commodity to a "strategic asset" with applications in national security, grid resilience, and technology.

## 3. TCu29 Solution Architecture

### 3.1 Multi-Layered Physical Backing

**Primary Backing**

Each TCu29 ($TCU29) token is backed by exactly one (1) pound (lb) of physical copper, verified by our (Tempestas Copper Inc.) stockpiles and reserves maintained in secure, strategically positioned facilities.

**Operational Support Structure**

To ensure reliable redemption and business continuity, Tempestas maintains:

- **Verified Physical Inventory:** Copper stockpiles and reserves maintained in secure, strategically positioned facilities to avoid regional risks. These reserves consist of verified copper meeting recognized standards, ensuring consistent quality and fungibility.
- **Strategic Supply Partnerships:** Established relationships with geographically strategic copper producers to ensure a strong supply chain for future warehouse growth
- **Proprietary Mining Operations:** Over 1.2 billion pounds (lb) of USA based in-ground copper that support future expansion of our physical inventory capacity.
- **Financial Safeguards:** Insurance covering storage facilities and redemption obligations, adding an extra layer beyond physical metal.

### 3.2 Blockchain & Token Design

**Chains Supported:** Operating exclusively on the Ethereum Chain (ERC-20), TCu29 aligns closely with MiCA regulatory standards while benefiting from expanded DeFi composability, enhanced interoperability across the wider RWA ecosystem, and improved accessibility for institutional participants.

- **Atomic Burn-Verify-Mint Transfers:** Tokens move across chains via irreversible burns and verified mints, without wrap/bridge vulnerabilities, maintaining total supply equal to physical copper.
- **On-chain & Real-world Auditing:** External audits and transparent reporting ensure that circulating tokens never exceed copper held.

## 4. Redemption & Market Use

Each TCu29 ($TCU29) token represents a direct commodity claim corresponding to one (1) pound (lb) of industrial-grade copper, subject to the redemption framework outlined below. Holders of TCu29 tokens have four distinct options for exercising their redemption rights.

### 4.1 Physical Delivery or Secure Storage

Qualified holders may redeem TCu29 tokens on the basis of one (1) pound (lb) of copper per token, subject to the redemption requirements outlined below.

To maintain operational efficiency, institutional settlement standards, and secure physical delivery procedures, redemption of copper underlying TCu29 is subject to the following qualification requirements:

- Physical copper redemption is available exclusively to holders who acquired TCu29 through approved OTC transactions directly facilitated by Tempestas Copper Inc. or its authorised distribution partners.
- The minimum redemption threshold is 50,000 pounds (lb) of copper represented by TCu29 tokens.
- Redemption requests below the minimum threshold will not qualify for physical settlement and may instead be liquidated through secondary market trading, subject to prevailing market conditions.
- All redemption requests remain subject to applicable compliance procedures, including KYC/AML verification, logistics coordination, settlement requirements, and applicable redemption, processing, storage, delivery, insurance, and administrative fees in effect at the time of redemption.

**Physical Delivery:** At the holder's request, qualifying copper may be shipped to a designated delivery location, subject to the following conditions:

- Reasonable notice and mutually agreed scheduling
- Shipping, handling, insurance, customs, and applicable redemption processing fees, quoted based on destination and shipment weight
- Compliance with all applicable import/export laws and regulatory requirements of the destination jurisdiction

**Secure Storage:** Token holders may alternatively elect to redeem their TCu29 tokens into allocated insured storage arrangements. The underlying copper will be held in insured facilities managed by Tempestas Copper Inc. or its appointed custodians. Ongoing storage, insurance, and related administrative fees may apply.

### 4.2 Buyback by Tempestas Copper Inc.

On occasion, Tempestas may offer to repurchase tokens or their underlying copper:

- These buybacks occur based on operational inventory needs, typically when the company requires copper to fulfill delivery obligations to off-chain customers
- The buyback price may be offered at a slight discount to the prevailing market rate
- Offers will be communicated transparently via the official portal and will be time-limited

## 4.3 Secondary Market Liquidity and DeFi Integration

### A. Exchange Trading

Listed on Phemex (Centralized Exchange), BitMart (Centralized Exchange), and Pancakeswap (Decentralized Exchange) - Tempestas is actively pursuing token listings on reputable digital asset exchanges. Once listed:

- Token holders may sell their TCu29 tokens on the open market
- Market liquidity and pricing will be determined by exchange conditions and copper demand
- Listing enables peer-to-peer trading, providing an alternative to physical redemption

### B. Decentralized Finance (DeFi) Integration

**Third-Party Liquidity Pools:**

- Independent parties may create liquidity pools pairing TCu29 with other tokens
- Industrial copper users or strategic partners may provide liquidity to facilitate efficient token acquisition
- These pools operate independently of Tempestas, with pricing determined by market forces and automated market makers

**Benefits for Ecosystem Participants:**

- **For Large Industrial Users:** Create liquidity pools to ensure reliable TCu29 access for copper procurement needs
- **For Strategic Partners:** Generate fees through providing swap liquidity while supporting copper market efficiency
- **For Token Holders:** Additional liquidity options beyond centralized exchanges and physical redemption

### C. Market-Driven Ecosystem Development

These secondary market mechanisms operate independently of Tempestas:

**Organic Liquidity Development:**

- Market participants create liquidity based on their business needs and profit opportunities
- Tempestas does not maintain, subsidize, or guarantee any third-party liquidity pools
- Pricing in all secondary markets reflects copper fundamentals and market-determined supply/demand

**Industrial Use Case Support:**

- Large copper consumers may establish liquidity infrastructure to secure supply chain access
- Manufacturing companies can create efficient token acquisition pathways for procurement needs
- Strategic partners in the copper ecosystem may facilitate trading to capture arbitrage opportunities

### 4.4 B2B Features & Applications

- **API/ERP Integration** with procurement and inventory systems; role-based multi-user controls.
- **Bulk/Bespoke Redemption Scheduling:** Supports industrial procurement, strategic reserve planning, and just-in-time supply needs.

## 5. Security, Governance, and Compliance

### 5.1 Asset Security

- **Audits:** Independent audits, insurance, real-time reconciliation, and immutable on-chain audit records.
- **Diversification:** Multiple storage providers and jurisdictions mitigate regulatory and disaster risk.

### 5.2 Digital Security

- **Smart Contract Audits:** Formal verification, multi-signature admin, time-locked upgrades.
- **Infrastructure:** Distributed servers, hardware-secured keys, and zero-trust IT policies.

### 5.3 Governance Model

- **Oversight Board:** Industry/tech experts set strategy, oversee supply, and audit results.
- **Scenario-Based Risk Planning:** Regularly adapts policies for conservative, moderate, and extreme market cases.

### 5.4 Compliance

- Swiss-Ledger Based Security classification governs token issuance and custody.
- Explicit focus on B2B and direct commodity exposure, avoiding investment/futures/securities characteristics.

## 5.5 TCu29 Transaction Oversight & Ownership Recordkeeping

TCu29 represents direct ownership of physical copper held by Tempestas Copper Inc., which controls the underlying copper backing the token. Each TCu29 ($TCU29) token corresponds to one (1) pound (lb) of physical copper, backed by the audited reserves of Tempestas Copper Inc., and carries a legally enforceable ownership and redemption claim consistent with the TCu29 documentation framework.

For all transactions in TCu29, an independent interim party is appointed to maintain authoritative ownership records. Digital RFQ Limited, an FCA-regulated entity, performs this role. Digital RFQ is responsible for maintaining complete, accurate, and auditable records of all TCu29 transactions, including transaction confirmations, ownership allocations, settlement mechanics, and post-trade reconciliation.

These records operate as an independent verification layer, ensuring that TCu29 transaction activity is fully documented and that ownership allocations accurately reflect the corresponding physical copper ownership represented by TCu29 tokens. This framework ensures that each TCu29 transaction remains consistent with the 1:1 physical copper backing and ownership structure of the TCu29 ecosystem.

This governance structure provides institutional-grade transparency, auditability, and oversight, supporting regulatory compliance, dispute resolution, and external audit processes, while reinforcing the integrity of the physical copper ownership and redemption framework underlying TCu29.

## 5.6 Liability & Balance-Sheet Treatment

For transactions exceeding USD 100 million, the corresponding copper obligation is recognised on Tempestas Global Ltd's balance sheet in the subsequent reporting year as a formal liability. Where required, an MR01 filing can be lodged with Companies House to register a first-ranking charge over Tempestas Global Ltd. This creates a legally enforceable security interest - effectively placing a lien over the company - up to the value of the sale transaction. The secured amount is recorded on the 2025 balance sheet as a liability, ensuring the copper obligation is transparently embedded within the company's financial statements.

In the event of insolvency or corporate failure, the secured creditor would have the legal right to enforce the charge and claim the copper (or equivalent value) represented by the liability.

# 6. Strategic Advantages for Stakeholders

## 6.1 For Industry & B2B Participants

- **Resource Security:** Guaranteed physical access even under allocation mechanisms or price caps.
- **Procurement Optimization:** Flexible, just-in-time copper inventory synchronized with production cycles.
- **Strategic Buffering:** Ability to build reserves ahead of infrastructure projects and defend against extreme price spikes or shortages.

## 6.2 For Financial Institutions/DeFi

- **Commodity Utility:** Commodity-backed digital asset with intrinsic value and real-world redemption rights.
- **Collateral/DeFi Integration:** Can be used for loans, yield, or trading pairs.

# 7. Risk & Scenario Analysis

- **Physical Asset Risks:** Mitigated by insurance, geographic diversity, continuous audits, and diversified supply chain partnerships.
- **Market Risks:** Token value tracks underlying copper price; extreme scenario planning ensures ongoing redemption and supply even if markets fragment.
- **Regulatory Risks:** Swiss structure, clear commodity status, and careful communication maintain regulatory alignment; direct marketing only to approved jurisdictions and participants.

# 8. Roadmap & Future Development

- **Short-term:** API/ERP enhancements, partner expansion (AI/energy/EV), more streamlined redemption/compliance.
- **Medium-term:** Deeper ecosystem/DeFi integration, just-in-time inventory applications, dashboard analytics, strategic reserve planning.
- **Long-term:** Standard-setting for tokenized commodities, global liquidity partnerships, enhanced cross-chain capabilities, strategic positioning as copper shifts to strategic resource status.

## 9. Legal Structure

Tempestas Copper Inc. have employed Tempestas Development Limited to be onboarded with "LEXR Law Switzerland AG" to assess the legal feasibility and regulatory requirements for issuing a copper-backed token (the "**TCu29 Token**") under Swiss law. We are of the preliminary view that:

- The **TCu29 Token** classifies as an asset token and **not as a security and not as a financial instrument** as per the FINMA Guidelines and Swiss financial market regulatory laws. Hence, the issuance and redemption of the TCu29 Token, as well as the connected custody of physical copper, is **not subject to Swiss securities regulations** (notably the Swiss Financial Market Infrastructure Act and the Swiss Financial Services Act). The issuance of TCu29 Tokens is not subject to a prospectus requirement under Swiss law.

- The **issuance and redemption of the TCu29 Token**, as well as the connected custody of physical copper, is furthermore **not subject to any (licensing or other regulatory) requirements under:**
    - The Swiss Anti-Money Laundering Act; and
    - The Swiss Banking Act; and
    - The Swiss Collective Investment Schemes Act.

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## 10. Conclusion

TCu29 provides an efficient bridge between physical copper and modern financial infrastructure as copper transitions from commodity to strategic resource. The platform gives industrial users, technology developers, institutional financiers, and DeFi protocols the tools to securely manage, procure, and utilize copper amid unprecedented demand and supply constraints. Its robust, verifiable, and resilient structure delivers asset security, industrial utility, and blockchain-driven efficiency - no matter how copper markets evolve across the coming decade.

## Disclaimer:

*This information provides a general overview and is NOT financial or investment advice.*

*TCu29 is a commodity claim token. Participants should conduct their own research, understand risks (commodity market fluctuations, blockchain technology), and consult independent advisors. Refer to official TCu29 documentation and Terms of Service for complete details.*