KRYONIS SOVEREIGN SYSTEMS LIMITED

$BCCS

Token Economic Model

Parameterized Protocol Economics

Emission Schedule, Fee Mechanics, Staking, Stress Tests, and Security Budget

Biological Computing Control Standard (BCCS) — Document 04

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1. Model Overview

This document presents the parameterized economic model for the $BCCS verification unit. All parameters are configurable through protocol governance after Phase 2 transition. The model is designed for a single outcome: sustainable verification infrastructure where economic incentives produce truthful biological state data.

$BCCS is not modeled as a speculative asset. It is modeled as a work-denominated unit within a verification protocol. Demand is driven by verification queries. Supply is governed by emission schedule and deflationary mechanics. The model targets long-term equilibrium, not short-term price dynamics.

2. Emission Schedule

45% of total supply (450,000,000 $BCCS) is allocated to validator node emissions over a 6-year halving schedule. Emissions begin at mainnet verification network activation. No emissions occur before active verification work is being performed.

Year	Annual Emission	Cumulative	% of Emission Pool	Remaining
1	112,500,000	112,500,000	25.0%	337,500,000
2	56,250,000	168,750,000	37.5%	281,250,000
3	28,125,000	196,875,000	43.75%	253,125,000
4	14,062,500	210,937,500	46.88%	239,062,500
5	7,031,250	217,968,750	48.44%	232,031,250
6	3,515,625	221,484,375	49.22%	228,515,625

Emissions are allocated proportionally to validators based on two factors: verification volume (number of state transitions verified) and accuracy score (historical confirmation rate). Early operators earn exponentially more due to halving schedule — this incentivizes early network participation when the protocol is most vulnerable.

3. Verification Fee Mechanics

Every verification query processed through the BCCS API incurs a fee denominated in $BCCS. This is the primary utility demand driver for the verification unit.

3.1 Fee Structure

Query Type	Fee	Description
State query	0.01 $BCCS	Current state of a single BAIN ID
History query	0.05 $BCCS	Full state-transition history
Batch query	0.008 per ID	State of multiple BAIN IDs (volume discount)
Verification request	1.0 $BCCS	Request new verification of a specific asset
Lineage query	0.02 $BCCS	Spatial lineage (parent/child chain)

3.2 Fee Distribution

Query fees collected by the protocol are split: 50% is used to acquire $BCCS from the open market (Aerodrome DEX on Base) and distribute to active validators as supplemental emissions. 50% flows to the protocol treasury for operational costs. The buy-and-distribute mechanism creates continuous acquisition pressure proportional to protocol usage.

4. Staking Requirements

Oracle staking serves as economic alignment: validators with staked capital have direct financial exposure to the accuracy of their submissions.

Parameter	Value	Economic Function
Minimum oracle stake	$50,000 in $BCCS	Sybil resistance + quality filter
Lock period	90 days	Prevents stake-and-exit manipulation
Unstaking cooldown	14 days	Challenge window for recent submissions
Max slash per incident	25%	Sufficient penalty without total wipeout
Inactivity decay	1%/week after 30 days	Prevents passive staking without work

4.1 Staking Lock Impact

As the network scales, increasing quantities of $BCCS are structurally locked in staking contracts. At 500 active validators with $50,000 stake each, $25M worth of $BCCS is locked. At 2,000 validators: $100M locked. This creates a supply sink that grows linearly with network size, independent of market dynamics.

5. Infrastructure Access License Revenue

License revenue is denominated in USDC and flows entirely to the protocol treasury. It is completely separate from the $BCCS verification unit economy. No $BCCS is involved in the license acquisition process.

Tier	Licenses	Price	Tier Revenue	Cumulative
Alpha	500	$1,000	$500,000	$500,000
Beta	1,000	$1,500	$1,500,000	$2,000,000
Gamma	2,000	$2,200	$4,400,000	$6,400,000
Delta	3,000	$3,000	$9,000,000	$15,400,000
Epsilon	5,000	$3,500	$17,500,000	$32,900,000

6. Stress Test Scenarios

The economic model is evaluated against three adversarial scenarios:

6.1 Low Adoption Scenario

Assumptions: Only Alpha tier sells (500 licenses, $500K treasury). 50 active validators. 100 verification queries per day. Result: protocol is operationally sustainable at $1,500/month burn rate for 27 years on Alpha revenue alone. Query fees provide minimal supplemental income. Emission schedule remains unchanged — fewer validators means higher per-validator emissions, maintaining individual incentive.

6.2 Validator Exodus Scenario

Assumptions: 80% of validators leave the network within 3 months. Result: remaining 20% receive proportionally higher emissions (same total emission, fewer recipients). Staking unlocks follow 14-day cooldown, providing buffer for network adjustment. Protocol pauses non-critical operations if validator count falls below safety threshold (10 active validators).

6.3 Oracle Collusion Scenario

Assumptions: 30% of validators collude to submit false data for a high-value asset. Result: challenge mechanism activated by honest validators. Colluding validators slashed 25% each. At $50K stake, this represents $12,500 loss per colluding validator. Cost of attack for 30% of a 500-validator network: $1,875,000 in slashing penalties. Benefit of attack: negligible (false verification data has no direct financial payoff within the protocol). Economic attack is irrational.

7. Security Budget Analysis

The protocol’s security budget is the total economic cost an attacker must bear to corrupt the verification network. It is the sum of: staking requirements (capital locked), slashing penalties (capital at risk), and opportunity cost (emissions forfeited).

Network Size	Total Stake Locked	Attack Cost (30% collusion)	Annual Emissions to Honest
100 validators	$5,000,000	$375,000	112.5M $BCCS (Year 1)
500 validators	$25,000,000	$1,875,000	112.5M $BCCS (Year 1)

2,000 validators	$100,000,000	$7,500,000	56.25M $BCCS (Year 2)
5,000 validators	$250,000,000	$18,750,000	28.125M $BCCS (Year 3)

At scale, the security budget exceeds that of most DePIN protocols because biological verification requires higher economic alignment than data collection. The $50K minimum stake is deliberately higher than comparable DePIN node requirements to ensure validator quality over quantity.

8. Path to Deflationary Equilibrium

The model targets a convergence point where daily protocol demand for $BCCS (query fees + staking growth) exceeds daily emissions to validators. Three forces drive convergence:

Emission halving reduces new supply by 50% annually. Query volume grows as BAIN IDs are registered and AI agents integrate the API. Staking locks grow linearly with validator count. The intersection of declining emissions and growing demand defines the Deflationary Equilibrium point — the moment the protocol becomes self-sustaining without external capital inflow.

This model does not predict when equilibrium is reached. It establishes the mathematical conditions under which it occurs. Actual timing depends on adoption, which is not guaranteed.

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