

# The Calçotada Protocol: Equity PEG Tokens for Decentralized Venture Capital

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**Abstract**—The Calçotada Protocol turns seed capital—high-return Real World Assets traditionally reserved for venture capitalists—into performance-pegged tokens called Performance Equity Growth (PEG) tokens. These tokens track company valuation milestones and feature protocol-enforced buybacks inspired by a convertible note, using a Dynamic Convertibility Condition (DCC) method to enable buybacks outside a larger sale. This gives retail investors structured exposure to the same upside potential that drives early-stage funding rounds.

This document presents an early MVP implementation and lays the foundation for a broader, community-driven protocol. We invite collaborators—from financial engineers to DAO architects—to help shape this emerging standard and support its development through grants and other contributions. By channeling speculative energy toward real company growth, the Calçotada Protocol—named after the Catalan communal food feast—creates a new class of venture-backed assets and opens a powerful funding channel for traditional startups outside the crypto-native sphere.

**Index Terms**—Blockchain, Venture Capital, Real World Assets (RWAs), Performance-Pegged Tokens (PEGs), Tokenized Private Equity, Startup Funding, Retail Investing, Protocol-Enforced Buybacks, Decentralized Autonomous Organization (DAO), Open Protocol

## I. INTRODUCTION: A FOUNDATION FOR REAL-WORLD CRYPTO VALUE

While blockchain has the potential to transform financial systems, a significant portion of the crypto landscape is dominated by speculative, zero-utility assets that contribute little to real economic value. This creates a cycle of hype and volatility that undermines trust in Web3’s promise as a foundation for meaningful innovation. At the same time, traditional venture capital remains a centralized and exclusive industry, leaving many high-potential founders without access to early-stage capital.

The **Calçotada Protocol**—the official proposal by The Calçotada Company to raise its seed round—proposes a new, community-driven path by introducing a class of Performance Equity Growth (PEG) tokens. These tokens bridge the gap between speculative crypto capital and real-world company growth by aligning token value directly with company success. PEG tokens are issued against company valuation milestones and are governed by smart contracts that enforce financial transparency and buyback mechanisms. Inspired by convertible notes, the protocol uses a **Dynamic Convertibility Condition (DCC) method** to enable buybacks outside of a traditional exit

event, providing retail investors with structured exposure to the same upside potential that drives early-stage funding rounds.

This paper presents the protocol as both a Minimum Viable Product (MVP) and an open specification. By defining a transparent, programmable approach to seed funding, it challenges the concentration of venture power and expands access to capital for a more diverse range of founders. Our work directly addresses the limitations of existing token-based financing models, which often lack a strict link between token value and company performance. It transforms speculation into structured investment, paving the way for a more robust and inclusive economic system built on blockchain infrastructure.

### A. Protocol Development Anchored in Real Operations

Critically, the Calçotada Protocol is not merely theoretical. Its initial development is directly anchored in the funding needs of a functioning startup: *The Calçotada Company*, a food-tech venture with a validated business model and operational roadmap. By designing the protocol alongside an active business, its architecture, incentives, and smart contracts are built in response to actual operational constraints—not abstract scenarios.

This parallel development places The Calçotada Company in a unique position as a test bench for Web3 integration. The startup can experiment with blockchain-based governance, tokenized financial flows, and smart contract logic, while simultaneously exploring applications within traditional operations, such as e-commerce and app development. This applied approach enables rigorous testing of buyback mechanisms, community governance, and financial interactions in a live environment, creating a higher-trust, more credible foundation for both the company and the broader protocol rollout.

## II. STATE OF THE ART: THE PROBLEM OF DISCONNECTED CAPITAL

The promise of blockchain is often met with the reality of disconnected capital. On one side, startups—especially those with real-world products—face a significant challenge in raising seed capital. Traditional venture capital is a centralized system that often overlooks founders outside of its established networks, creating a **funding gap** for a diverse range of innovative ideas. The well-known “tunnel vision” associated with centralized VC is discussed in the first chapter of *Power and Progress* (2023) by Acemoglu and Johnson [1], where they argue that

innovation is not a neutral force but often serves the narrow agendas of those who control capital flows. This dynamic is amplified by the structure of the VC industry, which filters startup potential through a small number of high-net-worth individuals and institutions, leading to centralized decision-making and trend-following capital allocation.

This challenge is also implicitly supported by research from Headd (2003) [2], which notes that businesses with more resources and better financing have a higher chance of survival, and by Henrikson et al. (2010) [3], which, while challenging the concept of a "static" funding gap, highlights that a lack of resources remains a central issue for entrepreneurs at the early stages of a new venture.

On the other side, the crypto market is flooded with massive amounts of retail investment. However, this capital is largely funneled into speculative ventures like meme coins and highly volatile altcoins, creating a cycle of pump-and-dump schemes with no connection to real-world value creation. While often dismissed as irrational, these investors are simply seeking accessible, high-risk, high-return opportunities that are unavailable in traditional markets.

The Calçotada Protocol is designed to bridge the gap between traditional venture capital and decentralized finance. It aims to redirect retail crypto investment from speculative assets to tangible innovation by creating a new, inclusive form of venture funding.

#### *A. The Rise—and Limits—of Token-Based Startup Financing*

Blockchain-based financing emerged as a promising alternative to VC dominance. ICOs, in particular, were initially seen as a democratized fundraising mechanism. However, studies such as Howell et al. (2020) [4] and Catalini & Gans (2019) [5] found that token value in these offerings was often driven by speculative market sentiment rather than by startup fundamentals. The lack of intrinsic utility or rights backing these tokens made them volatile and prone to pump-and-dump cycles.

Attempts to bridge token value with financial fundamentals include models like the Simple Agreement for Future Tokens (SAFT), token warrants [6], and hybrid governance protocols (e.g., Compound, MakerDAO). Yet these models stop short of enforcing a valuation peg—a strict, transparent link between company performance and token economics.

Moreover, the majority of these fundraising models have been designed to serve crypto-native projects—protocols, DeFi platforms, and dApps—rather than general startups with traditional product-market strategies or offline operations. This creates a structural exclusion: while crypto capital is abundant, it remains inaccessible to founders outside the ecosystem who lack deep technical ties to Web3 culture or tooling.

As blockchain infrastructure matures and regulatory clarity improves, there is a growing opportunity to extend DAO-based venture financing to traditional startups. Doing so requires token models that reflect the financial logic of early-stage equity, not speculative or utility-only design.

#### *B. The Missing Piece: Equity Peg Tokens*

Recent research by Cao (2023) [7] differentiates between token and equity-based startup financing, concluding that token sales provide liquidity but introduce misalignment risks unless structured to reflect startup success metrics. This gap motivates the core innovation of the Calçotada Protocol: the design of Performance Equity Growth (PEG) tokens, which are governed by on-chain logic tied to company valuation.

PEG tokens act as a synthetic representation of equity performance—without requiring the legal complexity of security issuance—by enforcing treasury-backed buyback mechanics once valuation milestones are achieved. This model builds on the foundations of tokenized convertible instruments but extends them with financial enforcement via smart contracts, oracle-fed financial data, and protocol-level transparency. Research by J.P. Morgan (2025) [8] further highlights the potential for tokenization to democratize access to illiquid private assets for individuals.

PEG tokens aim to serve not only crypto-native ventures but any startup that can benefit from structured capital, community engagement, and transparent governance. This extends the reach of token-based financing beyond the narrow corridor of Web3-native businesses and opens the door for new industries to access decentralized capital infrastructure.

#### *C. Beyond Speculation: Capturing Retail Energy for Innovation*

Another key motivation for this protocol is the observed misalignment between retail investor behavior and long-term innovation. Meme coins and speculative tokens have attracted vast inflows from non-accredited investors who are excluded from traditional VC. While often dismissed as irrational actors, these users are expressing a real hunger for high-upside opportunities.

Recent studies highlight that meme coins (e.g., Dogecoin, Shiba Inu, PEPE, and \$TRUMP) are driven primarily by social momentum, narrative virality, and celebrity or influencer activity rather than utility or project fundamentals [9], [10]. Despite high volatility, they consistently attract hundreds of thousands of wallets, as seen in the over 700,000 wallets impacted by the \$TRUMP crash in 2024 [11].

Far from being irrational, these users are seeking accessible, high-upside entry points—currently unavailable through traditional equity mechanisms. As retail sentiment continues to move faster than institutional cycles, it represents a powerful force if properly directed [12], [13].

Redirecting this energy from pure speculation toward structured, valuation-pegged startup exposure could unlock meaningful capital for undeserved founders. In this sense, **PEG tokens** are not just technical artifacts—they are social and economical instruments. They challenge the concentration of venture power, expand the set of founders with access to capital, and provide retail investors with an opportunity to participate in shaping the economic frontier.

### III. FUNDAMENTALS OF THE CALÇOTADA PROTOCOL

The core principle behind the protocol is that the return on investment (ROI) and value appreciation of the issued tokens are achieved through a mechanism of **buybacks**. This system is built on the assumption that the sponsoring startup, serving as the issuing company, has a profitable business model that will increase its valuation over time.

Acting as a black box, the protocol extracts the company's valuation based on two market principles:

- **Discounted Cash Flow (DCF) Method:** An analytical methodology used to calculate a deterministic, on-chain valuation.
- **Open Market Exit:** The traditional path to liquidity for a startup.

Based on this calculated valuation, the company provides regular buyback opportunities, allowing investors to exit their positions and realize asset liquidity. The specific value of the RMSC token for each buyback is directly determined by the company's valuation at that time.

#### A. Dual-Token Issuance and Deflationary System

The protocol uses a dual-token model, where token issuance reflects real capital added to the company. Both tokens have a **strictly capped supply** corresponding to the target raise.

- **CalcotCoin (NFT):** Serves as a founding membership, granting governance rights, access to exclusive company benefits, and priority eligibility for buybacks. NFTs are released in **batches**, each associated with a round of capital addition. Purchasing an NFT is equivalent to joining as a founding investor. The NFT itself does not guarantee a fixed ROI; its value comes from the combination of benefits, governance privileges, and buyback access.
- **Romesco (RMSC) Token:** A fungible token reflecting the company's Performance Equity Growth (PEG) value. RMSC tokens are allocated to participants based on their capital contribution, providing financial exposure to the company's performance. Supply is capped by the total target raise, ensuring tokens are only minted when new capital enters the system.

a) *Participation and Token Allocation:* Capital additions are issued in **batches**. In each batch, the price of participation increases, reflecting the added value and risk for early investors.

Participation proceeds through clearly defined steps:

- 1) **Capital Contribution:** The participant provides capital to join a funding batch.
- 2) **RMSC Minting:** The contributed capital is converted into newly minted RMSC tokens according to a predefined price bonding curve.
- 3) **RMSC Allocation:**
  - **50% to Company Treasury:** These tokens serve as RMSC reserves, securing governance and buyback privileges via the NFT.
  - **50% to Participant:** Retained as a participation bonus, giving direct financial exposure to the company's growth.

- 4) **NFT Issuance:** In exchange for the treasury allocation, the participant receives a founding NFT, granting governance rights, community access, and buyback eligibility.

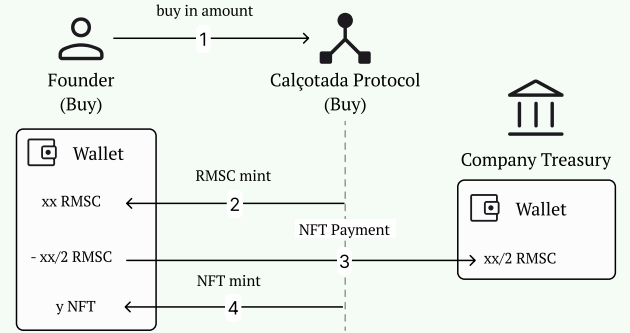


Fig. 1. Token minting process sequence diagram

In parallel, there is a **free pool of RMSC tokens** for participants seeking larger financial exposure beyond the batched issuances.

This mechanism ensures that **RMSC supply grows strictly in proportion to capital raised**, maintaining a transparent and auditable tokenomics framework. Simultaneously, the **NFT layer anchors governance, community access, and buyback privileges**, while RMSC serves as the liquid instrument for financial participation.

#### B. RMSC Treasury and Its Role

Half of the RMSC tokens minted through NFT purchases are transferred to the **company treasury** as reserves. This treasury has a strategic purpose:

- **Liquidity Provision:** A portion of the treasury can be deployed in liquidity pools to support RMSC market activity without increasing total supply.
- **Airdrops:** The treasury can distribute RMSC to NFT holders as rewards or incentives, strengthening community engagement.
- **Growth Initiatives:** The treasury provides capital for strategic programs and partnerships, enabling the company to expand its ecosystem while preserving token scarcity.

By maintaining these reserves, the treasury allows the company to execute financial strategies and community programs **without affecting the capped total supply of RMSC**, ensuring transparency and long-term sustainability of the tokenomics framework.

#### C. Valuation Methodology

Startup valuation is inherently challenging due to limited historical data, high uncertainty in cash flows, and rapidly evolving market conditions. Nevertheless, academic research and industry practice support the use of Discounted Cash Flow (DCF) as a rigorous, theoretically grounded approach for estimating firm value, even in early-stage ventures [14]–[18]. The DCF methodology provides a transparent, auditable framework that reflects the time value of money and the risk-adjusted potential of future cash flows.

To provide a verifiable and auditable valuation, the protocol proposes a hybrid approach that leverages both a deterministic on-chain model and the potential for a traditional market exit:

- **Dynamic On-Chain Discounted Cash Flow (DCF):** The primary valuation method is an on-chain DCF model that can be updated with actual operational data. Instead of relying solely on projected cash flows, past periods are replaced with real company performance metrics, including revenues, costs, margins, and CAPEX. This allows the protocol to calculate a near real-time company valuation ( $V_{\text{daily}}$ ), bridging traditional DCF theory with dynamic operational insight. By executing the inputs and calculations within smart contracts, the valuation remains tamper-proof, fully transparent, and accessible to all token holders [14], [18].

$$V_{\text{daily}} = \sum_{t=0}^T \frac{\text{FCF}_{t, \text{actual}}}{(1+r)^t} + \sum_{t=T+1}^{\infty} \frac{\text{FCF}_{t, \text{projected}}}{(1+r)^t} \quad (1)$$

- **Open Market Exit:** In the event of a traditional liquidity event (e.g., acquisition or Initial Public Offering), the protocol's valuation is superseded by the actual market valuation. This ensures that token holders are aligned with real-world outcomes and can benefit from successful exits, complementing the deterministic DCF framework [15], [17].

#### D. The Buyback Mechanism

The buyback mechanism is the core instrument of the tokenomics, controlling both the market supply and the liquidity pool of RMSC tokens. It provides a transparent, decentralized exit route for token holders while preserving company flexibility in valuation and capital management.

The deterministic Token ROI ( $\text{Tk}_{\text{ROI}}$ ) is computed using the adjusted company valuation and a formal SAFE (Simple Agreement for Future Equity) framework. Unlike traditional SAFEs, the purpose here is not direct equity conversion, but to anchor RMSC token liquidity and enforce price discipline in the open market.

The SAFE-based buyback mechanism is formally defined by four parameters:

- **Discount Rate ( $d$ )** – reduces the effective valuation for early token holders, providing an incentive for early participation.
- **Valuation Cap ( $V_{\text{cap}}$ )** – the maximum valuation used in calculating ROI, protecting token holders from excessive dilution.
- **Interest Rate ( $i$ )** – a simple accrual representing the time-based value until buyback or conversion.
- **Conversion Trigger / Maturity ( $T_{\text{trigger}}$ )** – the event or date at which ROI is realized, either via on-chain DCF valuation or a traditional market exit.

Formally, the Token ROI is computed as:

$$\text{Tk}_{\text{ROI}} = \max \left( \frac{(1+i)^{\text{year}}}{(1-d)}, \frac{V_{\text{cap}}}{V_{\text{on-chain}}} \right) \quad (2)$$

where:

- $V_{\text{valuation}}$  is either the on-chain DCF valuation ( $V_{\text{on-chain}}$ ) or market exit valuation ( $V_{\text{market}}$ ).
- $\bar{P}_{\text{mint}}$  is the average mint price of the RMSC of the overall minted supply.

The final per-token buyback price is:

$$P_{\text{buyback}} = \text{Tk}_{\text{ROI}} \times \bar{P}_{\text{mint}} \quad (3)$$

All inputs, intermediate calculations, and milestone flags are recorded or attested on-chain, ensuring that the buyback triggers and prices are fully auditable and executable by smart contracts. The execution of buybacks is subject to the company's treasury liquidity and governance oversight.

This buyback mechanism is instrumental in making the tokenomics work by controlling the market supply and liquidity pool of RMSC. It leverages the SAFE framework to allow flexible company valuation and price discovery, benefiting both the company and token holders. Importantly, the mechanism does not directly convert tokens into company equity; instead, it ensures liquidity exists that influences the RMSC token price in the open market.

The SAFE contract has been extensively analyzed in the literature. For example, [19] provides a comprehensive survey of seed financing contracts, including SAFEs, and discusses their adoption and implications in early-stage startup funding. Similarly, [20] explores the challenges in valuing young startups and the role of instruments like SAFEs in addressing these challenges.

#### IV. PROTOCOL MVP IMPLEMENTATION

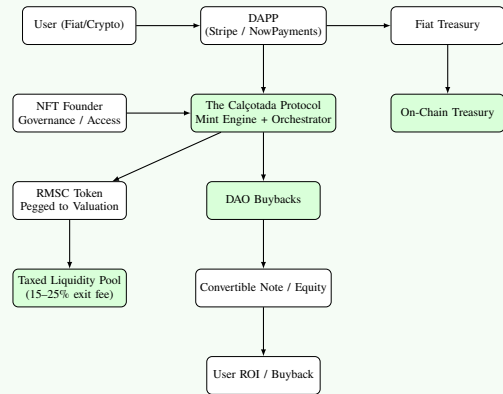


Fig. 2. Simplified architecture of the Calçotada Protocol: dual-token issuance and treasury-integrated valuation peg.

The Calçotada Protocol implements a sophisticated two-asset system. The architecture consists of four core smart contracts that work in concert: CalcotCoin (NFT), Romesco (RMSC token), Calçotada (orchestrator), and NormalizeToEuro (oracle integration). This system combines governance through non-fungible tokens (NFTs) with economic participation via fungible tokens (RMSC) that are designed to track company valuation.





Fig. 3. Calçot-Coin (CEBA) - The NFT representing community participation and governance



Fig. 4. Romesco (RMSCU) - The fungible token representing the "secret sauce" of venture returns

#### A. CalcotCoin NFT: Governance and Foundational Access

The *CalcotCoin* (CEBA) contract implements an ERC721 NFT system designed to recognize early supporters and provide governance rights. The current implementation features:

##### Technical Specifications:

- Token Type: NFT (ERC721)
- Token Name: Calçot-Coin
- Token Symbol: CEBA
- Batch: 0 (Genesis)
- Fixed supply of 333 NFTs (CEBA Genesis edition)
- Public allocation: 300 NFTs
- Premint - Reserved Treasury: 33 NFTs
- Linear pricing mechanism from 222.22 to 200 RMSC per NFT
- Sell Price: €100 per NFT with dynamic RMSC conversion

**Minting Mechanism:** The CalcotCoin contract implements a sophisticated dual-minting system where NFT purchases trigger a 2x RMSC mint. When purchasing an NFT:

- 1) The buyer receives participation price in newly minted RMSC
- 2) Half of the RMSC is automatically transferred to the treasury as payment for the NFT
- 3) The buyer retains the other half of minted RMSC as a bonus incentive
- 4) The NFT is minted to the buyer's address

##### Planned Governance Features:

- One vote per wallet (implementation pending)
- Participation in valuation recognition and capital allocation decisions
- Access to exclusive founder investment opportunities and communications
- Access to special offerings, discounts and events

Note: The whitepaper originally specified 6 batches totaling 5,888 NFTs. The current implementation focuses on the initial 333-unit genesis collection, with future batches to be deployed based on protocol evolution and community feedback.

#### B. RMSC Token: Equity-Pegged Financial Instrument

The *Romesco Token* (RMSC) is the core financial instrument of the protocol, implemented as an ERC20 token with ERC1363 and ERC20Permit extensions for enhanced functionality.

##### Technical Implementation:

- Token Type: FT (ERC20)
- Token Name: Romesco
- Token Symbol: RMSCU
- Fixed maximum supply of 5,000,000 RMSC (hard cap enforced in contract)
- Premint Treasury: 200,000 RMSC for liquidity and operational needs
- Base Price: €0.40 per RMSC
- Pausable functionality for emergency situations
- Permit functionality for gasless approvals
- ERC1363 support for single-transaction transfers and callbacks

##### Economic Design:

- Minting controlled by the orchestrator contract only
- No burn functionality for regular users (maintains supply integrity)
- Designed for future buyback mechanism at €1.5–€3.0 per RMSC
- Starting valuation implies approximately €0.40–€0.70 per RMSC

**Integration Features:** The RMSC token is designed for composability with DeFi protocols:

- ERC20Permit enables gasless transactions and meta-transactions
- ERC1363 allows for advanced payment flows and automated callbacks
- Standard ERC20 interface ensures compatibility with all major DEXs and lending protocols

Note: The buyback mechanism mentioned in the economic design is planned for future implementation through a separate contract that will interact with the on-chain accountancy system.

### C. Calçotada Orchestrator: Protocol Coordination

The *Calçotada* contract serves as the central orchestrator, coordinating interactions between all protocol components:

#### Core Functions:

- Manages the dual-minting mechanism for NFT purchases
- Controls RMSC minting according to bonding curve pricing
- Handles both public and private sale mechanisms
- Integrates with *NormalizeToEuro* for multi-currency support

**Bonding Curve Implementation:** The orchestrator implements a sophisticated normalized bonding curve using:

- Q16.16 fixed-point arithmetic for precision
- Configurable sigmoid curve shape for optimal price discovery
- Integration with trapezoidal rule for accurate pricing
- Starting price: €0.40 per RMSC, ending price: €0.60 per RMSC

#### Transaction Fee Structure:

- NFT purchases: €4.50 transaction fee
- RMSC purchases: €2.50 transaction fee
- Fees collected in POL and forwarded to treasury

### D. Price Oracle Integration

The *NormalizeToEuro* contract provides real-time price conversion using Chainlink oracles:

#### Oracle Feeds:

- ETH/USD, EUR/USD, and POL/USD price feeds
- Automatic conversion between EUR pricing and POL payments
- 18-decimal precision for all calculations

### E. PEG Enforcement and Future Development

While the current implementation provides the foundation for equity-pegged tokens, the full PEG mechanism awaits implementation:

#### Current State:

- Token supply and pricing mechanisms are fully implemented
- Oracle integration provides real-time price conversion
- Treasury accumulation occurs automatically

#### Planned Enhancements:

- On-chain accountancy module for transparent financial tracking
- Automated buyback contracts triggered by valuation milestones
- Governance voting mechanisms for NFT holders
- Integration with external valuation attestation services

### F. Initial Supply and Distribution

The initial supply of RMSC tokens is allocated in a controlled and transparent manner to recognize pre-protocol contributions and prepare for public issuance. No tokens are minted speculatively or granted without capital justification.

1) *Angel Investor Allocation:* Prior to the protocol's launch, a group of early angel investors provided capital to The Calçotada Company under a convertible loan agreement. These early backers are entitled to receive RMSC tokens at the protocol's base issuance price, plus an interest premium to account for the time value of their risk.

- **Base Price Conversion:** Angel investments are converted into RMSC at the same base price offered during the initial public issuance phase.
- **Interest Adjustment:** A fixed 7% interest rate is applied to the original invested amount, and this adjusted total determines the corresponding RMSC allocation.
- **Non-inflationary Grant:** These tokens are accounted for as part of the protocol's total capped supply and are not created in excess of the 5 million RMSC ceiling.

2) *Pre-Mint Reserve:* In addition to angel investor conversion, a total of 200,000 RMSC tokens are pre-minted and held in the protocol treasury for operational, liquidity, and market stabilization purposes. This reserve will be used judiciously to support exchange listings, liquidity pool seeding, and strategic partnerships.

3) *Public Issuance:* All remaining RMSC tokens are made available through direct, capital-backed purchase via the protocol interface. Tokens are minted on-demand as described in the Minting Scheme, with no pre-sale, airdrop, or speculative allocation.

This initial supply model ensures that token distribution is fully aligned with the company's real financial history and avoids the common pitfalls of over-allocation, unbacked inflation, or opaque private rounds.

### G. Initial Distribution and Structured Pricing

The protocol implements a sophisticated pricing mechanism that balances early adopter incentives with sustainable fundraising:

1) *Current Implementation: Genesis Collection:* The deployed contracts focus on the initial CalcotCoin Genesis collection:

- 333 total NFTs with 33 reserved for treasury
- Linear RMSC pricing from 222.22 to 200 RMSC per NFT
- Fixed EUR price of €100 per NFT
- Dual-minting mechanism providing 2x RMSC to NFT buyers

2) *Future Batch Structure:* The protocol design accommodates future expansion through additional NFT collections:

Half of the RMSC minted for each NFT is transferred to the protocol treasury, while the remaining half is consumed by the NFT minting contract. This ensures that treasury-backed liquidity grows proportionally with capital raised.

3) *Public RMSC Issuance via Bonding Curve:* The Calçotada orchestrator implements a sophisticated bonding curve mechanism for public RMSC sales:

#### Technical Implementation:

- Normalized sigmoid curve stored as Q16.16 fixed-point values

TABLE I  
NFT BATCHES AND ASSOCIATED RMSC MINTING

Batch	NFT supply	Buy-In price (€)	$\bar{P}_{\text{mint}}$ (€)	RMSC supply
Calçot Coins	333	100	0.40	66,000
FounderPass 1	555	125	0.50	139,000
FounderPass 2	1111	250	0.525	529,000
FounderPass 3	1111	375	0.55	757,000
FounderPass 4	1111	500	0.575	966,000
FounderPass 5	1111	625	0.60	1,157,000
<b>Total: 5,332 NFTs</b>				
<b>2,047,025 € raised, 1,807,796 RMSC minted</b>				

- Configurable curve shape via uploadable parameters
- 16-step trapezoidal integration for accurate pricing
- Real-time POL/EUR conversion via Chainlink oracles

#### Pricing Parameters:

- Starting price: €0.40 per RMSC
- Ending price: €0.60 per RMSC
- Available supply: Up to 4.6M RMSC (after pre-mint and NFT allocations)
- Transaction fee: €2.50 per purchase

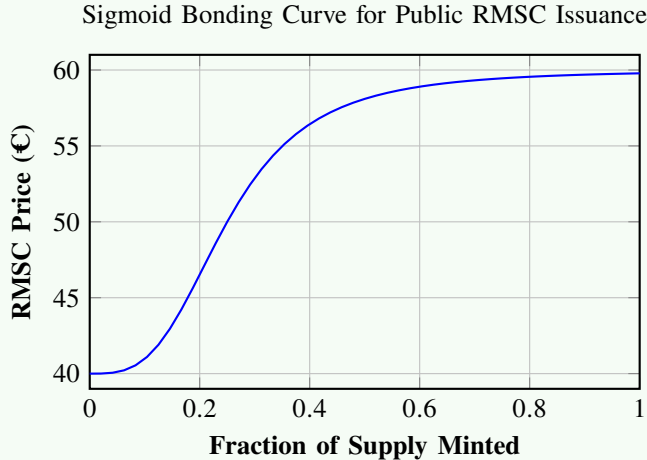


Fig. 5. Sigmoid bonding curve used for public RMSC issuance pricing.

This curve allows the protocol to capture higher marginal funding value while maintaining a predictable and fair pricing structure. Early public buyers enjoy lower prices, and late-stage buyers pay a premium as the available supply nears exhaustion.

4) *Liquidity and Secondary Market Strategy*: The protocol's liquidity strategy leverages standard DeFi infrastructure:

#### Current Implementation:

- RMSC is a standard ERC20 token, compatible with all major DEXs
- Treasury accumulates POL and RMSC for future liquidity provision
- No transfer restrictions or vesting schedules

#### Planned Liquidity Features:

- DEX liquidity pools on QuickSwap or Uniswap V3

- Treasury-funded initial liquidity provision
- Potential liquidity mining incentives for early providers
- Integration with lending protocols for RMSC collateralization

Note: The Taxed Liquidity Pool (TLP) mentioned in the original design is deferred to future protocol upgrades, allowing for simpler initial deployment and community-driven liquidity solutions.

#### H. Network Deployment

Polygon is selected as the base network for its:

- Low transaction fees and fast confirmation times,
- Proven security track record via Ethereum finality,
- Established ecosystem of NFT and DeFi projects.

Deploying on Polygon enables frictionless user participation while ensuring composability with future liquidity protocols and DAO tools.

### V. TECHNICAL IMPLEMENTATION

#### A. Smart Contract Architecture

The Calçotada Protocol consists of four core smart contracts deployed on Polygon:

##### 1. CalcotCoin.sol (ERC721):

- Manages NFT issuance and ownership
- Implements linear pricing mechanism
- Handles treasury pre-allocation
- Integrates with orchestrator for minting

##### 2. Romesco.sol (ERC20):

- Implements capped token supply (5M RMSC)
- Provides ERC1363 and Permit extensions
- Controlled minting via orchestrator only
- Pausable for emergency situations

##### 3. Calcotada.sol (Orchestrator):

- Coordinates all protocol interactions
- Implements bonding curve pricing
- Manages dual-minting mechanism
- Handles fee collection and treasury forwarding

##### 4. NormalizeToEuro.sol (Oracle):

- Integrates Chainlink price feeds
- Provides EUR/POL/ETH conversions
- Ensures accurate multi-currency pricing

#### B. Security Considerations

##### Access Control:

- Owner-controlled administrative functions
- Orchestrator pattern for inter-contract calls
- No external minting access on token contracts

##### Safety Features:

- ReentrancyGuard on all payment functions
- Pausable functionality for emergency response
- Overflow protection via Solidity 0.8.28
- Battle-tested OpenZeppelin libraries

### C. Gas Optimization

- Batch minting reduces per-NFT gas costs
- Q16.16 arithmetic minimizes computational overhead
- Efficient storage patterns in bonding curve
- Optimized loops with unchecked arithmetic where safe

### D. Protocol Composability

The Calçotada Protocol exposes several public and payable functions that enhance composability with other DeFi protocols:

#### Public Query Functions:

- `previewPurchaseCost`: Returns prices in POL for RMSC purchases
- `previewPurchaseCostEur`: Returns prices in EUR for RMSC purchases
- `getPriceBatchNFT`: Provides pricing for NFT batches in both POL and EUR

#### Payable Minting Functions:

- `calcotCoinPublicMint`: Allows public minting of NFTs with POL payment
- `publicRmScMint`: Enables direct RMSC token purchases (not yet exposed in UI)

These functions allow external protocols and smart contracts to integrate with the Calçotada ecosystem, enabling:

- Automated trading strategies based on real-time pricing
- Integration with DEX aggregators for optimal routing
- Building of derivative products on top of RMSC tokens
- Creation of vaults and yield strategies

## VI. VISION: FROM MEME COINS TO PEG COINS

This whitepaper presents not just a protocol implementation, but a vision for transforming venture capital through blockchain technology. We invite builders, researchers, and visionaries to join us in developing the foundational components for true DAO-based venture capital.

### A. Redefining PEG: From Price Stability to Performance Growth

The term "PEG" in traditional crypto contexts typically refers to price-pegged assets like stablecoins. We intentionally reappropriate this term to create a powerful contrast with MEME coins. While MEME coins represent pure speculation without underlying value, PEG (Performance Equity Growth) tokens represent the opposite: real value creation tied to company performance.

#### The MEME vs PEG Paradigm:

- **MEME**: Speculation, hype-driven, no intrinsic value
- **PEG**: Performance-driven, value-backed, growth-oriented

Unlike traditional price pegs that maintain stable values, our PEG tokens are *pegged to company growth*. This represents a new category of crypto assets:

- Not pegged to a stable price (like USDT to USD)
- Not pegged to another asset (like WBTC to BTC)
- But pegged to a company's valuation trajectory and success

This redefinition serves a dual purpose: it creates a memorable contrast with MEME coins while accurately describing

tokens that track real business performance. PEG tokens offer the excitement of venture returns with the substance of equity participation—transforming speculation into investment.

### B. The Composability Foundation

The Calçotada Protocol aims to establish standardized components that any startup can use to create their own equity-pegged tokens:

**Standardized Valuation Methods:** We propose using Discounted Cash Flow (DCF) models as the industry standard for early-stage startup valuations. Unlike traditional approaches, our innovation embeds buyback mechanisms directly tied to current company performance. This creates a new standard where:

- Valuations are calculated transparently on-chain
- External parameters (industry multipliers, WACC) are provided by oracles
- Buybacks are triggered automatically based on performance milestones
- Early liquidity is provided through a SAFE + Interest model

**Projected Returns (2027-2032):** Based on our DCF models for The Calçotada Company:

- Pessimistic scenario: 2.1x return by 2031
- Standard scenario: 2.8x return by 2031
- Optimistic scenario: 5.5x return by 2031

### C. On-Chain Accountancy Revolution

Current accounting depends on centralized bank integrations and proprietary software. We envision:

- Immutable, auditable financial records on-chain
- Access to real-time Free Cash Flow data
- New ecosystem of accountancy DApps
- Smart contract auditors guaranteeing transparency
- Integration with privacy solutions (e.g., Hyperledger) for competitive data

### D. Capturing the Meme Coin Market

The crypto community investing in meme coins represents untapped potential for meaningful investments:

#### What PEG Coins Offer:

- High risk/reward profile similar to meme coins
- 20% early rewards for liquidity providers
- Long-term returns ranging from 2x to 5.5x
- Real utility backing token value
- Community engagement through governance

#### Liquidity Strategy:

- Early liquidity pools with tax mechanisms for flippers
- Rewards for long-term believers
- Transition from speculation to value creation



### E. Building Trust Through Standards

The protocol addresses fundamental trust barriers:

- **Valuation Trust:** Pre-defined DCF models with oracle-provided parameters
- **Buyback Trust:** Smart contract execution with public reserves
- **Process Trust:** Deterministic mathematical expressions
- **Access Trust:** Guaranteed participation in seed capital opportunities

### F. Target Audience and Growth

#### Primary Targets:

- Retail investors currently in meme coins seeking real utility
- Young professionals interested in startup investing
- International investors excluded from traditional VC
- Non-accredited investors seeking early-stage opportunities

#### Growth Mechanisms:

- Referral system (5 RMSC per new user)
- Education initiatives on equity pegs
- Community-driven protocol development

### G. Five-Year Success Metrics

By 2029, success means:

- The Calçotada Company operating at full scale in Europe
- 3 patents published on protocol innovations
- Profitable operations from year 3
- Active buyback program demonstrating model viability
- RMSC accepted as collateral in major DeFi protocols
- Establishment of the "Calçotada Standard" for equity pegs

### H. Call for Builders and Contributors

This whitepaper is a proposal and invitation. We seek:

- **Protocol Developers:** To build standardized components
- **Oracle Integrators:** To validate fiat transactions
- **Financial Engineers:** To refine DCF models
- **Legal Experts:** To navigate regulatory frameworks
- **Community Leaders:** To educate and onboard users
- **Startup Founders:** To adopt and test the protocol

Many questions remain unanswered—optimal update frequencies, discount rates for pre-revenue startups, governance structures. These will be defined collectively as we build this new foundation for venture capital.

The Calçotada Protocol is more than technology; it's a movement toward democratized, transparent, and accessible startup funding. Join us in creating the future of venture capital.

## VII. TEAM AND ACKNOWLEDGMENTS

The Calçotada Protocol is driven by a dedicated team of RMSC holders representing the company's interests:

**Dr. Julià Delos Ayllón** - Founder and Chief Architect. With a distinguished career spanning from software to high-power systems, Dr. Ayllón holds a PhD in Electrical Engineering focused on power electronics and LED driver optimization. His professional journey includes roles at Philips Research, HP, and Lear Corporation, where he developed innovative solutions

from embedded software to advanced power management systems. At Philips Research, he contributed to multiple patents in LED driver technology and integrated power systems. This deep technical expertise in hardware miniaturization and system optimization now informs his approach to blockchain protocol design. Dr. Ayllón founded The Calçotada Company with a vision to revolutionize access to food experiences through a Food Experience as a Service (FEaaS) business model—creating an "Airbnb for culinary experiences" that enables rapid scaling while preserving authentic local gastronomy. His unique background bridges hardware engineering, corporate R&D, and entrepreneurial innovation, positioning him to architect protocols that merge real-world business models with decentralized finance.

**Dr. Louisa Spaans** - Medical doctor and protocol keyguard. Early angel investor and major RMSC holder safeguarding protocol integrity.

**Dr. Dimitri Pustakhod** - PhD and protocol keyguard. Strategic advisor and major RMSC holder ensuring governance alignment.

**Danail Hristov** - Telecom engineer and protocol keyguard. Technical advisor and major RMSC holder protecting protocol development.

This team represents the convergence of technical innovation, medical precision, business acumen, and entrepreneurial vision—united in democratizing access to venture capital through blockchain technology.

## VIII. CONCLUSION AND FUTURE WORK

The Calçotada Protocol represents a significant step toward democratizing venture capital through blockchain technology. By implementing tokenized convertible notes with clear valuation pegs, the protocol creates a bridge between traditional startup funding and decentralized finance.

### A. Current MVP Implementation

The deployed Minimum Viable Product serves as a proof of concept and market validation tool:

#### Implemented Features:

- Genesis collection of 333 CalçotCoin NFTs at €100 each
- RMSC token with 5M supply cap and bonding curve mechanics
- Dual-minting system rewarding early supporters
- Oracle integration for EUR/POL price conversion
- Basic treasury accumulation mechanism

#### MVP Objectives:

- Demonstrate technical feasibility of tokenized venture funding
- Validate market demand with €30,000 initial raise target
- Build initial community of supporters and advisors
- Test smart contract security and gas efficiency
- Establish foundation for future protocol development

This MVP represents a testimonial to the work ahead, starting with a solid foundation of minting strategies and bonding curve sales mechanisms. The limited scope allows for careful iteration

based on community feedback before expanding to the full protocol vision.

## B. Development Roadmap

The current deployment represents a Minimum Viable Product (MVP) designed to validate market interest and establish the foundational infrastructure. The roadmap prioritizes sustainable growth and community building over rapid feature deployment.

**Whitepaper Publication and Protocol Launch:** This whitepaper will be released concurrently with the public announcement of the Calçotada Protocol, marking the official start of Phase 1.

### Phase 1 - MVP Validation and Team Formation (Current - Q3 2024):

- Target: Raise initial €30,000 through Genesis collection (333 NFTs)
- Validate market interest and protocol mechanics
- Build core team for protocol development
- Present protocol to major blockchain networks and communities
- Establish fundamental protocol standards
- Define trustworthy governance framework

### Phase 2 - Protocol Expansion (Q4 2024 - 2025):

- Launch second NFT collection (September 2024 target)
- Release full 5,555 NFT collection based on community feedback
- Define operational phases for The Calçotada Company
- Establish protocol update and governance strategies
- Begin development of on-chain accountancy framework

### Phase 3 - Operations Launch (2025-2026):

- Calçotada Company begins operations with collected funds
- First products delivered to market
- Protocol provides initial company valuation estimates
- Deploy liquidity pools on major DEXs
- Implement basic financial reporting on-chain

### Phase 4 - Value Realization (2027+):

- Initiate first buyback programs based on company profits
- Define and communicate exit strategies for token holders
- Expand protocol to support additional portfolio companies
- Establish Calçotada Protocol as standard for tokenized venture funding

## C. Research Directions

Future research will explore:

- Optimal bonding curve parameters for different funding stages
- Integration of zero-knowledge proofs for private financial data
- Cross-chain implementations for broader accessibility
- Regulatory compliance frameworks for security token standards

The Calçotada Protocol MVP demonstrates the technical feasibility of tokenized venture funding while prioritizing community validation and sustainable growth. By starting with a focused Genesis collection of 333 NFTs, the protocol seeks to

validate market interest, build a dedicated team, and establish fundamental standards before expanding to its full vision. This measured approach ensures that when the protocol scales to support The Calçotada Company's operations and eventual buybacks, it will do so with proven mechanics, community trust, and a clear path to delivering value to all stakeholders. The journey from MVP to full protocol implementation represents not just a technical roadmap, but a new model for inclusive, transparent venture capital.

## APPENDIX

### A. Company Overview

The Calçotada Company is a Barcelona-based food-tech startup pioneering Food Experience as a Service (FEaaS). As the primary sponsor and first implementation of the Calçotada Protocol, the company serves as both a proof of concept and a real-world test case for tokenized venture funding.

### B. Business Model: FEaaS

Food Experience as a Service (FEaaS) represents a paradigm shift in the hospitality industry:

- **Scalable Culinary Experiences:** Transforming traditional dining into reproducible, high-quality experiences
- **Technology-Enabled Operations:** Leveraging automation and data analytics to optimize food service
- **Franchise-Ready Model:** Creating standardized processes that maintain authenticity while enabling rapid expansion
- **Cultural Preservation:** Protecting and promoting traditional Catalan cuisine through modern business practices

### C. Why Calçotada?

The company takes its name from the traditional Catalan calçotada—a communal feast celebrating spring onions. This choice reflects:

- Community-driven values aligned with DAO principles
- Scalable social experiences perfect for FEaaS model
- Strong cultural identity providing market differentiation
- Natural alignment between shared meals and shared ownership

### D. Protocol Synergy

The Calçotada Company's use of the protocol demonstrates:

- Real revenue generation for buyback mechanisms
- Clear valuation metrics through operational data
- Community engagement through product and investment
- Bridge between physical business and digital assets

We'll be the first to admit it: a blockchain protocol named after a charred onion is unusual. But a *calçot* is no ordinary onion. When grilled over an open flame, its outer layers burn away to reveal a heart of astonishingly sweet, tender deliciousness, perfect for dipping in a rich romesco sauce. The Calçotada Protocol draws its name from this Catalan tradition of *la calçotada*, a communal feast that embodies shared effort and collective success—values we believe mirror our mission to democratize access to venture capital.

Beyond the symbolism, the names are a bit of fun that links the protocol directly to its sponsoring entity, **The Calçotada Company**. We believe that the success of our fundraising will bring us all a step closer to earning a seat at a real *calçotada* feast. It's a culinary reward for a financial breakthrough.

The protocol's dual-token architecture reflects this heritage:

- **The NFT (Calçot-Coin):** Represents governance and participation. NFT holders are part of the decision-making collective, with voting rights and access to benefits as the company and protocol grow. This also guarantees participation in yearly meetings to try and enjoy the company's products. The NFTs are freely tradable, and holders will have founding advantages in financing and the use of services.
- **The RMSC Token (Romesco):** Represents capital and returns. The freely tradable RMSC token is designed to capture company performance while remaining detached from governance, preventing the concentration of influence among large holders. The secret, after all, is in the sauce.

Ultimately, retaining these names provides a distinctive, culturally resonant identity, reinforcing the connection between the protocol and The Calçotada Company, and ensuring brand consistency and long-term visibility.

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