



**all this is good what i actually meant when i said capital actions is at what parts or how each network is implementing its on-chain finance can you give me another report with that please**

Now I'll generate the comprehensive report with all the details on DePIN on-chain finance mechanisms.

## **DePIN On-Chain Finance Implementation Report**

### **Executive Summary**

Decentralized Physical Infrastructure Networks employ five primary on-chain finance mechanisms to coordinate incentives between service providers, consumers, and governance participants. Unlike traditional centralized infrastructure, DePIN protocols implement transparent, code-enforced capital flows where all transactions, rewards, and treasury actions occur on-chain. The most sophisticated DePIN networks combine multiple mechanisms—particularly burn-and-mint equilibrium models with time-vested rewards and fiat-pegged pricing—to achieve deflationary dynamics while maintaining sustainable provider economics. The sector now demonstrates over \$17 billion in total market capitalization, with protocols increasingly adopting fiat-denominated reward systems and DAO-managed treasuries to reduce volatility exposure and improve institutional participation.<sup>[1]</sup> <sup>[2]</sup>

# Top DePIN Projects On-Chain Finance Implementation

Comprehensive comparison of decentralized infrastructure tokenomics

Project Name	Primary Token	On-Chain Finance Model	Reward Distribution Mechanism	Collateral/Staking Requirements	Token Burn Mechanism	Fiat Integration	Governance Model
Filecoin	FIL	Block rewards + storage fees	75% vest over 180d, 25% immediate; 70% to mining	FIL staking required; Proof-of-Replication	Token burns via network usage	Some providers accept USD	Filecoin Foundation voting; 70%+ participation
Render Network	RNDR	Burn-and-Mint Equilibrium (BME)	90% to node operators, 10% availability rewards; USD-pegged pricing	GPU commitment required	RNDR burned on job submission	Jobs priced in USD, converted to RNDR	Community proposals; token holder voting
Helium	HNT	Burn-and-Mint Equilibrium	Data Credit consumption burns HNT; new HNT minted for rewards	Hotspot staking required	HNT burned to generate Data Credits (\$0.00001)	Data Credits pegged to USD	Community HIPs; DHF voting
Bittensor	TAO	Subnet-based emission distribution	41% validators, 41% miners, 18% subnet owners; 1 TAO minted every 12s	TAO stake by validators/miners	Dynamic TAO proposal under testing	Limited; primarily token-based	Yuma Consensus; validator stake-weighted voting
Akash Network	AKT	Market-driven pricing mechanism	Block rewards distributed via Cosmos SDK; decay function over time	Provider collateral required	Deflationary model via fee structure	Service pricing negotiated; some USD acceptance	On-chain governance proposals; community voting
AIOZ Network	AIOZ	Task completion + staking rewards	Nodes earn AIOZ per minute processed; proof-based validation	AIOZ staking for node operators	Token burning based on network usage, node	Fiat on-ramps possible via frontend	Cosmos-based governance; token

## Top DePIN Projects: On-Chain Finance Implementation Comparison

### Core On-Chain Finance Mechanisms

#### Burn-and-Mint Equilibrium (BME) Model

The burn-and-mint equilibrium represents the most innovative on-chain finance structure in DePIN, creating a self-balancing system where token supply adjusts to network demand. In this model, users burn tokens to access network services, while the protocol simultaneously mints tokens as rewards to infrastructure providers. This creates deflationary pressure during high usage periods while ensuring providers receive predictable compensation. [3] [4]

**Helium Network Implementation:** Data Credits (DC) exemplify this approach. The protocol pegs Data Credits at \$0.00001 USD and requires users to burn HNT tokens to generate them. When HNT price appreciates, fewer tokens are required to generate equivalent USD value in Data Credits, creating a virtuous cycle. The network implements a Net Emissions cap at 1% of epoch emissions to ensure sustained deflationary pressure even as the protocol mints new tokens for hotspot operators. [5]

**Render Network's Variant:** Render implements a more sophisticated BME where job submissions in USD-pegged pricing automatically burn RNDR tokens. The protocol then mints approximately 107 million RNDR over time (expanding from 537 million to 644 million max supply) specifically to reward node operators for completed work. This structure ensures predictable pricing for consumers (quoted in USD) while giving node operators transparent reward expectations tied to actual compute demand. [6] [7] [8]

## Time-Vested Reward Distribution

Filecoin pioneered a critical innovation: time-locked vesting schedules that prevent mining profitability from encouraging network abandonment. This mechanism addresses a fundamental DePIN problem—storage providers with massive hardware investments need assurance of long-term returns, not immediate liquidity.<sup>[9] [6]</sup>

**Filecoin's Structure:** 75% of block rewards vest linearly over 180 days, while 25% remain immediately available. This split balances provider cash flow (covering operational costs) with long-term alignment (ensuring sustained participation). The network allocates 70% of all tokens to mining, with additional collateral requirements (measured in FIL) that providers must stake to secure storage commitments. Proof-of-Replication (PoRep) and Proof-of-SpaceTime (PoSt) verification mechanisms ensure providers are actually storing customer data, creating on-chain proof that justifies reward distribution.<sup>[10] [11] [6]</sup>

## Performance-Based Reward Allocation

Bittensor and Render both implement reward systems tied to actual work quality and completion metrics, rather than simple participation. This merit-based approach scales naturally with network growth and reduces rewards for low-quality providers.

**Bittensor's Subnet Model:** The network mints exactly 1 TAO token every 12 seconds, distributing it across 32 subnets based on their performance scores. Within each subnet, the emission splits as follows: 41% to validators (dividend), 41% to miners (incentive), and 18% to subnet owners. Validators use the Yuma Consensus mechanism to assign weights to subnets, with voting power proportional to their delegated stake. This creates a dynamic system where high-performing subnets (those providing valuable machine-learning results) receive larger emissions, automatically adjusting incentives.<sup>[12] [13] [14]</sup>

**Render's Per-Epoch Distribution:** Node operators earn rewards proportional to completed frames within each epoch (initially weekly, moving toward daily settlement). The protocol mints 90% of newly created RNDR for node operators and 10% for availability/creator incentives. This performance linkage creates powerful optimization—operators profit directly from rendering speed and quality, eliminating the perverse incentive structures that plague simple participation-based rewards.<sup>[7] [8]</sup>

## Fiat-Pegged Reward Mechanisms

The critical innovation of fiat-denominated provider rewards addresses institutional adoption barriers. When providers are paid in volatile tokens, large capital expenditures (servers, storage hardware, electricity) become economically untenable. Fiat-pegged systems maintain predictable revenue in USD terms while still using tokens as the settlement mechanism.<sup>[2]</sup>

### Implementation Examples:

- **Render:** Jobs are priced based on OctaneBench metrics and quoted in USD. The protocol converts USD pricing to equivalent RNDR at current market rates at job submission time. This protects creators from token volatility while giving node operators transparent compensation tied to real market demand.<sup>[6] [7]</sup>

- **Helium**: Data Credits maintain a fixed \$0.00001 peg, allowing device operators to estimate monthly costs in USD regardless of HNT volatility. The protocol ensures deflationary pressure by requiring HNT burning to generate new DCs, while minting HNT to reward coverage providers.<sup>[3]</sup> <sup>[5]</sup>
- **IO.net**: Allocates 37.5% of tokens to suppliers and their delegators over 20 years using a disinflationary model. Provider rewards are calculated in fiat value, then settled in IO tokens, ensuring computing infrastructure operators receive predictable revenue for electricity and hardware costs.<sup>[2]</sup>

Fiat-pegged systems create a virtuous cycle: predictable provider economics → institutional infrastructure deployment → increased network capacity → higher token demand → token appreciation → smaller dilution from fixed-fiat reward pools → improved profitability for remaining providers.<sup>[2]</sup>

## On-Chain Treasury and DAO Governance

Successful DePIN networks implement protocol treasuries managed by token-holder governance, creating funding mechanisms for ecosystem development without relying solely on venture capital.<sup>[15]</sup>

**DIMO's DAO Treasury**: 700 million DIMO tokens (approximately 70% of early allocations) flow into a community-controlled treasury. The DAO votes on allocations for developer grants, protocol improvements, and network expansion initiatives. Remaining tokens flow to drivers as data-contribution rewards (424M tokens initially, decreasing 15% annually) and core team/investors (335M tokens). This structure aligns incentives—drivers are paid to generate data, developers are paid to build applications consuming that data, and governance participants control capital allocation.<sup>[16]</sup> <sup>[17]</sup>

**Filecoin Foundation Model**: The Filecoin Foundation manages governance with over 70% participation in recent token allocation decisions. The protocol maintains a mining reserve to manage inflation, with governance voting determining how to use this reserve for ecosystem incentives, price stabilization, and security improvements. This on-chain governance mechanism prevents unilateral decision-making while maintaining protocol upgrades.<sup>[6]</sup>

## Category-Specific Financial Implementations

# DePIN On-Chain Finance Implementation Patterns

Five key tokenomic models shaping decentralized infrastructure

Pattern Name	Key Mechanism	Example Projects	Advantages	Disadvantages
Burn-and-Mint Equilibrium (BME)	Users burn tokens to access services; network mints tokens as rewards	Helium (Data Credits), Render Network, The Graph	<ul style="list-style-type: none"> <li>Deflationary when usage grows</li> <li>Aligns supply with demand</li> <li>Stable pricing</li> </ul>	<ul style="list-style-type: none"> <li>Requires sufficient demand</li> <li>Can create price volatility without usage</li> </ul>
Time-Vested Rewards	Rewards vest over predetermined periods (180+ days) to prevent early exit	Filecoin (75% vesting), Cosmos-based chains	<ul style="list-style-type: none"> <li>Incentivizes long-term participation</li> <li>Prevents network drain</li> <li>Aligns provider interests</li> </ul>	<ul style="list-style-type: none"> <li>Poor cash flow for small providers</li> <li>Requires lock-up periods</li> </ul>
Performance-Based Distribution	Rewards tied to actual work completion, uptime, or quality metrics	Bittensor (Proof of Intelligence), Render (frame completion)	<ul style="list-style-type: none"> <li>Rewards merit</li> <li>Incentivizes quality</li> <li>Scalable with network growth</li> </ul>	<ul style="list-style-type: none"> <li>Requires robust verification</li> <li>Potential gaming of metrics</li> </ul>
Fiat-Pegged Rewards	Provider rewards denominated in USD value, denominated/paid in tokens	Render (USD-pegged pricing), Helium, IO.net, Grass	<ul style="list-style-type: none"> <li>Predictable revenue for providers</li> <li>Reduces volatility exposure</li> <li>Attracts institutions</li> </ul>	<ul style="list-style-type: none"> <li>Dilution if token price doesn't match USD</li> <li>Complex calculations</li> </ul>

## DePIN On-Chain Finance Implementation Patterns: 5 Core Models

### Storage DePINs (Filecoin, Arweave, Storj)

Storage networks implement collateral-backed systems where provider security deposits protect consumers from data loss. The on-chain finance structure layers multiple incentives:

- 1. Consumer Payments:** Storage providers set their own fees in FIL or USD, creating competitive markets
- 2. Collateral Requirements:** Providers lock FIL proportional to promised storage capacity; slashing mechanisms penalize dishonest behavior
- 3. Proof Systems:** Proof-of-Replication and Proof-of-SpaceTime generate on-chain verification that justifies automatic reward distribution
- 4. Vesting and Mining Reserves:** Time-locked rewards prevent provider abandonment; mining reserves manage inflation

### Compute DePINs (Render, Bittensor, IO.net)

Compute networks prioritize real-time settlement and performance-based allocation:

- 1. Job Submission Burns:** Render jobs submitted to the network automatically burn RNDR tokens at job creation
- 2. Instant Verification:** Completed compute work is cryptographically verified on-chain, enabling immediate reward distribution

3. **Dynamic Pricing:** Render uses OctaneBench metrics to dynamically price GPU work in USD, converting to tokens at submission time
4. **Subnet Competition:** Bittensor subnets compete for emissions based on validator-assessed work quality, creating continuous performance optimization

## Wireless/IoT DePINs (Helium, Natix, Geodnet)

Wireless networks implement coverage-based economics where network quality directly correlates to revenue:

1. **Proof of Coverage:** On-chain verification confirms hotspots provided legitimate wireless coverage (latency-based witness chains)
2. **Data Credit Burn:** IoT devices burn Data Credits to send data through the network, directly incentivizing coverage expansion
3. **Dynamic Burn-Mint:** As HNT price appreciates, fewer tokens must be burned to maintain \$0.00001 Data Credit peg, creating automatic deflation
4. **Slashing Mechanisms:** Dishonest coverage claims result in automatic penalty application via smart contracts

## Bandwidth DePINs (Grass, Meson Network)

Bandwidth networks monetize idle internet capacity through phased token release and performance tracking:

1. **Contribution Tracking:** Grass Points track each node's bandwidth contribution, uptime, and data quality
2. **Phased Release:** Only 10% of GRASS tokens distribute initially via airdrops; remaining tokens release periodically to prevent dilution
3. **Router Incentives:** 3% of total GRASS supply rewards router nodes that optimize traffic flow, with selection frequency proportional to delegated stake
4. **Company Payments in Fiat:** AI companies pay fiat for bandwidth; the protocol converts payments to GRASS, creating demand-side token burning



Capital Flow Mechanisms: DePIN Categories and On-Chain Finance Implementation

## Financial Flow Architecture: Complete System Design

A comprehensive DePIN on-chain finance system operates as follows:

**Consumer/User Payment Layer:** End-users or enterprises pay fees to consume services. This can occur in three forms:

- Direct token payments (Filecoin storage fees in FIL)

- Fiat payments converted to tokens (Render jobs priced in USD, converted to RNDR)
- Data Credits or utility tokens pegged to fiat value (Helium Data Credits at \$0.00001)

**Protocol Capture and Distribution:** The protocol automatically routes payments through smart contracts:

- Portion directed to provider rewards (typically 50-90% of newly minted tokens)
- Portion retained in treasury for ecosystem development and operational costs
- Portion burned to maintain deflationary dynamics
- Slashing reserves held to penalize dishonest providers

**Node Operator Rewards Calculation:** On-chain consensus mechanisms calculate rewards based on:

- Work completed (frames rendered, data stored, coverage provided)
- Time period vested (180-day release schedules reduce immediate liquidation)
- Quality metrics (Proof of Intelligence scores in Bittensor, uptime percentages in Helium)
- Stake proportions (larger delegated stakes receive proportionally larger rewards)

**Governance and Treasury Management:** Accumulated protocol fees fund:

- DAO treasuries voted on by token holders
- Developer grants and ecosystem development
- Protocol upgrades and parameter modifications
- Token buybacks and burns (if implemented)

## Comparative Analysis: Implementation Trade-offs

Different DePIN projects make distinct trade-offs in their on-chain finance design:

Dimension	Render/Helium (BME Model)	Filecoin (Vesting Model)	Bittensor (Subnet Model)	DIMO (DAO Treasury)
<b>Provider Economics</b>	Predictable USD-pegged rewards; low cash flow friction	Delayed compensation via vesting; high security	Performance-based with market volatility	Data-contribution incentives; weekly payouts
<b>Protocol Sustainability</b>	Deflationary when usage grows; scaling improves token value	Sustainable via mining reserve management	Dynamic allocation prevents overpayment for low-performing subnets	Treasury voting ensures sustainable spending
<b>Institutional Adoption</b>	High (predictable costs + stable pricing)	High (proven revenue model)	Moderate (performance unpredictability)	Moderate (token volatility exposure)

Dimension	Render/Helium (BME Model)	Filecoin (Vesting Model)	Bittensor (Subnet Model)	DIMO (DAO Treasury)
Decentralization	Community voting on inflation proposals	Foundation governance with broad participation	Validator stake-weighted voting	DAO voting with broad token distribution
Token Deflation	Strong (user burn + vesting)	Moderate (mining reserve management)	Weak (continuous minting)	Moderate (treasury burning discretionary)

## Critical Design Considerations for On-Chain Finance

**Measurement and Verification:** Every reward distribution must be cryptographically verifiable on-chain. This requires:

- Proof systems appropriate to the physical infrastructure (Proof-of-Replication for storage, Proof of Coverage for wireless, Proof of Compute for GPU networks)
- Regular auditing mechanisms to detect Sybil attacks or fake contributions
- Automatic slashing to penalize dishonest nodes

**Inflation Management:** Unchecked token inflation erodes provider incentives and kills long-term network health. Successful protocols implement:

- Disinflationary schedules (annual percentage decreases)
- Burn mechanisms tied to real network usage
- Mining reserve caps that limit total issuance
- Governance voting on inflation parameter changes

**Fiat Stability vs. Token Appreciation:** The optimal DePIN design balances provider revenue certainty with token value growth:

- Fiat-pegged rewards ensure provider participation
- Deflationary mechanics reward long-term token holders
- Performance-based allocation incentivizes service quality
- Treasury buybacks can support token price during market downturns

## Conclusion

DePIN networks have developed sophisticated on-chain finance mechanisms that replace traditional corporate ownership with transparent, cryptographically-enforced capital flows. The most successful implementations combine burn-and-mint equilibrium with time-vested rewards, fiat-pegged pricing, and DAO governance to align incentives across all participants. These systems enable unprecedented capital efficiency—providers deploy hardware immediately while receiving predictable compensation; consumers access services at competitive rates; and

governance participants maintain transparent oversight of protocol development and treasury allocation.

The next generation of DePIN networks will likely emphasize institutional provider adoption through fiat-denominated rewards, cross-protocol capital efficiency via composable financial layers, and increasingly sophisticated performance-based reward allocation using machine learning to identify and incentivize highest-quality infrastructure contributions.<sup>[1] [2]</sup>

DePIN Fundraising Playbook 2026: Investor List and Capital Trends<sup>[1]</sup>

DePIN Token Economics Report by Fluence<sup>[2]</sup>

DePIN Overview: Exploring the Current State and Economic Models<sup>[15]</sup>

Filecoin Tokenomics: Storage Provider Economics<sup>[6]</sup>

Render Network Token Economics: Decentralized GPU Rendering<sup>[7]</sup>

Helium Network: Burn-and-Mint Equilibrium Model<sup>[3]</sup>

Filecoin Crypto-Economics Documentation<sup>[10]</sup>

Render Network: How RNDR Uses Tokenomics<sup>[8]</sup>

Understanding Tokenomics: Helium Data Credits<sup>[4]</sup>

Filecoin Token Allocation Specification<sup>[11]</sup>

The Helium Network Token Documentation<sup>[5]</sup>

Filecoin: Crypto-economics and Block Rewards<sup>[9]</sup>

Bittensor (TAO) Staking and Tokenomics<sup>[12]</sup>

Bittensor (TAO) Staking Calculator and Reward Mechanisms<sup>[13]</sup>

Bittensor (TAO) Tokenomics: Subnet Emissions<sup>[14]</sup>

DIMO: Decentralized Revolution of Vehicle Data<sup>[16]</sup>

DIMO Crypto Token Distribution and Driver Rewards<sup>[17]</sup>

Economic Incentives in DePIN: Structuring Value Beyond Token Rewards<sup>[2]</sup>

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1. <https://www.rapidinnovation.io/post/depin-tokenomics-understanding-the-economic-model-behind-the-technology>
2. <https://depinxyz.com/report>
3. <https://www.linkedin.com/pulse/helium-network-crypto-story-michail-piperakis>
4. <https://uplink.xyz/blog/tokenomics-explained-understanding-the-economics-of-cryptocurrencies>
5. <https://docs.helium.com/tokens/hnt-token/>
6. <https://www.gate.com/crypto-wiki/article/how-does-the-token-economic-model-of-filecoin-incentivize-storage-providers-20251119>
7. <https://www.blockchainappfactory.com/blog/how-render-rndr-tokenomics-powers-decentralized-gpu-rendering/>
8. <https://www.coingecko.com/learn/what-is-render-network-rndr-crypto>
9. <https://docs.filecoin.io/basics/what-is-filecoin/crypto-economics>
10. <https://filecoin.io/blog/posts/the-economics-of-storage-providers/>
11. [https://spec.filecoin.io/systems/filecoin\\_token/token\\_allocation/](https://spec.filecoin.io/systems/filecoin_token/token_allocation/)
12. <https://www.stakingrewards.com/asset/bittensor>
13. <https://www.stakingrewards.com/asset/bittensor/calculator>

14. <https://www.gate.com/learn/course/de-pin-deep-dives-bittensor/tao-tokenomics>
15. <https://www.nadcab.com/blog/what-is-depin>
16. <https://www.gate.com/learn/articles/dimo-decentralized-revolution-of-vehicle-data/2789>
17. <https://www.bittrue.com/blog/get-to-know-dimo-crypto-tokenomics>
18. <https://website.chainup.com/marketupdates/Understanding-The-DePIN-Economics>
19. <https://www.gate.com/learn/articles/revenue-models-of-bandwidth-sharing-de-pin-projects/6257>
20. <https://kaisar.io/blog/economic-incentives-in-depin/>
21. <https://onchain.org/magazine/depin-business-models-weaving-the-new-wweb3/>
22. <https://onchain.org/magazine/what-is-depin-a-user-centric-model-for-a-web3-world/>
23. <https://www.binance.com/en-IN/square/post/12227884320665>
24. <https://depinhub.io/blog/010-depin-tokenomics>
25. <https://coinmarketcap.com/academy/article/what-is-render-network-rndr>
26. <https://coinswitch.co/price/akash-network-price-in-india>
27. <https://consensys.io/blog/your-guide-to-ethereum-validator-staking-rewards>
28. <https://github.com/akash-network/community/blob/main/sig-economics/akt20-prop/README.md>
29. <https://docs.sui.io/concepts/tokenomics>
30. <https://www.coinbase.com/price/akash-network>
31. <https://io.net/docs/guides/staking/staking>
32. <https://www.youtube.com/watch?v=qEkMayVgHUg>
33. <https://ideausher.com/blog/build-ai-inference-marketplace-using-aioz-network/>
34. <https://solanacompass.com/projects/grass>
35. <https://coinbureau.com/review/aioz-network-review/>
36. <https://www.kucoin.com/learn/crypto/what-is-grass-network-and-how-to-earn-passive-income-from-it>
37. <https://docs.aioz.network/overview/aioz-tokenomics>
38. <https://stakin.com/blog/grass-rewards-and-token-utility-explained>
39. <https://dataunions.org/token-incentives/>
40. <https://www.mexc.com/crypto-pulse/article/aioz-network-investment-analysis-57124>