Snek Cash: A Peer-to-Peer Deflationary Meme System

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Abstract. A purely peer-to-peer version of deflationary token transfer would allow value to be sent directly between participants without reliance on centralized authorities. Although SNEK introduced deflationary incentives within the Cardano memecoin ecosystem, it preserves a non-zero asymptote of supply. *Snek Cash* ($sCASH) extends this model through an epoch-based framework inspired by Cardano's Ouroboros consensus, here adapted as *Ouroburnos*—a protocol in which validation is achieved through coordinated destruction rather than creation.

Each epoch produces verifiable attestations of reduction, governed by *Bernoulli Burn Constants* (BBCs): coefficients derived from Bernoulli Numbers that define the proportional rate of burn. Participants organize into *burn pools* that aggregate and confirm supply contraction through deterministic delegation and epochal reporting, replacing issuance with structured proof of loss.

Over time, Ouroburnos drives $sCASH toward a mathematically convergent limit of zero supply—a *Singularity Phase*—where the network continues to confirm empty ledgers and consensus is maintained solely around the fact that nothing remains to agree upon.

1. Introduction

Trustless digital assets demonstrate that cryptographic proof can substitute for institutional trust in online transfers of value. SNEK established a culture of deflationary incentives on Cardano; however, a residual nonzero supply persists. If deflation is beneficial, a natural question follows: can a system be designed whose supply converges to zero in a decentralized, verifiable manner?

Snek Cash ($sCASH) explores this limit. The design objective is not merely scarcity but *closure*: a protocol in which each valid attestation irreversibly reduces supply, and the total supply forms a convergent sequence with limit zero. The network employs an epoch-based coordination model, *Ouroburnos*, inspired by Cardano's Ouroboros consensus. Within each epoch, participants collectively generate verifiable proofs of reduction—burn attestations—governed by Bernoulli-derived coefficients that yield an adaptive, oscillatory, yet monotone-decreasing supply trajectory. Over time, these recursive epochs drive the system toward mathematical extinction while maintaining consensus on the process of its own disappearance.

2. Transactions

We define an $sCASH transaction as a standard UTxO spend on Cardano with an embedded, protocol-enforced *burn fraction*. Let an input amount be $x > 0$. For block (or epoch) index n, the protocol computes a Bernoulli Burn Constant $\beta_n \in (0, 1)$; the transaction outputs are constructed such that a fraction $\beta_n x$ is destroyed, while $(1 - \beta_n)x$ is available for assignment to recipients.

Transactions are valid iff:

1. Signatures and spending conditions hold for each input;
2. The sum of explicit outputs equals the sum of inputs minus the burn, minus fees;
3. The burn fraction applied matches β_n within protocol-specified rounding rules.

To avoid dust growth, any remainder below a protocol threshold τ is burned rather than preserved.

3. Bernoulli Burn Constant (BBC)

Let B_n denote the nth Bernoulli Number. We define the epochal *Bernoulli Burn Constant*

$$\beta_n = \frac{|B_{2k(n)}|}{2\pi} \cdot \alpha, \tag{1}$$

where $k(n)$ maps epochs to even indices (Bernoulli numbers for odd indices > 1 vanish), and $\alpha \in (0, 1)$ is a protocol scalar setting target deflation.

The alternating sign and varying magnitude of $|B_{2k}|$ introduces low-amplitude, deterministic variation in the per-epoch burn, modeling sentiment while preserving a long-run downward supply path. This construction serves as a formal nod to Lovelace's insights on series expansion and computable processes.

4. Proof-of-Burn Consensus (Ouroburnos)

The $sCASH network employs a delegated, epoch-based consensus style inspired by Cardano's Ouroboros family, adapted here as *Ouroburnos*. In each epoch, a finite sequence of *slots* is conceptually defined. For each slot, a leader is pseudo-randomly derived from public, deterministic inputs and historical burn participation. The designated leader is authorized to finalize a *burn attestation* for that slot, recording a verifiable reduction in total $sCASH.

Unlike production-oriented consensus, Ouroburnos is *reductive*: slot leaders do not assemble transactions to expand state; they co-sign structured statements that confirm supply contraction. Finality is achieved by the accumulation of successive burn attestations across slots in an epoch, followed by an epoch boundary where summary statistics of aggregate reduction are published and referenced by the subsequent epoch's leader selection function.

Leader selection weight is proportional to *historic burn density*—a non-transferable measure of prior, confirmed immolation—subject to an epochal smoothing factor to avoid short-term concentration. This retains the familiar rhythm of stake-driven scheduling while aligning the system's liveness with its core purpose: continuous, measurable reduction of supply.

5. Network

Participants self-organize into *burn pools* that coordinate the preparation, witnessing, and publication of burn attestations. Delegators opt in by signaling their intention to route balances toward scheduled destruction at the pool's cadence. At epoch boundaries, pools consolidate witness data into compact reports containing: (i) inputs indicating balances earmarked for reduction, (ii) signed burn intents from participants, and (iii) the computed decrease applied under the epoch's Bernoulli Burn Constant β_n.

Inter-pool communication follows a best-effort, gossip-style propagation model. Messages need only reach a sufficient quorum of pools to be acknowledged within the next slot. To resolve concurrent reports for the same slot, Ouroburnos deterministically selects the report with strongest leader eligibility and, as a tie-breaker, *maximal aggregate reduction*. This *maximal-entropy preference* ensures the canonical sequence reflects the greatest realized burn where multiple admissible options exist.

Network bandwidth and latency requirements remain modest. Since reports compactly summarize reductions rather than carry high-throughput application payloads, typical operation achieves low overhead while preserving verifiability of aggregate supply contraction over time.

6. Incentives

Traditional issuance-based rewards are replaced by non-transferable *Reputation of Reduction Units* (RRUs). When a slot leader finalizes a burn attestation that satisfies the epoch's minimum target, the leader's pool receives RRUs proportional to the confirmed reduction and discounted by a recency factor. RRUs decay exponentially across epochs to privilege sustained contribution over isolated events.

Delegators to a pool inherit a share of that pool's RRUs for reputational display and governance within the burn collective; however, RRUs confer no claim on future balances and cannot be exchanged for $sCASH. The incentive is therefore aligned with scarcity maximization rather than yield extraction: rational actors optimize for predictable participation in reductions that move the supply trajectory toward its epochal target β_n while maintaining pool reliability.

In practice, reputation competes on three axes: (i) schedule adherence to proposed burn cadence, (ii) accuracy of reported reductions relative to targets, and (iii) continuity—how consistently a pool contributes across consecutive epochs.

7. Reclaiming Disk Space

As with Merkleized transaction sets, old spent outputs may be pruned while preserving block headers and Merkle roots. Because burns eliminate outputs outright, the UTxO set tends to contract, reducing state growth. Light clients need only maintain block headers and Merkle branches to verify inclusion and burn amounts.

8. Simplified Verification

A simplified client holds only the block headers of the longest chain and requests Merkle branches for specific transactions. It verifies PoW, β_n derivations, and per-tx burn correctness without executing full validation logic. Security holds so long as honest nodes control a majority of aggregate work.

9. Supply Dynamics

Let S_0 denote initial supply and let $\beta_n \in (0, 1)$ be the Bernoulli-derived burn constant for epoch n. Ouroburnos operates on an epochal recursion:

$$S_{n+1} \;=\; S_n \left(1 - \beta_n \cdot \rho_n\right), \tag{2}$$

where $\rho_n \in [0, 1]$ is the realized participation ratio in epoch n after accounting for pool schedules, thresholds, and rounding. The value ρ_n is observable from published burn attestations; its variability captures the network's operational cadence rather than any change to the protocol constant β_n.

To prevent dust accumulation, amounts below a protocol threshold τ are rounded downward and destroyed, effectively increasing ρ_n at low balances. Over a horizon of N epochs, the remaining supply is

$$S_N \;=\; S_0 \prod_{n=1}^{N} \left(1 - \beta_n \rho_n\right). \tag{3}$$

Because β_n follows a Bernoulli-number schedule, small deterministic oscillations appear in the per-epoch reduction rate while the long-run trend remains monotone decreasing. Simulations under nominal parameters indicate convergence to near-zero supply within approximately 69,420 epochs, after which reductions become vacuous by construction.

10. Privacy

All burn attestations are publicly auditable; however, residual balances shrink deterministically over time, reducing the analytic value of linkage. Delegators rotate signaling keys at epoch boundaries to avoid trivial association between consecutive burn intents, and sub-threshold outputs are eliminated rather than preserved. In the long-run limit where balances vanish, address correlation becomes moot: the network's observable state consists primarily of aggregate reduction summaries rather than persistent per-address histories.

11. Singularity Phase

When circulating supply falls below a terminal threshold $S_{\min}$, the system enters the *Singularity Phase*. Epoch scheduling, leader eligibility, and report propagation proceed unchanged; however, burn attestations become formalities that confirm the absence of further reducible balances. Pools continue to publish epoch summaries with zeroed reductions to maintain archival continuity and to cryptographically bind the termination of the supply sequence.

At this stage, Ouroburnos achieves its conceptual closure: leadership probability becomes independent of stake, participation reduces to ceremony, and the ledger stabilizes as a canonical record of completed reductions rather than a substrate for further allocation. The protocol thereby demonstrates that decentralized coordination can persist in the absence of issuance, utility, or remainder.

12. Conclusion

Snek Cash formalizes a peer-to-peer deflationary system whose limit state is zero supply. By coupling a Bernoulli-derived burn schedule with proof-of-burn-of-work consensus and conservative pruning, $sCASH offers a tractable model for maximal scarcity on Cardano. The design retains standard verification properties while replacing issuance incentives with measurable burn commitments. The result is a serious, experimentally useful protocol that—by construction—treats complete deflation not as a failure mode, but as its terminal success condition.

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Disclaimer

Snek Cash ($sCASH) is presented as a conceptual and satirical exploration of deflationary meme economics, not as a financial instrument or deployable protocol. The mechanisms described herein—including Ouroburnos consensus, Bernoulli Burn Constants, and burn pools—are theoretical constructs intended for artistic and educational purposes. No real tokens, contracts, or economic systems are implied or should be inferred.

All references to destruction of value, deflationary equilibrium, or token immolation are metaphorical. The authors make no representations regarding implementation, investment potential, or suitability for any purpose other than humor and reflection on cryptocurrency culture.

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