Tokenomics on Mina
Audit Report

This paper, in response to the Community Advancement RFP: 'Tokenomics in Mina Report', examines Mina's tokenomics, peer analysis, and options analysis to enhance growth and development.

Content

Intro

Mina is a lightweight blockchain that leverages recursive zero-knowledge proofs (zk-SNARKs) to enable anyone to verify the network using only a 22 KB proof, regardless of the blockchain's overall size. This approach ensures scalability, decentralization, and accessibility. Mina powers privacy-focused applications, verifiable data sharing, and trustless interactions, fostering a secure digital ecosystem. It uses the Ouroboros Samasika proof-of-stake (PoS) protocol for efficient consensus and supports zkApps for seamless, private, and energy-efficient development.

This report delves into the economic design and tokenomics of Mina, examining its token distribution, inflation, utility, incentives/rewards, consensus, and governance mechanisms. It evaluates how these components contribute to network sustainability, decentralized participation, and long-term value creation.

The report provides a summary of findings followed by three sections and an appendix:

1. Historical Analysis: Mina tokenomics today
2. Peer Analysis: Cardano, Starknet, Algorand, and Near
3. Options Analysis: Approaches to sustainable, decentralized, long-term value creation
4. Appendix: Simulations

TL;DR of the Mina Audit Report

This audit report analyzes the tokenomics of Mina Protocol, focusing on its economic design, peer analysis, and potential improvements to ensure long-term sustainability and growth. This analysis is based on historical blockchain data pulled from Mina Foundation in the case of Mina Protocol, and from other blockchain data providers[1] in the case of peer analysis.

Historical Analysis

Mina's performance has substantially tracked macro-cryptoeconomic trends. Transaction volume has not meaningfully increased over the observed period. Inflation is on the high end at 9% which has likely contributed to healthy decentralization with ~200 validators. Despite the removal of supercharged rewards in June 2024, reducing inflation from 12% to its current level, there was no meaningful impact on the number of validators over the following three months.

On the other hand, validators have decreased 50% since the beginning of October 2024. This can likely be attributed to the removal of sanctioned countries from the Mina Foundation delegation program and reduction in Mina Foundation delegation program participants from ~240 to 80 over the similar period.

Challenges: Reliance on inflationary rewards, lack of deflationary mechanisms, and absence of protocol-level fees or a decentralized treasury. Even with increased adoption, the current economy lacks mechanisms for value accrual from user interactions and primarily depends on inflationary emissions to maintain attractiveness.

Peer Analysis

We compared Mina with Cardano, Algorand, Starknet, and Near on factors like inflation, staking, treasury models, and fee structures. This set of peer comparisons were chosen based on similarities in consensus mechanisms, ZK-focus, and decentralization properties.

Some of the key takeaways are:

- Mina has the highest inflation rate, nearly twice that of its peers, with no deflationary mechanisms
- Mina has a similar market cap and user base to Starknet but with lower transaction volume.
- Mina is the only protocol with no protocol fees, unlike the other networks that rely on transaction fees for revenue[2].
- High staking ratio compared to the other chains.
- Mina is the only protocol with no decentralized treasury.

[1] Detailed links to data sources are provided in the Peer analysis section

[2] Cardano and NEAR have fee split mechanisms, with Cardano directing 80% of rewards to validators and 20% to the treasury, while NEAR burns 70% of fees and gives 30% to developers (not validators). Starknet currently sends all fees to validators but is working on introducing a split in the future. Algorand burns all fees, with no direct validator or treasury allocation.

When looking at the token price movement, Mina has closely tracked its peers. Starknet and Near appear to have experienced the same spikes and dips as Mina over the past year. This suggests that macroeconomic trends in the crypto industry as a whole have the greatest impact on price movements.

Options Analysis

Mina's inflation rate is relatively high compared to its peers. Additionally, the protocol lacks deflationary mechanisms and sustainable treasury replenishment strategies to support long-term growth.

Here is a summary of the potential improvements to consider:

- **Inflation Control**: Gradual reduction of inflation rates could stabilize token value and reduce sell pressure. This approach should be combined with a gradual shift toward relying more on transaction fees.
- **Protocol Fees**: Introducing small protocol fees might generate a sustainable revenue stream for a decentralized treasury and the introduction of token burns.
- **Rewards Splits**: Allocating a portion of block rewards to a treasury could fund ecosystem growth and community initiatives.
- **Token Locking**: Token locking could eventually reduce staking participation, increasing rewards for remaining delegators. Alternatively, the protocol can cap the rewards at current APY levels, and redirect the **Undistributed Rewards**[3] from reduced staking to fund a decentralized treasury.

However, no single mechanism is effective in isolation; a combination of multiple strategies is required to achieve optimal results.

Appendix: Simulations

The appendix contains various scenarios modeling the effects of inflation control, protocol fees, rewards splits, and token locking, showing potential impacts on token price, buy pressure, and treasury growth. These simulations were used to inform the options analysis and recommendation.

These simulations are meant to spur discussion, empowering the Mina community to collectively evaluate and prioritize changes based on the protocol's vision and needs. For detailed simulations and assumptions, refer to the appendix.

[3] Given the blockchain's reward payout structure, a smaller delegating pool would mean each delegator generates more rewards. At the same time, BPs are rewarded proportionally to the percentage of delegation received; so even if total delegated amount decreases, if a BP receives the same percentage of delegation, the BPs reward levels will remain unchanged. In this scenario "undistributed" rewards refer to the "new excess rewards" generated for the delegator in a reduced delegation scenario. The community could decide to redirect all or a portion of the "new excess rewards" to fund the decentralized treasury.

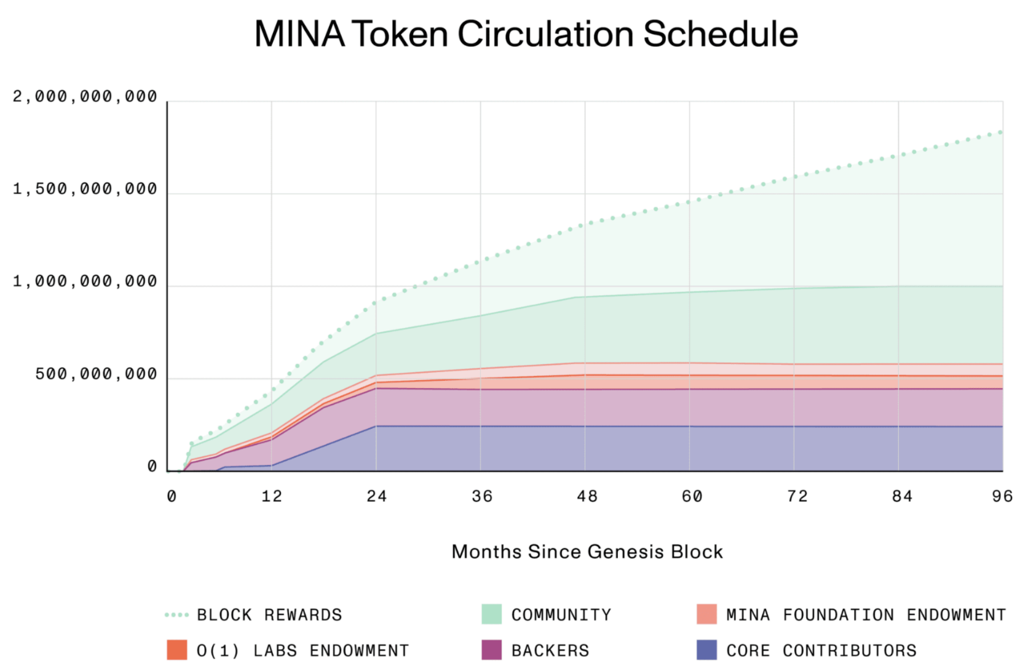
1. Historical Analysis

This section will focus on data from Mina's inception to January 1, 2025, covering its key economic parameters.

1.1 Existing economic parameters

1.1.1 Token supply and distribution

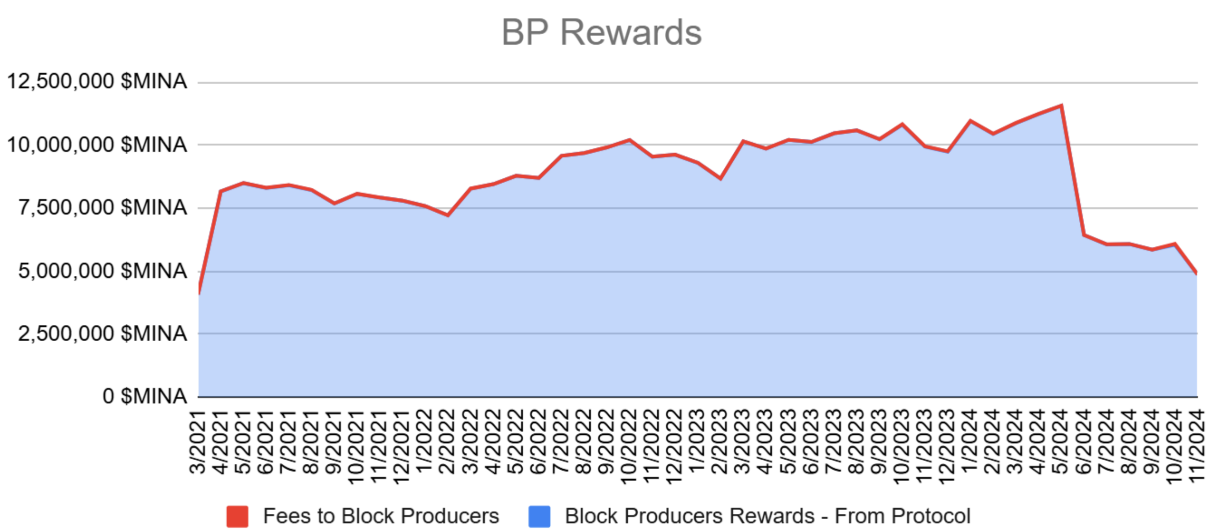
- Initial Supply: At mainnet launch in March 2021, Mina had an initial distribution of 805,385,694 MINA tokens.1
- Current Circulating Supply: As of January 5, 2025, the circulating supply is approximately 1,208,165,879 MINA tokens. 2
- Allocation Breakdown:
    - Community: 42.3% (approximately 340,000,000 MINA)
    - Core Contributors: 23.6% (approximately 190,000,000 MINA)
    - Backers: 20.5% (approximately 165,000,000 MINA)
    - O(1) Labs Endowment: 7.5% (approximately 60,000,000 MINA)
    - Mina Foundation Endowment: 6.0% (approximately 50,000,000 MINA) 3
- Vesting Schedules: The majority of tokens were subject to lock-ups at launch, with various vesting periods extending up to 8 years. 4



1.1.2 Inflation and Deflation Mechanisms

- **Annual Inflation Rate:** Initially set at 12%, now around 9%, with plans to stabilize at 7%.
- Deflationary Mechanisms: None implemented (e.g., no token burns).

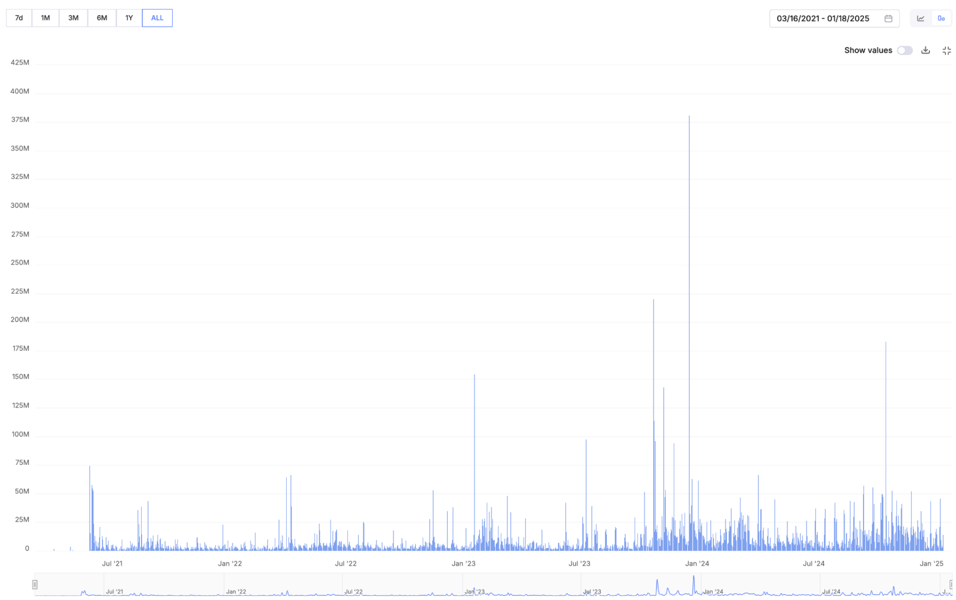
MONTHS FROM LAUNCH	INFLATION TARGET[1]
0–23	12%
24–29	11%
30–35	10%
36–41	9%
42–47	8%
48 onwards	7%



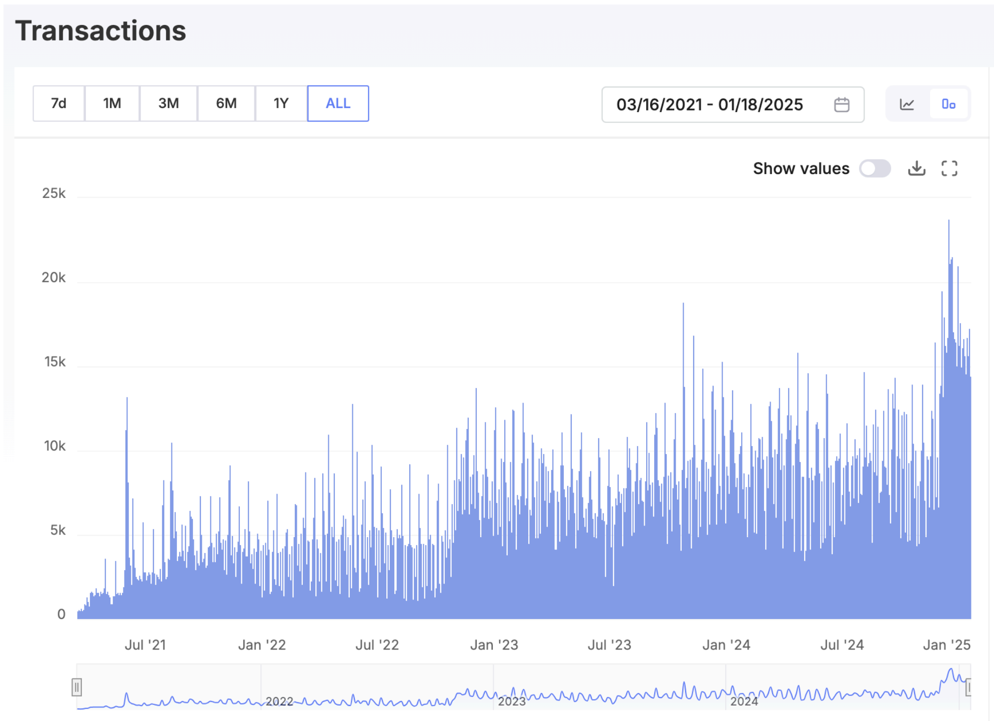
Description: The graph above highlights the rewards allocated to block producers since launch, distinguished between rewards from the protocol (inflation emissions) and user fees. Due to the significant difference in amounts, block reward values are displayed on the right axis, while user fees are on the left. We notice from this graph that the rewards to block producers dropped significantly after the supercharged rewards stopped. Block rewards are now set at **720 MINA per block** for both locked and unlocked accounts. Previously, block producers with **unlocked accounts** received "supercharged rewards" of **1440 MINA per block**, while those with **locked accounts** received **720 MINA per block**. This distinction existed prior to the recent changes, which have now equalized the rewards for all block producers at **720 MINA per block**, regardless of account status.

1.1.3 Transaction volumes and user adoption

- Transaction volumes have not meaningfully increased, although a recent modest increase has been seen since the Berkeley upgrade although this increase is from ledger transactions, not zkApp transactions.
- Mina's lightweight zk-SNARK design encourages accessibility but adoption is still modest compared to larger ecosystems.



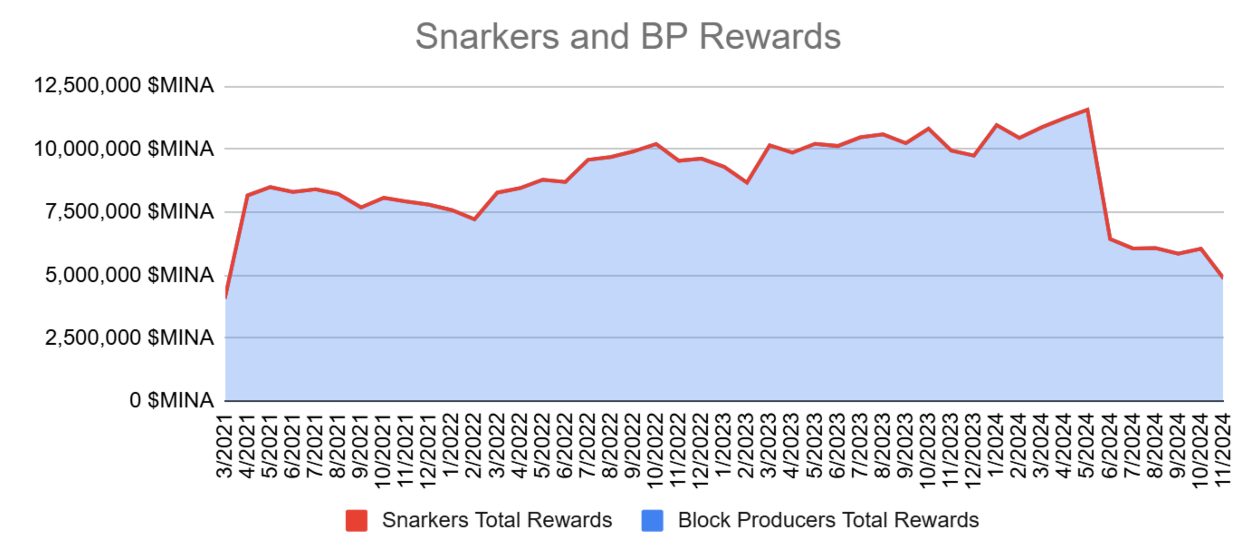
https://minascan.io/mainnet/analytics/transactions/transaction%20volume



https://minascan.io/mainnet/analytics/transactions/transactions

1.1.4 Fees and revenue

All fees are determined by users and paid to block producers. Block producers share a percentage of these fees with SNARK workers.



Description: The graph above highlights the rewards allocated to block producers and snarkers since launch. Notably, the snarker rewards are minimal when compared to BP rewards.

There are currently **no protocol fees in Mina**. Lack of protocol fees limits sustainability and treasury funding needed for ongoing support of public goods and grants.

1.1.5 Incentives and rewards

Mina Protocol's incentive structure revolves around four main economic agents: **Block Producers**, **SNARK Workers, Delegators, zkApps,** and **Users.**

Key Incentives:

1. **Block Producers:**
    - Block producers are incentivized through block production rewards.
    - The selection of block producers is based on a probabilistic mechanism tied to stake weight, ensuring fair and decentralized block production opportunities.
    - Block producers are also responsible for redistributing rewards to delegators who contribute their stake.
2. **SNARK Workers:**
    - SNARK workers are tasked with generating zk-SNARK proofs necessary for maintaining the network's lightweight blockchain structure.
    - They earn rewards for producing SNARKs, aligning their interests with the network's need for computational resources.
    - However, intense competition among SNARK workers has led to a "race to the bottom," where most fees for SNARK generation are set at or near zero, potentially discouraging participation.
3. **Delegators**
    - Delegators can delegate their staked tokens to block producers, to earn a portion of their block rewards.
    - The total delegated stake for a given validator influences their chances of being selected for block production. In other words, the more delegated stake a validator has, the higher their potential revenue generation.
4. **zkApps**
    - zkApps could become a key driver of Mina's economy by generating transaction activity and increasing network utility. As adoption grows, developers will pay fees to deploy zkApps, driving user adoption and transactions.
5. **Inflation-Based Rewards:**
    - Incentives are funded through token inflation, supporting both block producers and SNARK workers.
    - While this promotes active participation, it poses a challenge to long-term sustainability without sufficient demand for the MINA token.

1.1.6 Staking and validator economy

Staking Rewards and Distribution

- **Annual Inflation Rate:** Initially set at 12%, decreasing over time to a steady-state of 7%. [Mina Protocol]
- **Supercharged Rewards:** From March 2021 up until June 2024, representing 39 months in total, unlocked accounts received double the block rewards compared to locked accounts.

Validator Economics

- **Incentives:** Validators earn rewards from block production and transaction fees.
- **Participation:** The protocol's design allows for broad participation without significant hardware requirements.

Strengths and Weaknesses

- **Strengths:**
  - Low barrier to entry promotes decentralization.
  - Staking rewards incentivize network security.
- **Weaknesses:**
  - High inflation rates may dilute token value.
  - Potential centralization if large holders dominate staking.

1.1.7 Token utility

Current Token Utility

- **Staking:** MINA tokens can be staked to participate in block production and earn rewards.
- **zkApps**: Developers will pay fees to deploy **zkApps**, and users will pay fees to interact with them.
- **Transaction Fees:** Used to pay for transactions and SNARK proofs within the network.
- **Governance:** Token holders can participate in protocol governance decisions.
- **Account Creation Fee:** For all new accounts created by users, 1 MINA is taken out of circulation in the process

1.1.8 Token Price

Mina

The MINA token price seems to be largely influenced by the macro conditions, following macro trends largely influenced by BTC price.

1.2 Benefits

Decentralization and Accessibility:

- The protocol's low hardware requirements and lack of staking lock-up encourage broad participation, contributing to Mina's consistently high staking ratio compared to other L1s. This design enhances decentralization and provides flexibility for users.

Staking Incentives:

- Generous inflation-based rewards drive active participation, ensuring a large validator network and robust security. Delegation opportunities also enable non-technical users to contribute and earn rewards, fostering community engagement.

Alignment of Economic Agents:

- The dual-agent model ensures incentives for both block producers and SNARK workers, maintaining security and efficient zk-SNARK generation. This alignment supports the network's scalability and functionality.

zkApps Adoption:

- zkApps represent a new opportunity to drive increased transaction volumes and user engagement, laying the foundation for long-term demand for MINA tokens as the ecosystem matures.

Cost Efficiency for Users:

- Mina's lack of protocol fees or token burns leads to lower transaction costs, enhancing usability and accessibility for applications and users.

Fair Validator Selection:

- The probabilistic mechanism tied to stake weight ensures equitable block production opportunities, preventing centralization and encouraging distributed participation.
- This keeps the section focused, concise, and aligned with the client's request to emphasize Mina's tokenomics benefits effectively.

1.3 Limitations

Reliance on Inflationary Emissions

- The majority of rewards for block producers come from token inflation rather than organic user activity, making the system unsustainable in the long term if demand for the MINA token does not grow significantly.
- High inflation can erode token value over time, making it less attractive and potentially unsustainable in the long run.

Lack of Deflationary Mechanisms

- There are no deflationary mechanisms (e.g., token burns) to counterbalance inflation, which could limit token value appreciation.
- Implementing token burns or similar deflationary mechanisms could help counteract inflation and improve token value over time.

No Protocol Revenue Model

- The protocol does not charge any protocol-level fees, instead it incorporates user-determined transaction fees to compensate block producers, in addition to block rewards. This limits the protocol's ability to generate direct revenue for sustainability.
- Introducing protocol-level fees or alternative monetization methods could ensure sustainable protocol growth and maintenance.

No Decentralized Treasury

- There is no decentralized treasury for the moment. A decentralized treasury is essential for the growth and success of L1 blockchains, funding development, community initiatives, and ecosystem expansion. Most L1s use treasury models to issue grants, incentivize developers, and support ecosystem projects, aligning incentives with long-term goals. Treasuries are replenished through transaction fees, slashing penalties, and staking rewards, ensuring sustainability and resilience. While Mina Protocol lacks a decentralized treasury, proposals aim to establish one to drive its growth and sustainability.
- Developing a replenishment mechanism for the decentralized treasury, such as splitting protocol transaction fees or allocating a portion of block rewards, could stimulate protocol growth and drive adoption.

Limited User Activity

- Expanding Mina’s utility in areas like AI, DeFi, and beyond, while incentivizing Web3 builders to develop on Mina, could accelerate ZKapp deployment and attract more users. Growth could also be driven by enabling Layer 2 chains to settle back to Mina’s L1, significantly boosting MINA’s demand and adoption.

Snark Workers Incentive Structures

- Near-zero fees for SNARK generation, potentially discouraging participation and long-term engagement.
- Revisiting SNARK worker incentives to mitigate the “race to the bottom” issue and ensure long-term sustainability of zk-SNARK generation.

2. Peer Analysis

2.1 Summary

As of 24 Jan 2025

Criteria	Mina[4]	Cardano[5]	Algorand	Starknet	Near
Total Supply	1.21 billion MINA[6]	45 billion ADA	10 billion ALGO[7]	10 billion STRK[8]	1.23 billion NEAR[9]
Inflation Rate	9% annually	~2.5% annually	~5% annually	Variable (max 4%)[10]	5% annually
Staking APY	8% to 12%	2% to 4%	5% to 8%	N/A	9% to 12%
Market Capitalization	$616.9 million	$35.18 billion	$3.52 billion[11]	$500 million[12]	$5.97 billion
Unique Users	259k	4.38M[13]	22M	300K[14]	900k[15]
Number of Validators	231	3,000[16]	3701	50	221[17]
Consensus Mechanism	Ouroboros Samisika, a variant of Proof-of-Stake.	Ouroboros PoS	Pure PoS	ZK-Rollup	Nightshade PoS (PoS with sharding)
Protocol Fees/Revenue	$0 daily	$100,000 daily	$2,390[18] daily	$2,5k daily[19]	$27,790 daily[20]
Staking Ratio	60%	60%[21]	17%[22]	30%	46%
Burn Mechanism	No	No	Yes	No	Yes
Locking for Staking	No	No	No	Yes	Yes
Delegation	Yes	Yes	Yes	No	Yes
Decentralized Treasury	No	Yes	Yes (controlled by foundation)	Yes	Yes

4 https://minascan.io/mainnet/home
5 https://www.binance.com/en/square/post/
6 https://coinmarketcap.com/currencies/mina/
7 https://coinmarketcap.com/currencies/algorand/
8 https://coinmarketcap.com/currencies/starknet-token/
9 https://coinmarketcap.com/currencies/near-protocol/
10 Capped at 4%, and tied to the staking ratio: token-minting-proposal
11 https://app.intotheblock.com/coin/ALGO/
12 https://app.intotheblock.com/coin/STRK/
13 https://app.intotheblock.com/coin/ADA/deep-dive?group=network&subgroup=addressStats
14 https://app.intotheblock.com/coin/ALGO/deep-dive?group=network&subgroup=addressStats
15 https://nearblocks.io/charts/addresses
16 https://www.litefinance.org/blog/for-beginners/how-to-trade-crypto/cardano.
17 https://nearblocks.io/node-explorer
18 https://tokenterminal.com/explorer/projects/algorand?v=Y2I4MDY0ZjRiNTAyZmNhMTliN2I1ZmE2
19 https://tokenterminal.com/explorer/projects/starknet
20 https://nearblocks.io/charts/txn-fee
21 https://www.coinbase.com/en-br/earn/staking/cardano
22 https://www.coinbase.com/en-br/earn/staking/algorand

Key Observations:

- Higher Inflation: Mina has nearly twice the inflation rate compared to other protocols, which impacts long-term token supply dynamics.
- Market Capitalization: Mina's market cap is similar to Starknet, another ZK-based project, and they share comparable unique user counts.
- No Protocol Fees: Mina is the only Layer 1 without protocol fees, distinguishing it from other networks that generate revenue through transaction fees. Cardano and NEAR have fee split mechanisms, with Cardano directing 80% of rewards to validators and 20% to the treasury, while NEAR burns 70% of fees and gives 30% to developers (not validators). Starknet currently sends all fees to validators but working on introducing a split in the future. Algorand burns all fees, with no direct validator or treasury allocation.
- High Staking Ratio: Mina exhibits a high staking ratio, which is expected given its inflationary model and lack of staking lock-up requirements.
- No Decentralized Treasury: Unlike its competitors, Mina does not have a decentralized treasury, which could impact ecosystem funding.

Token pricing

Cardano

Algorand

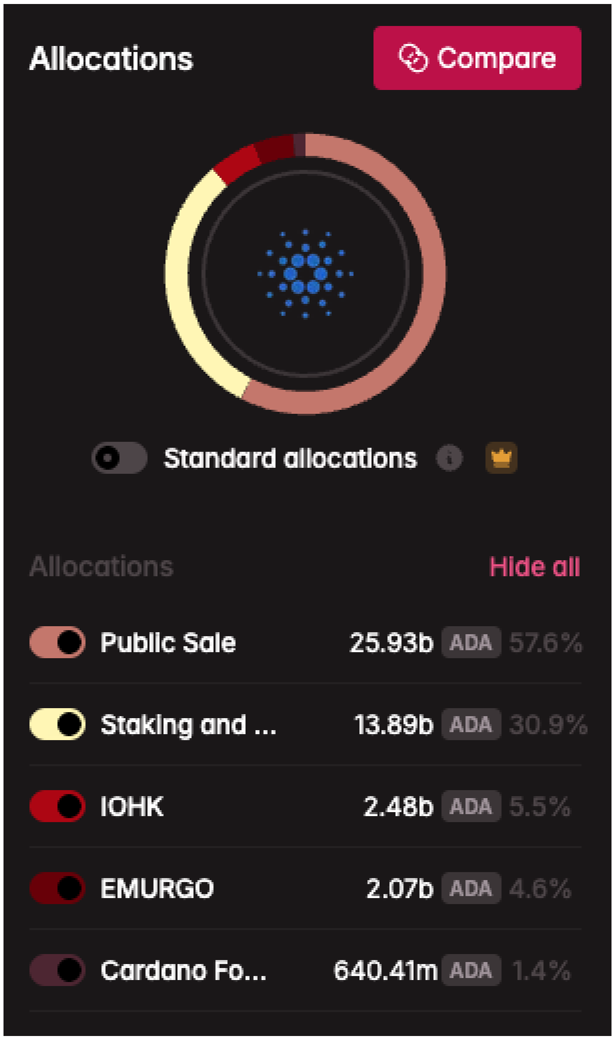
2

Near Protocol

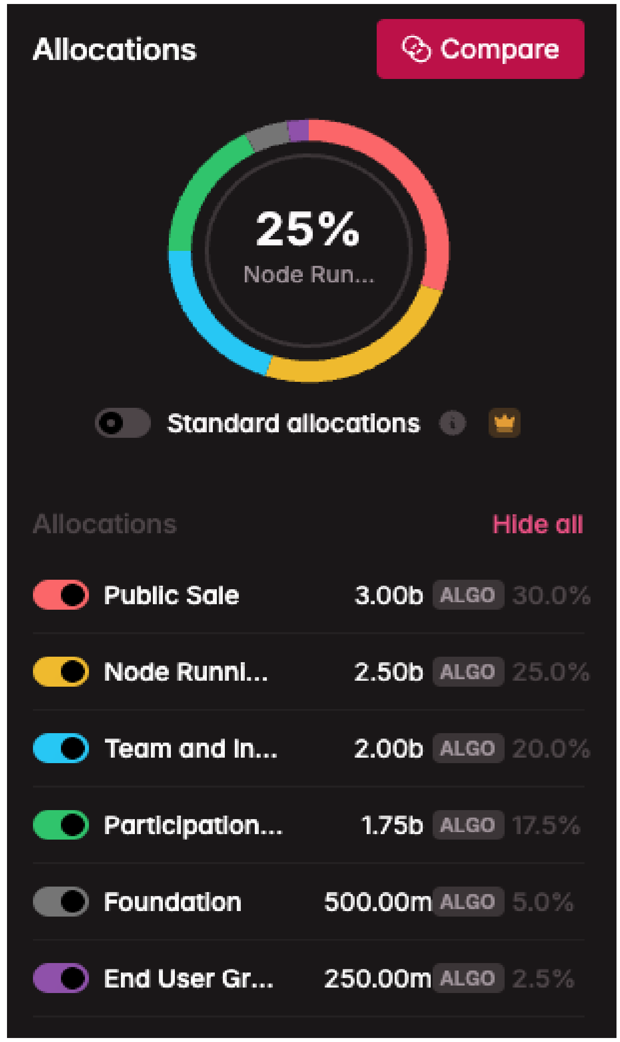
Starknet

2.2 Allocations

Cardano

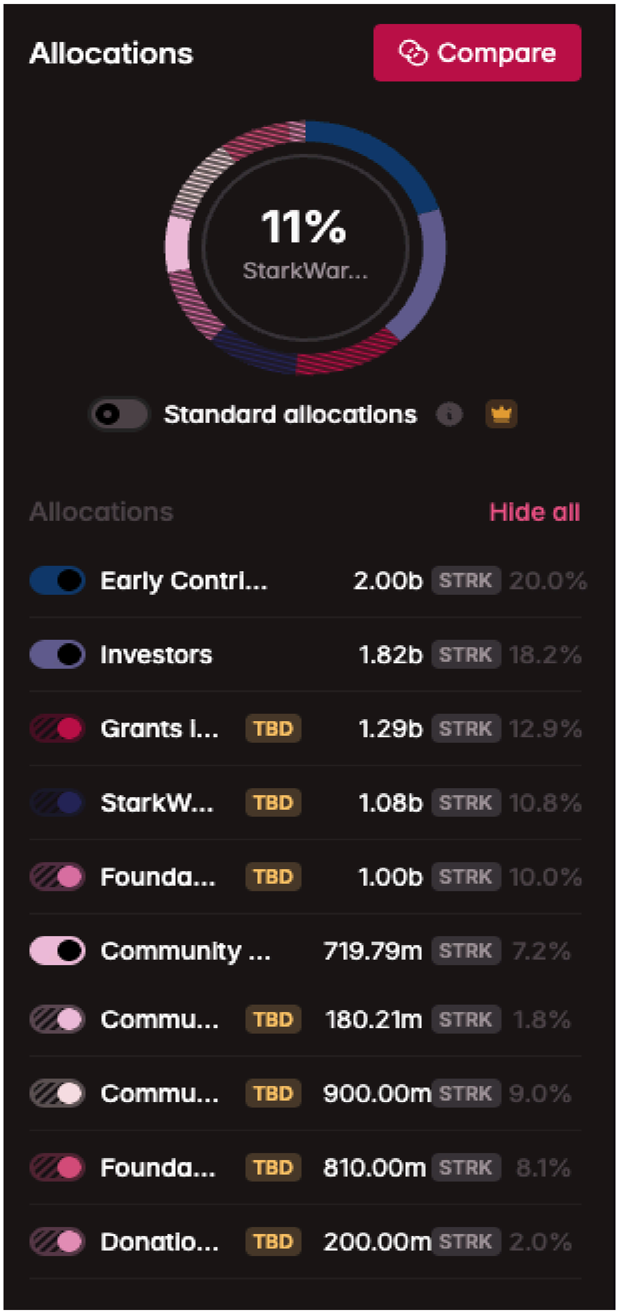


Algorand

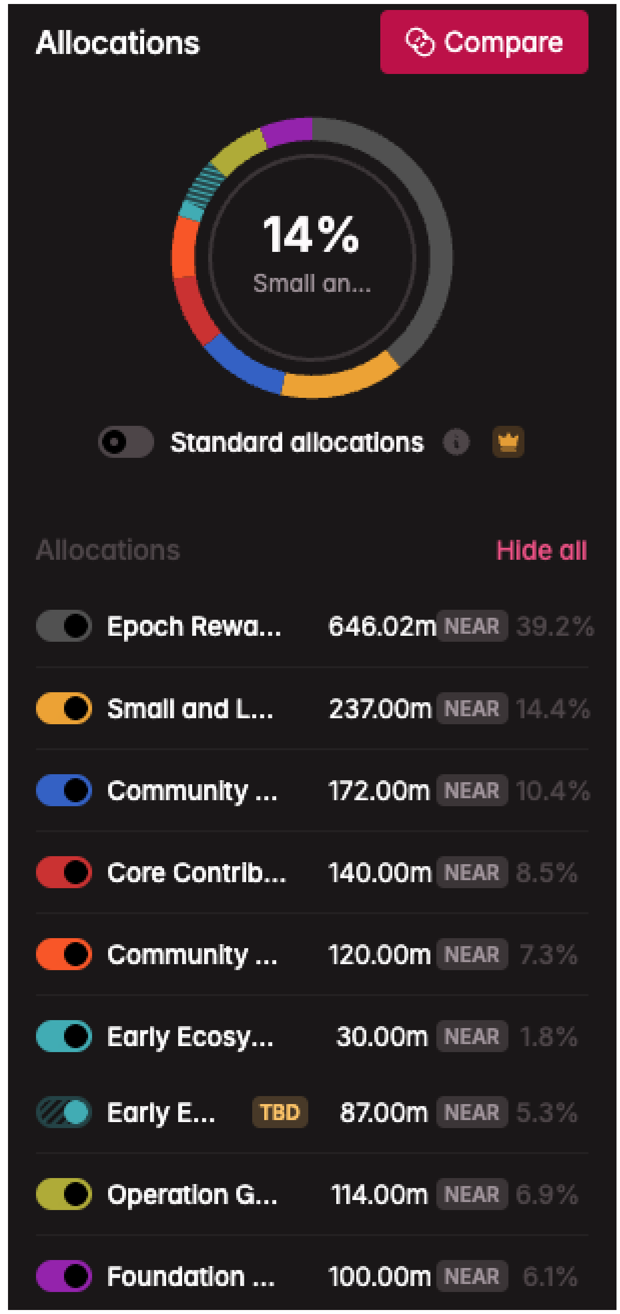


Both Cardano and Algorand had very large public sales : 57% and 30% of their respective total token supply. Cardano seems to have a smaller allocation to the team, that is potentially due to their super high valuation.

Starknet



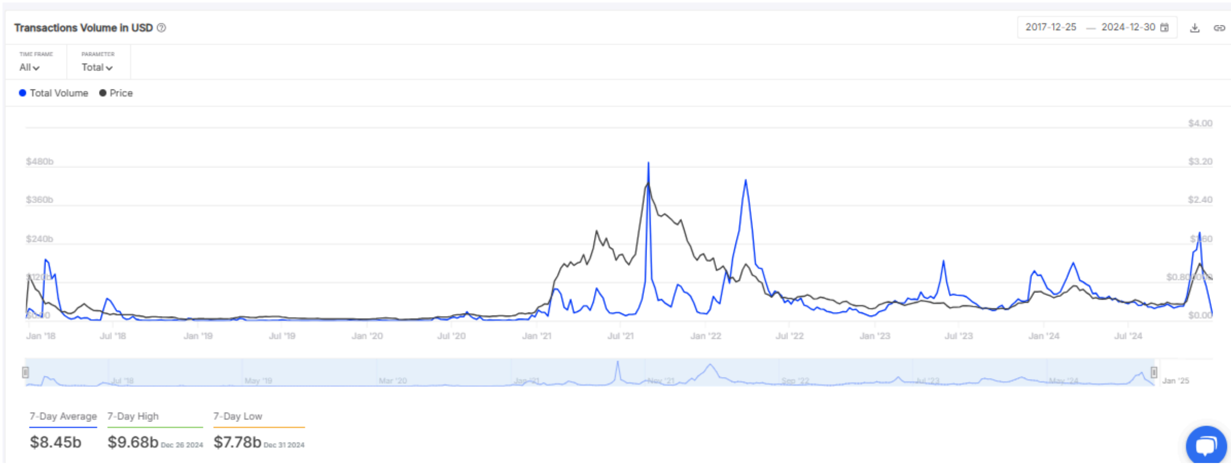
Near



Both Starknet and Near have higher allocations for investors and early supporters, but this didn't have a big impact on their token price action.

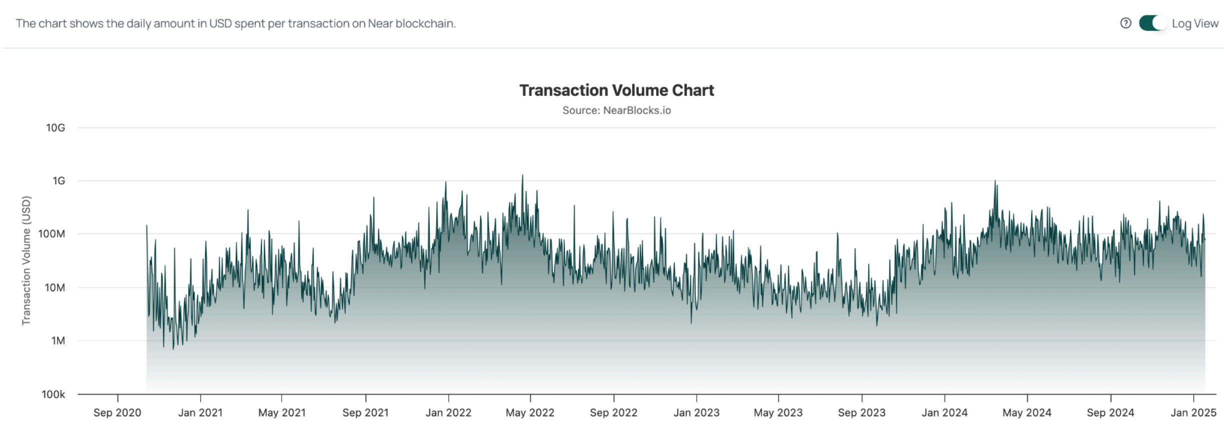
2.3 Transaction Volume

Cardano:



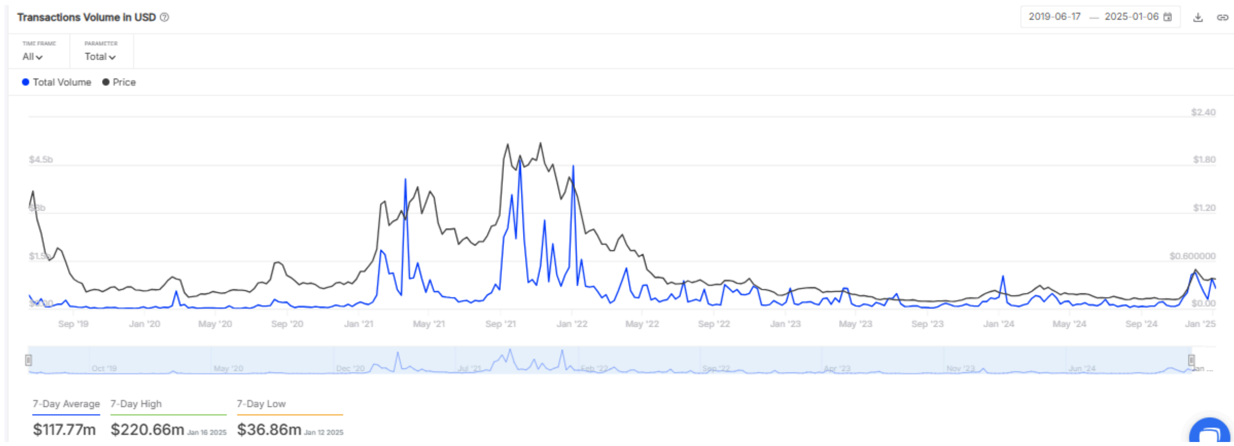
https://app.intotheblock.com/coin/ADA/deep-dive?group=network&subgroup=transactions

Near Protocol:



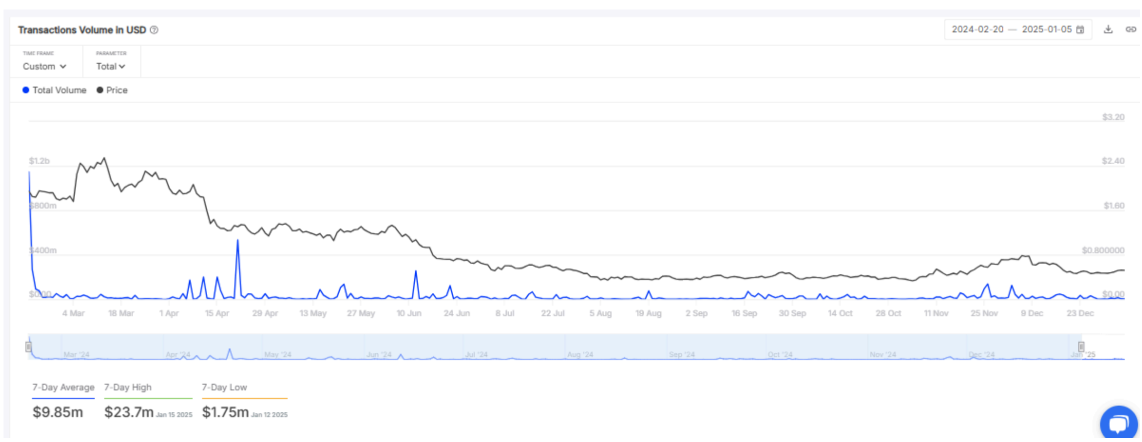
https://nearblocks.io/

Algorand:



https://app.intotheblock.com/coin/ALGO/deep-dive?group=network&subgroup=transactions

Starknet:



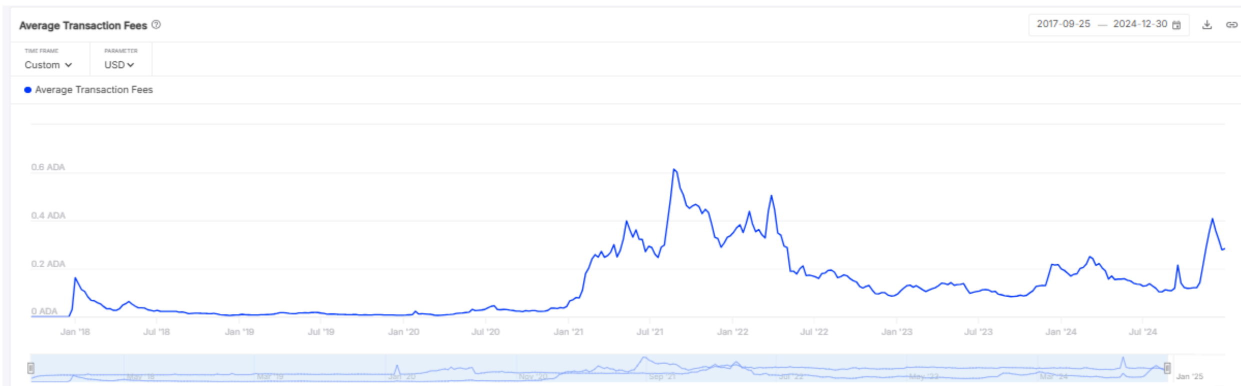
https://app.intotheblock.com/coin/STRK/deep-dive?group=network&subgroup=transactions

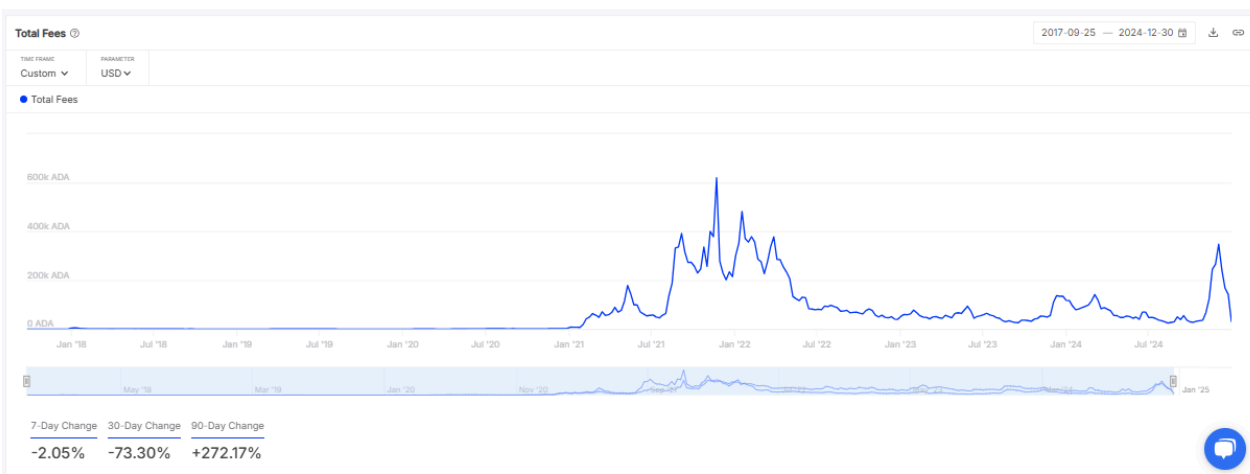
With the exception of Starknet, we notice disproportionate increases in transactions and transaction volumes during bull runs (notably the 2021 cycle).
Cardano, Near, and Algorand have significantly larger ecosystem partners and Dapps, resulting in higher transaction volumes and greater adoption overall.

2.4 Fees and Revenue

Cardano: https://docs.cardano.org/about-cardano/explore-more/fee-structure

Cardano's fee structure uses a formula a * size(tx) + bb, where aa reflects transaction size costs and bb serves as a baseline fee to prevent spam attacks, ensuring sustainability and security. Fees are pooled and distributed among block producers, delegators, and the treasury during an epoch, while parameters aa and bb can be adjusted via protocol updates to adapt to evolving system needs and economic conditions.





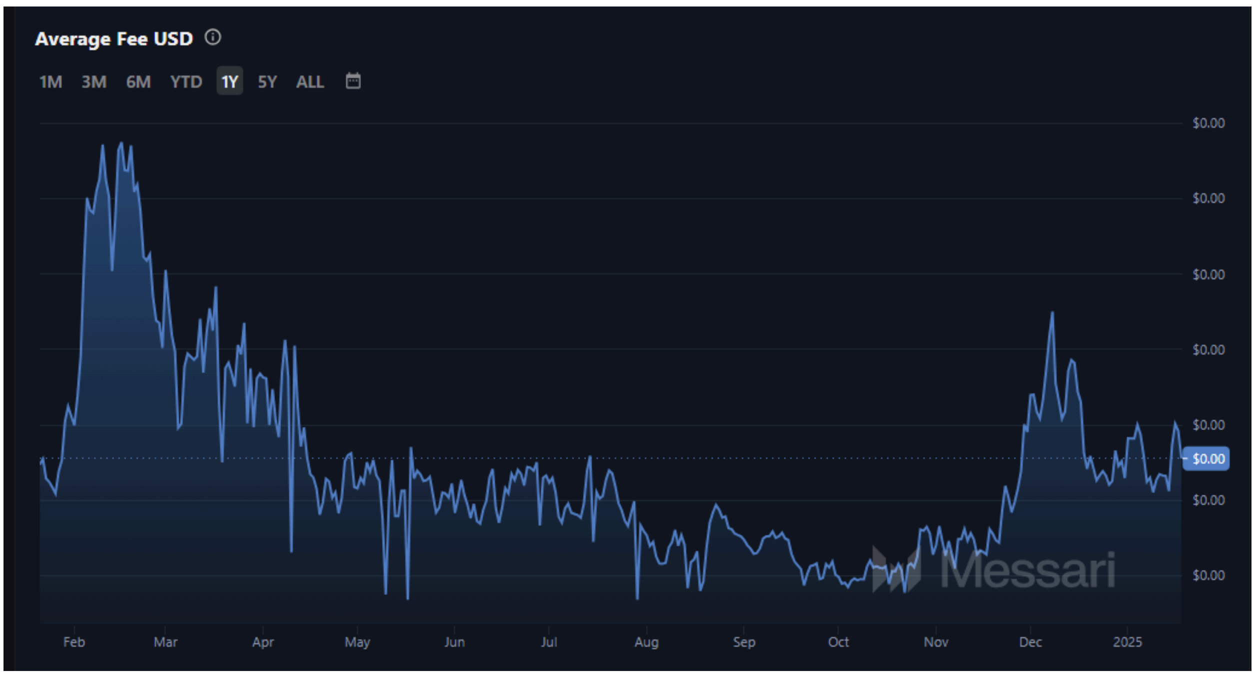
https://app.intotheblock.com/coin/ADA/deep-dive?group=network&subgroup=feesStats

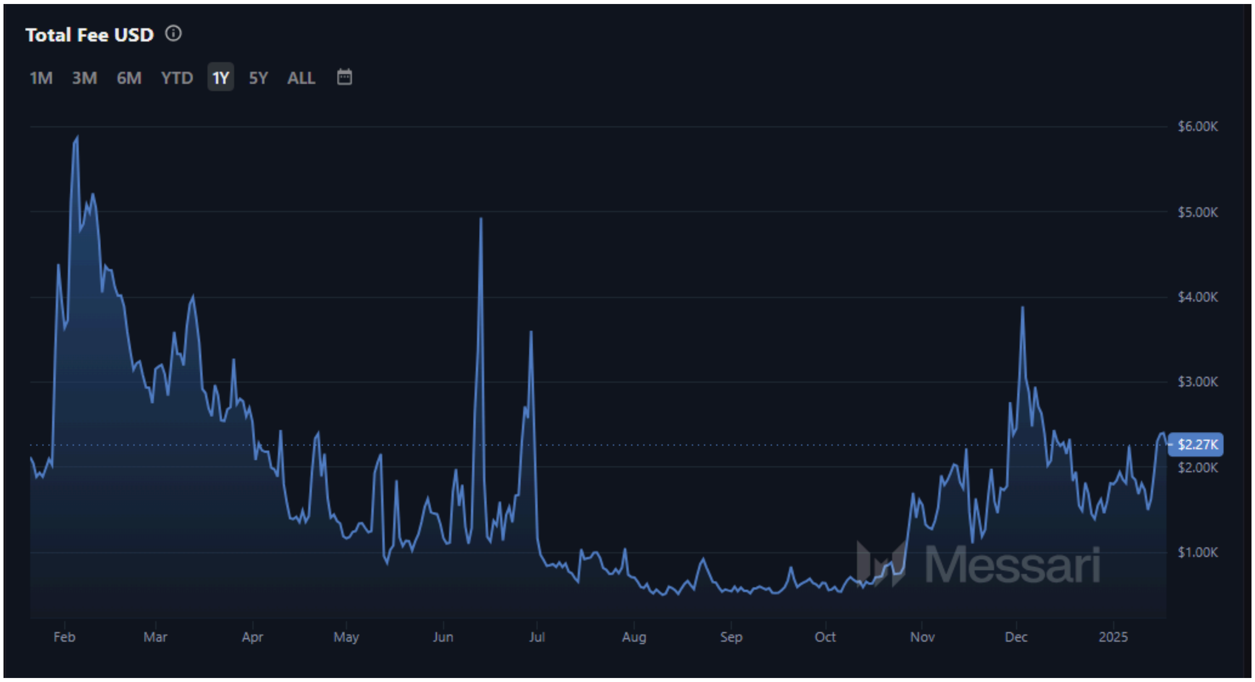
Near Protocol: https://docs.near.org/concepts/protocol/gas

NEAR's gas fee system charges a small $NEAR fee for every transaction based on deterministic gas units, with fees calculated using the formula: fee = gas_units * gas_price. Gas units represent compute, bandwidth, and storage resources, while gas prices adjust dynamically per block based on network demand. NEAR incentivizes developers by allocating 30% of gas fees burned during contract execution to the contract's account, fostering the creation of efficient and useful smart contracts.

Algorand: https://developer.algorand.org/docs/get-details/transactions/

Algorand's fee structure is based on transaction size and network congestion, with a minimum fee of 0.001 A. Fees are calculated using the formula: fee=max(current_fee_per_byte·len(txn_in_bytes),min_fee}. This ensures that during low congestion, the minimum fee applies, while higher fees are used when the network is congested. Fees can be set dynamically using suggested parameters from the Algorand SDK or manually as a flat fee, and pooled fees allow one transaction to cover fees for others in the same atomic group.





https://messari.io/project/algorand/charts/fees-and-revenue

Starknet:
https://docs.starknet.io/architecture-and-concepts/network-architecture/fee-mechanism/

Starknet's fee mechanism charges transaction fees on L2 based on computational complexity, on-chain data, L2→L1 messaging, and L2 payloads like calldata, events, and code. Fees are calculated atomically during execution using gas estimates, with dynamic gas pricing adjusting per block to reflect network demand.

2.5 Rewards Distribution Mechanisms and APY

Near Protocol

- **Rewards Distribution**: NEAR employs a high staking rewards model where validators and delegators earn proportional rewards based on their staked amount, the APY is . Rewards are distributed regularly to incentivize participation and ensure network security.
- **APY**: NEAR offers a competitive staking APY, ranging from 10% to 12%, depending on network activity and total tokens staked. The high APY is designed to attract validators and delegators, but it contributes to inflation if transaction fees do not scale adequately.

Algorand

- **Rewards Distribution**: Algorand takes an inclusive approach by distributing block rewards directly to all token holders, regardless of staking status. This mechanism ensures widespread participation but does not differentiate incentives for validators and active contributors.
- **APY**: Rewards APY has varied over time but is generally lower compared to other networks Like Near, often around 5%-6%. While accessible to all holders, the lack of enhanced rewards for validators may reduce their engagement.

Cardano

- **Rewards Distribution**: Cardano uses a pool-based staking system where rewards are distributed to validators (stake pool operators) and delegators based on their contributions to the network. Validators define and earn a fixed pool fee and a percentage of the rewards, while delegators share in the remaining rewards.
- **APY**: Staking APY typically falls in the range of 3% to 5%, varying with network parameters and staking pool performance. Cardano’s focus on gradual inflation and sustainability balances rewards with long-term economic stability.

Starknet

- **Rewards Distribution**: Starknet minimizes reliance on traditional block rewards due to its rollup architecture. Validators primarily earn from transaction fees rather than block rewards. The model is designed to reduce inflationary pressure on the token supply.
- **APY**: As Starknet focuses more on transaction-based incentives, staking APY is relatively low compared to inflation-heavy models, typically under 3%. This design prioritizes long-term token value over high rewards

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Key Takeaways

- **APY Variance**: NEAR offers the highest APY among the four protocols, leveraging high inflation to attract participation, while Cardano and Algorand maintain moderate APYs, emphasizing sustainability. Starknet stands out with a low APY, relying instead on transaction-based incentives.
- **Inclusivity vs. Activity Focus**: Algorand's equal distribution model prioritizes inclusivity, whereas Cardano and NEAR focus rewards on active participants such as validators and delegators. Starknet's approach minimizes inflation by tying rewards to actual network usage.
- **Sustainability**: Cardano and Starknet adopt more sustainable models by curbing inflation and relying on user activity, whereas NEAR and Algorand face potential challenges from inflation-driven rewards over the long term.

2.6 Limitations and Benefits

Cardano

- **Block Rewards**
  - Benefits: Declining rewards balanced by treasury funding promote sustainability and validator participation.
  - Limitations: Relies heavily on future transaction fees, creating uncertainty for long-term incentives.
- **Transaction Fees**
  - Benefits: Fixed fees ensure predictability and prevent spam.
  - Limitations: Fixed fees or high fees deter low-value transactions.
- **Treasury**
  - Benefits: Funds ecosystem growth, reducing reliance on external funding.
  - Limitations: Slow governance can delay developments.

Algorand

- **Block Rewards**
  - Benefits: Direct distribution to all holders promotes inclusivity.
  - Limitations: Equal distribution reduces incentives for active participants.
- **Transaction Fees**
  - Benefits: Low, predictable fees attract high-frequency users.
  - Limitations: Flat fees may fail to scale under heavy demand.
- **Treasury**
  - Benefits: Actively funds projects and innovation.
  - Limitations: Centralized foundation raises transparency concerns.

Starknet

- **Block Rewards**
  - Benefits: Rollup architecture minimizes inflation.
  - Limitations: Heavy reliance on transaction fees may deter validators.
- **Transaction Fees**
  - Benefits: Complexity-based fees optimize resource use.
  - Limitations: Dynamic pricing can deter users seeking predictability.
- **Treasury**
  - Benefits: Funds scaling and developer grants.
  - Limitations: Early contributor reliance centralizes decisions.

NEAR Protocol

- **Block Rewards**
  - Benefits: High staking rewards ensure security and participation.
  - Limitations: Inflation risks if fees don't scale with adoption.
- **Transaction Fees**
  - Benefits: Dynamic pricing balances cost and usability.
  - Limitations: Complexity can deter newcomers.
- **Treasury**
  - Benefits: Decentralized funding supports ecosystem growth.
  - Limitations: Reliance on transaction fees is risky if adoption lags.

3. Options Analysis

This section considers options for changes to Mina's tokenomics, the simulated impacts of those changes, and finally our recommendations for changes. Our simulations focused on comparing the impact of different protocol changes on token price, validator profitability, decentralized treasury growth, staking participation, and overall sustainability.
The simulations and recommendations are meant to spur discussion, empowering the Mina community to collectively evaluate and prioritize changes based on the protocol's vision and needs.

3.1 Potential Changes and Impacts

3.1.1 Introduce a protocol fee

Experiment: Implement a baseline protocol fee allocating 50% to a burning mechanism, 20% to Validators, and 30% to a decentralized treasury.

We tested multiple fee models—fixed, dynamic, and hybrid—along with varying fee values and percentage allocations. The exact fee structure can be finalized in a future phase. The primary objective was to evaluate the impact of this mechanism under different user volume scenarios to assess its effects on token price, validator profitability, and overall protocol sustainability.

Simulation Outcomes:

- Increases protocol revenue, creating a sustainable funding mechanism.
- Strengthens buy pressure on MINA, contributing to price stabilization through supply reduction.
- Treasury funding scales with transaction volume, reinforcing long-term ecosystem sustainability.

Analysis:

Our simulations show that the net effect on token price is dependent on transaction volume growth. At low volumes, fee revenue remains marginal, limiting its impact on buy pressure and treasury replenishment. At higher volumes, the burning mechanism and treasury allocation generate meaningful deflationary effects.

All Simulation results: Protocol Fee

3.1.2 Introduce Token Locking

Experiment: Introduce a token locking mechanism, assuming a decrease in staking participation as a result. The Decrease in staking ratio opens the possibility of redirecting the "undistributed rewards" to a decentralized treasury, funding the protocol growth.

Simulation Outcomes:

- Redirects a portion of block rewards to a decentralized treasury while maintaining competitive APY for active stakers.
- Can increase long-term holding incentives, reducing circulating supply.
- Potential security trade-off We need to continuously monitor the staking ratio to ensure it remains healthy, especially if participation declines beyond a critical threshold, in which cases, we can incentivize higher staking participation by increasing the APY cap.

Analysis:

Simulations compared multiple **staking vs. locking scenarios** to determine the threshold where staking participation remains sufficient to secure the network. While the model confirmed that token locking helps reinforce long-term value accrual, it also highlighted the importance of **ensuring staking remains attractive enough** to prevent excessive collateral reduction.

All Simulation results: [Token Locking]

3.1.3 Rewards Split

Experiment: Direct **20% of block rewards** to a decentralized treasury.

Simulation Outcomes:

- Ensures **continuous ecosystem funding** for grants, community initiatives, and protocol growth.
- **Reduces sell pressure**, contributing to greater price stability.
- Helps sustain long-term incentives while supporting protocol-level reinvestment.
- **Reduced APY**, This approach lowers validator profitability and staking APY in the short term but could have a positive long-term impact. The reduction should be offset by increased token value, ultimately compensating for the lower APY.

Analysis:

By running simulations under various market conditions, we observed that while **a reduction in BP rewards could impact short-term incentives**, the long-term benefit comes from **less selling pressure**, which maintains stability. The treasury's ability to reinvest also plays a crucial role in ecosystem expansion, offsetting potential downsides.

All Simulation results: Block Rewards Split

3.1.4 Inflation Control

Change: Gradually reduce inflation rates from **9% to 7%**, then to **5%** over time. This translates to a reduction in **block rewards from 720 MINA to 540 MINA**, and eventually to **360 MINA**. The first reduction can be implemented immediately to help sustain the token economy, while the second reduction should be contingent on an increase in protocol transaction volume.

Validated Outcomes from Simulations:

- **Lowers dilution**, improving token stability and reducing long-term sell pressure.
- **Encourages token accumulation**, as fewer new tokens are introduced into circulation.
- **Reduced APY**, This approach lowers validator profitability and staking APY in the short term but is expected to have a positive long-term impact. The reduction should be offset by increased token value, ultimately compensating for the lower APY.

Comparative Analysis:

These simulations compared different **inflation reduction scenarios** and their impact on BP incentives and token price. The results indicate that if **inflation is reduced too quickly without an offsetting increase in transaction fees or staking rewards**, BP participation could be affected. However, if token price adjusts positively, BPs could maintain profitability despite lower emissions.

All Simulation results: Inflation

For detailed analysis and assumptions, please refer to the appendix

Options Summary Matrix

Criteria	Change	Pros	Cons
Inflation Rate	Reduce from 9% to 5% over time	Reducing inflation lowers sell pressure and helps stabilize token price. It also increases long-term value accrual by slowing down supply expansion.	**Impacts block producer profitability**, Lower (BP) profitability may require alternative incentives (e.g., increase in fee revenue) to maintain BP participation and security.
Protocol Revenue Potential Sources:	Yes	Establishing revenue sources creates a sustainable funding model for protocol development, grants, and ecosystem growth through a decentralized treasury. adoption	Implementing revenue sources requires governance approval, which may lead to resistance from some community members who are negatively impacted (e.g., block producers if the mechanism reduces their profitability).
a) Protocol fee	Introduce protocol fee in addition to the current priority fees	A small protocol fee, with 80% burned and 20% allocated to the treasury, creates a deflationary effect, stabilizing token price while ensuring continuous funding for network development.	Introducing fees may become a friction point, and slow down user adoption. It is important to stay competitive compared to other L1/L2 blockchains.
b) Rewards split	Increase from 0% to 20%	Redirecting a portion (e.g., 20%) of block rewards to the treasury provides stable funding for grants and network adoption without overly impacting BP profitability.	Reducing BP rewards could discourage participation, especially for smaller validators, potentially leading to network centralization risks.
c) Token locking	Introduce token lockup on stake	This can be an alternative to point (b) above. Token locking reduces circulating supply, which favors increases in buy pressure, and should decrease the staking ratio. The rewards that remain undistributed can then be allocated to the treasury **without adversely affecting BP or Delegator rewards.**[1]	The downsides to such a mechanism are: lower staking participation might reduce the network security, and increase centralization risks. Users unwilling to lock might sell their tokens instead of holding without earning rewards, increasing sell pressure without reducing participation in delegation.

Note (1): Given the blockchain's reward payout structure, a smaller delegating pool would mean each delegator generates more rewards. At the same time, BPs are rewarded proportionally to the percentage of delegation received; so even if total delegated amount decreases, if a BP receives the same percentage of delegation, the BPs reward levels will remain unchanged. In this scenario "undistributed" rewards refer to the "new excess rewards" generated for the delegator in a reduced delegation scenario. The community could decide to redirect all or a portion of the "new excess rewards" to fund the decentralized treasury.

3.2 Recommendations

Our key findings highlight two primary issues to address to foster long-term growth and stability:

1. Reduce sell-side pressure and inflation control
2. Protocol value capture

The Mina Protocol can ensure long-term sustainability by reducing inflationary pressures and aligning incentives across all stakeholders. No single mechanism can achieve these goals effectively; rather, a strategic combination of inflation control, staking incentives, and value capture mechanisms is required.

These recommendations focus on gradually reducing inflation, optimizing staking rewards, and ensuring the protocol captures value for sustained growth. Each proposed mechanism is designed to balance sustainability with validator profitability, ensuring that Mina remains secure, decentralized, and competitive as it evolves into a settlement layer for ZK applications.

1. Reduce Block Rewards Over Time

Description

Gradually decreasing block rewards aims to curb inflation and reduce sell-side pressure on the token. This approach aligns Mina with industry standards for sustainable token issuance while ensuring long-term economic stability. Instead of an abrupt reduction, a phased approach allows the network to adjust gradually, mitigating risks associated with validator churn. Block rewards can be reduced from 720 MINA to 540 MINA as an initial step.

Pros

- Directly reduces inflation and overall token emissions.
- Aligns with best practices and industry standards.
- Encourages a shift toward transaction fees as the primary revenue source.

Cons

- May lead to lower APY for validators and delegators, potentially reducing staking participation.
- Immediate reductions could impact network security if validators exit due to reduced profitability.

2. Introduce Token Locking and Variable Block Rewards Proportional to Stake

Description

Token locking can enable a dynamic staking rewards mechanism where rewards scale based on the staking ratio. Additionally, token locking reduces the circulating supply, which helps lower sell pressure and is expected to decrease the staking ratio. This anticipated reduction in the staking ratio results in a decrease in the absolute number of token rewards distributed, effectively reducing inflation and sell pressure—without impacting the APY for Validators and Delegators.

Validators and delegators receive variable APYs depending on how long they commit their tokens to staking. This approach maintains competitive incentives while reducing circulating supply velocity, creating a healthier economic model.

Pros

- Reduces immediate sell pressure.
- Helps stabilize staking rewards by ensuring a predictable APY curve.
- Encourages long-term participation and strengthens network security.

Cons

- Requires additional governance and technical implementation.
- May create liquidity concerns for validators and delegators who prefer immediate access to tokens and rewards.
- Needs careful calibration to avoid over-incentivizing long-term staking at the expense of liquidity.

3. Introduce Token Locking and Variable Block Rewards Proportional to Stake, Direct a Portion of Block Rewards to Fund the Protocol

Description

A combined approach that integrates token locking and block reward splitting can optimize the blockchain's reward payout structure. With a smaller delegation pool, each delegator would typically earn a higher share of rewards. However, by maintaining the APY at its current level, a portion of the token rewards can be saved and redirected to the treasury.

At the same time, Block Producers (BPs) are rewarded based on the percentage of delegation they receive. This means that even if the total delegated amount decreases, a BP's reward level remains unchanged as long as they retain the same percentage of delegation.

In this scenario, “undistributed” rewards refer to the excess rewards generated for delegators due to reduced overall delegation. The community could choose to redirect all or a portion of these excess rewards to fund the decentralized treasury, ensuring long-term ecosystem sustainability.

Pros

- Balances inflation control, validator incentives, and ecosystem funding.
- Supports long-term sustainability by reducing sell pressure and funding protocol growth.
- Provides flexibility in managing network incentives and treasury allocations.

Cons

- More complex to implement and requires governance coordination.
- May face pushback from validators due to perceived profitability reductions.

4. Future Considerations

Protocol Fee

- Implement a small protocol fee on transactions and zk-snarks. This fee would be separate from the existing Priority Fee, which continues to go directly to validators. The exact fee structure is still open for discussion
- Fee revenue can be burned, redirected to the treasury, or partially distributed to validators.
- Critical for long-term sustainability but may not generate significant revenue immediately.

Mina as a Settlement Layer for zk-Proofs

Mina can serve as a lightweight, efficient settlement layer for zk-proofs by optimizing proof verification and finalization. Instead of traditional block space reservations, Mina’s role should focus on enabling seamless zk-proof aggregation, ensuring verifiable and immutable finality for rollups and decentralized applications.

By introducing proof submission fees or a tiered verification system, Mina can create an economic model where high-priority zk-proofs pay additional fees for expedited processing, ensuring fair and efficient resource allocation. This approach maintains Mina’s minimal-compute philosophy while reinforcing its position as a scalable, cost-effective zk-proof settlement layer.

3.3 Conclusion

This report presents a focused set of recommendations to address Mina Protocol's economic challenges and enhance its long-term sustainability. Combining various protocol changes, such as inflation control, fees, treasury replenishment, and token locking, has shown a positive impact on the economy in simulations. However, it is important to acknowledge that while these scenarios can be analyzed and understood within a token modeling framework, their real-world feasibility will depend on participants' engagement and behavior.

Appendix: Simulation

This section of the paper is dedicated to describe the projections made on top of the Mina protocol given certain parameters. The simulation is based on 60 months of protocol development, highlighting the most important KPIs to keep track of.

Base Scenario

To better understand the direct impact of each proposed change, the analysis begins with a base scenario that reflects the current state of Mina's economy. This scenario incorporates all protocol-specific parameters previously outlined in this paper and serves as a benchmark for evaluating subsequent adjustments.

This approach ensures that the simulation remains rooted in realistic protocol-level interactions, enabling the identification of potential vulnerabilities and crafting strategies to address them. By doing so, Mina Foundation can optimize token performance, promote sustainability, and build a robust ecosystem for its stakeholders.

The current metrics supporting the base scenario are as follows:

Relevant System Parameters:

Inflation	%	9%	9%	9%

Block Rewards	
Share to Block Producers	*100%*
Share to Treasury	*0%*

Staking	
Tokens locked	*0%*
Fee cut	*0%*

Speculative Buy Pressure	
Monthly Percentage	*30%*

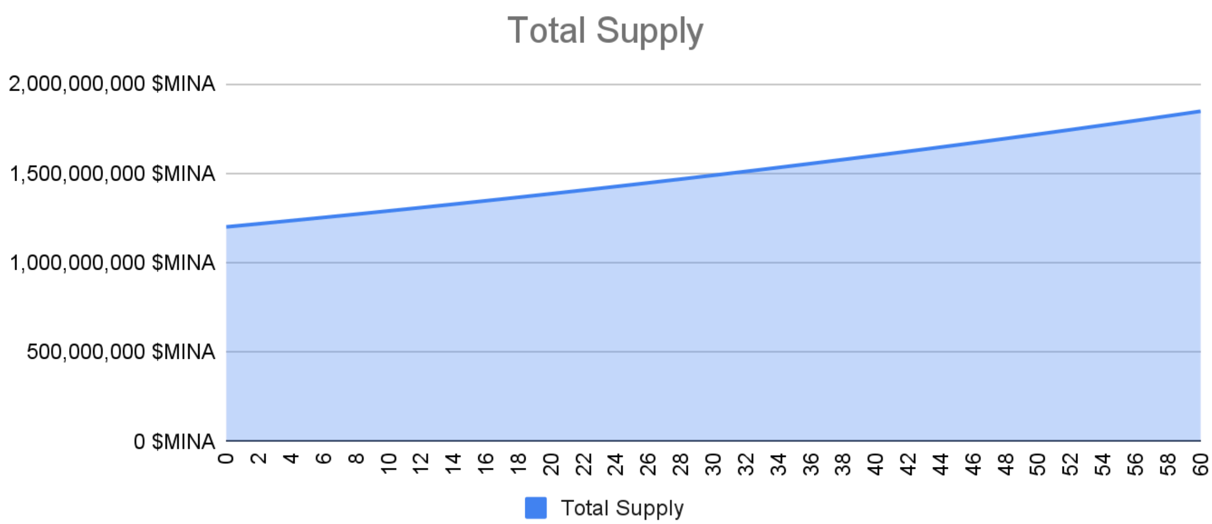
Tokens Held

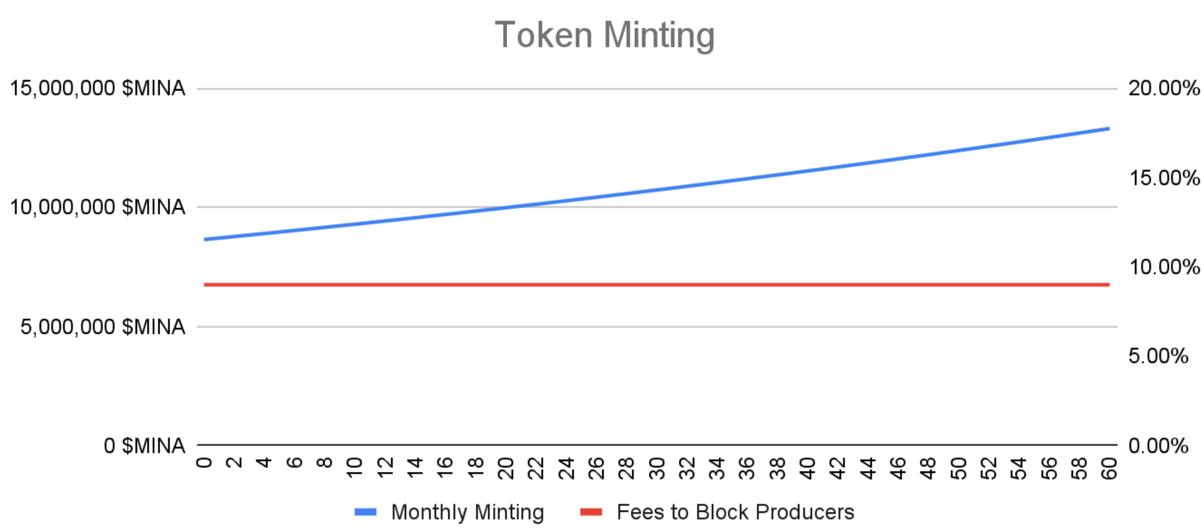
Monthly Percentage	*60%*

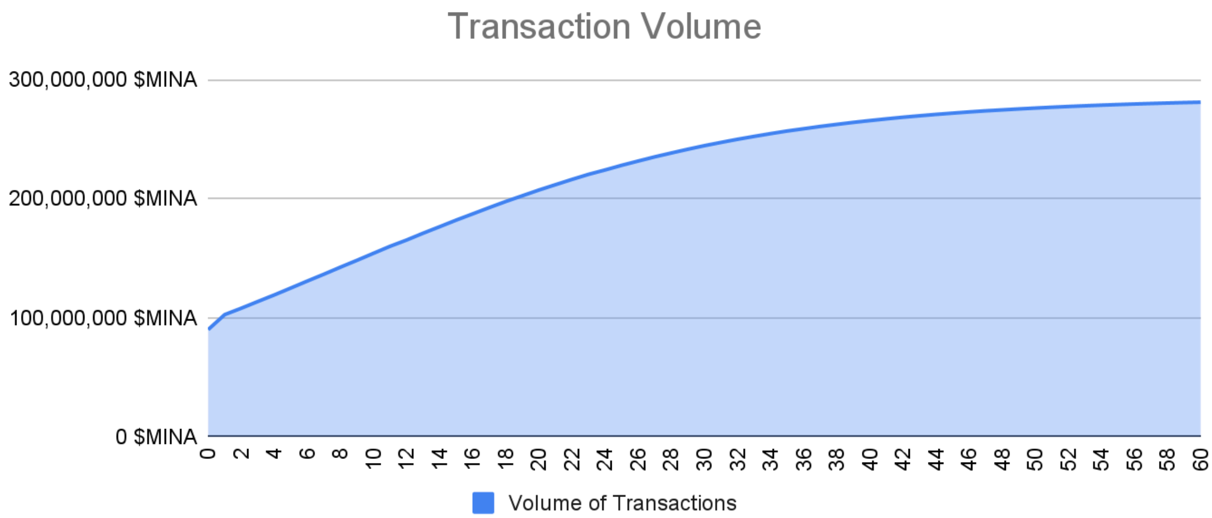
Protocol fees

Protocol fees	*0*

Main Results:






Transaction Volume
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200,000,000 $MINA
100,000,000 $MINA
0 $MINA
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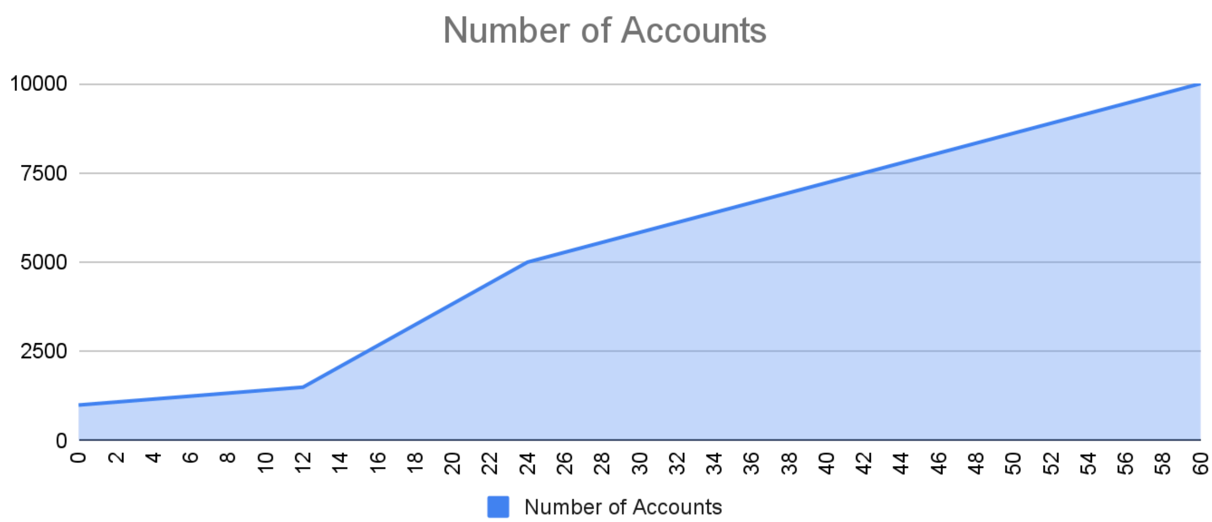
Volume of Transactions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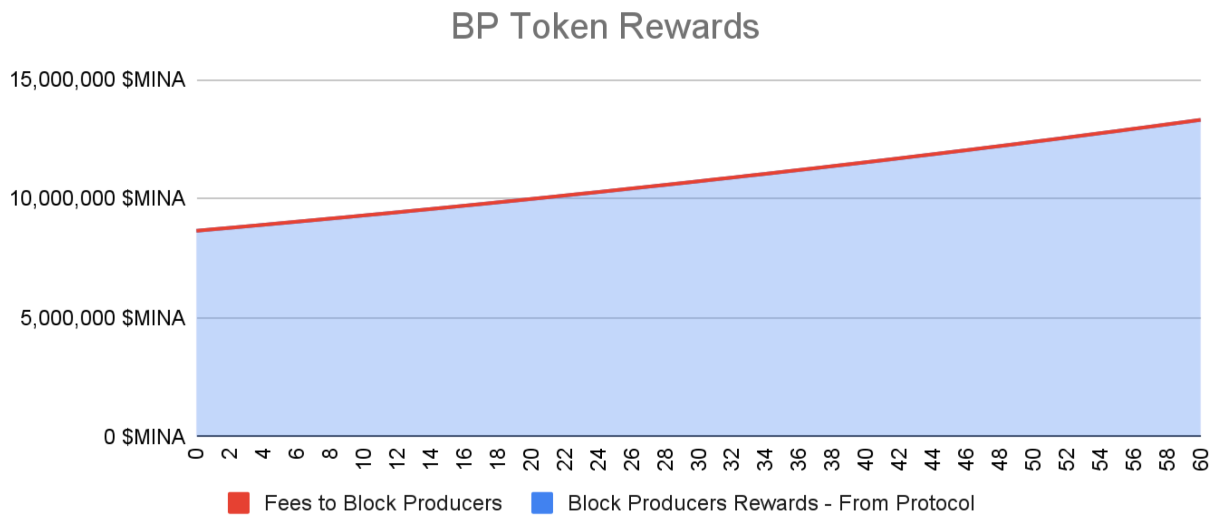
5000
2500
0
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
Number of Accounts


BP Token Rewards
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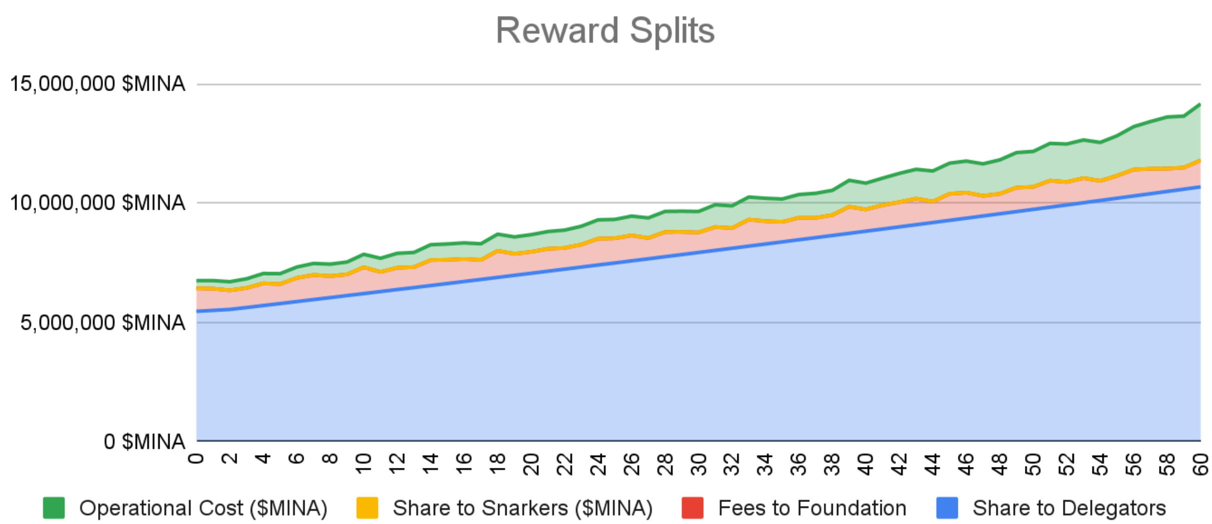
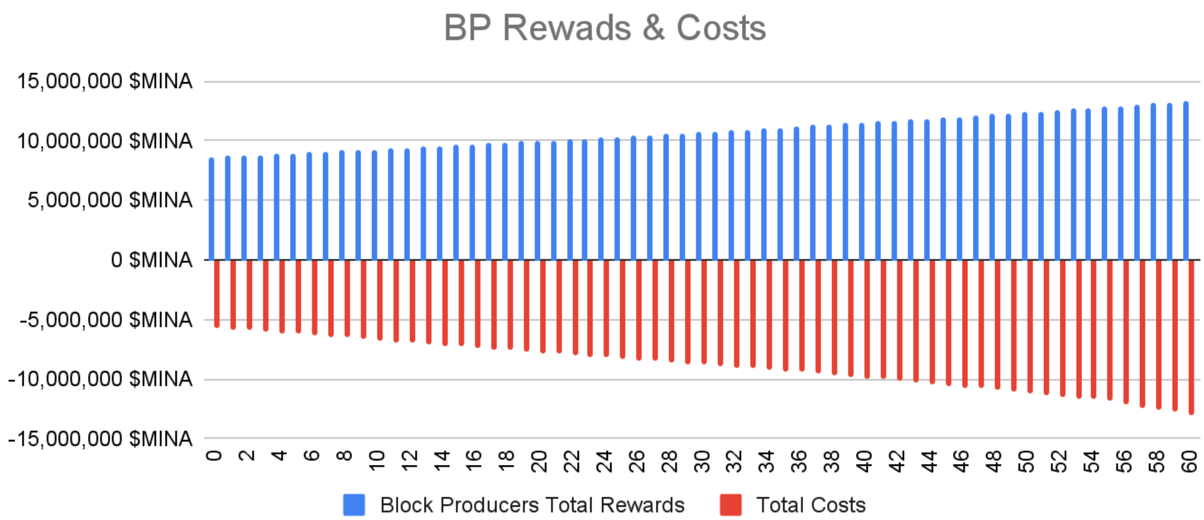
10,000,000 $MINA
5,000,000 $MINA
0 $MINA
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
Fees to Block Producers
Block Producers Rewards - From Protocol


Reward Splits
15,000,000 $MINA
10,000,000 $MINA
5,000,000 $MINA
0 $MINA
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
Operational Cost ($MINA)
Share to Snarkers ($MINA)
Fees to Foundation
Share to Delegators


BP Rewards & Costs
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0 $MINA
-5,000,000 $MINA
-10,000,000 $MINA
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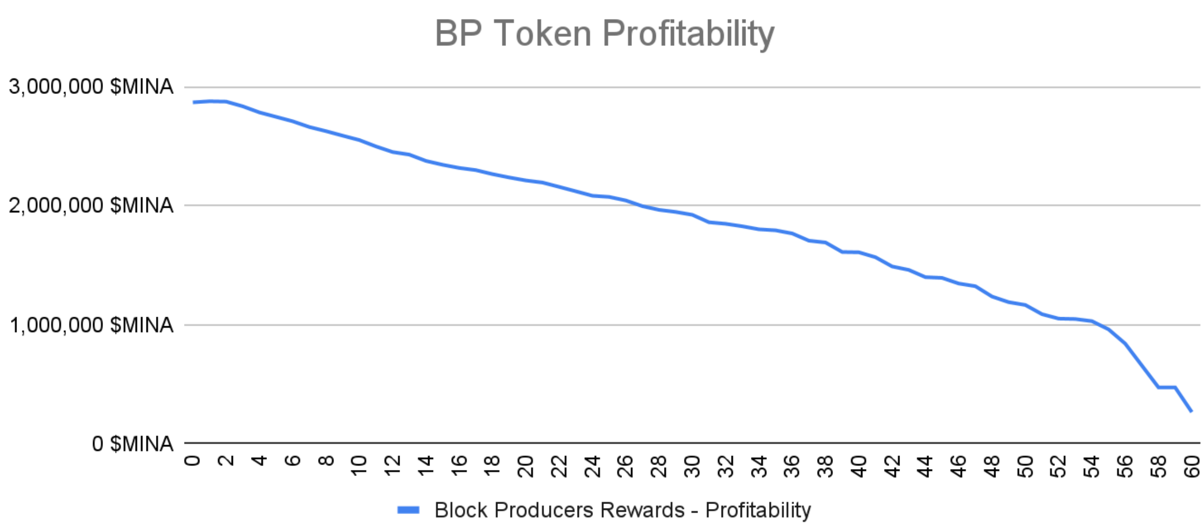
Block Producers Total Rewards
Total Costs


BP Token Profitability
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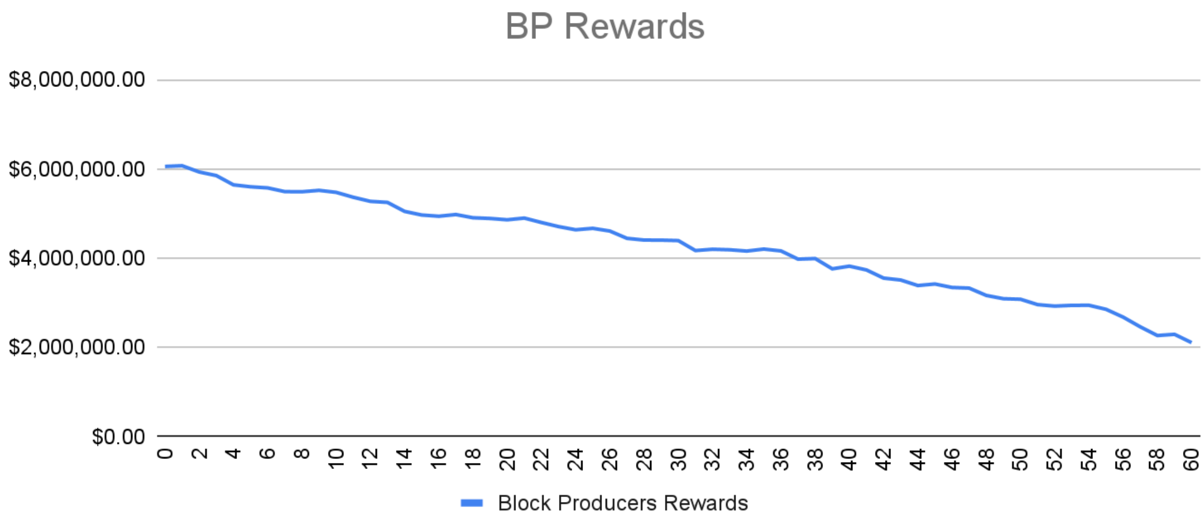
2,000,000 $MINA
1,000,000 $MINA
0 $MINA
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
Block Producers Rewards - Profitability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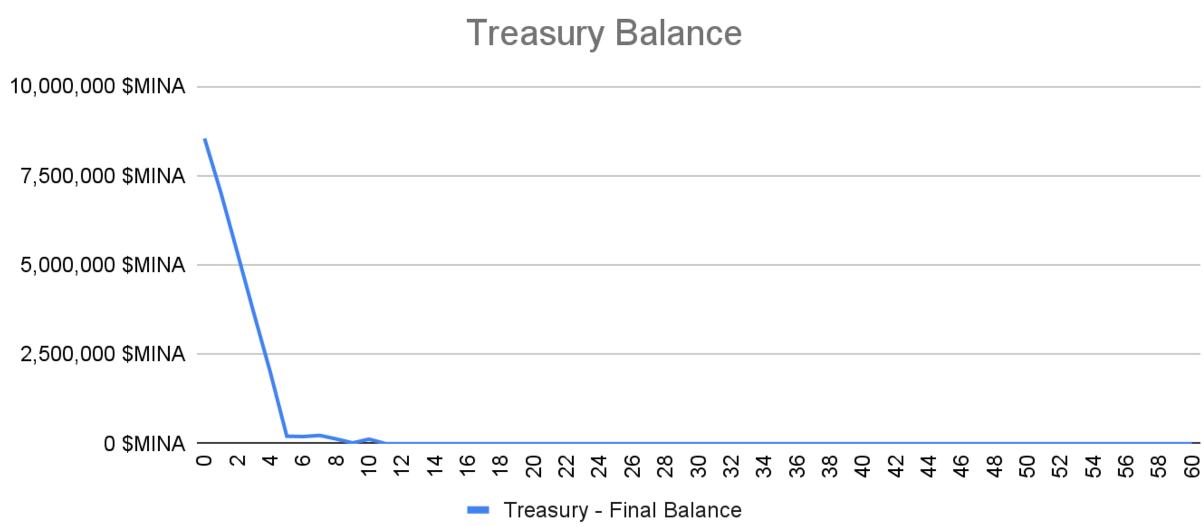
Block Producers Rewards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5,000,000 $MINA
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0 $MINA
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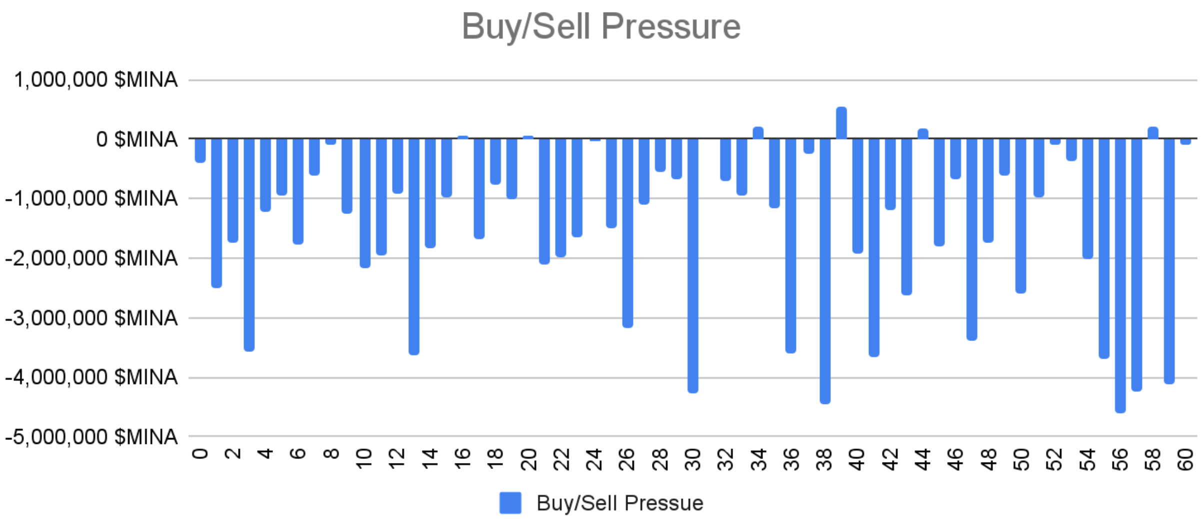
Treasury - Final Balance


Buy/Sell Pressure
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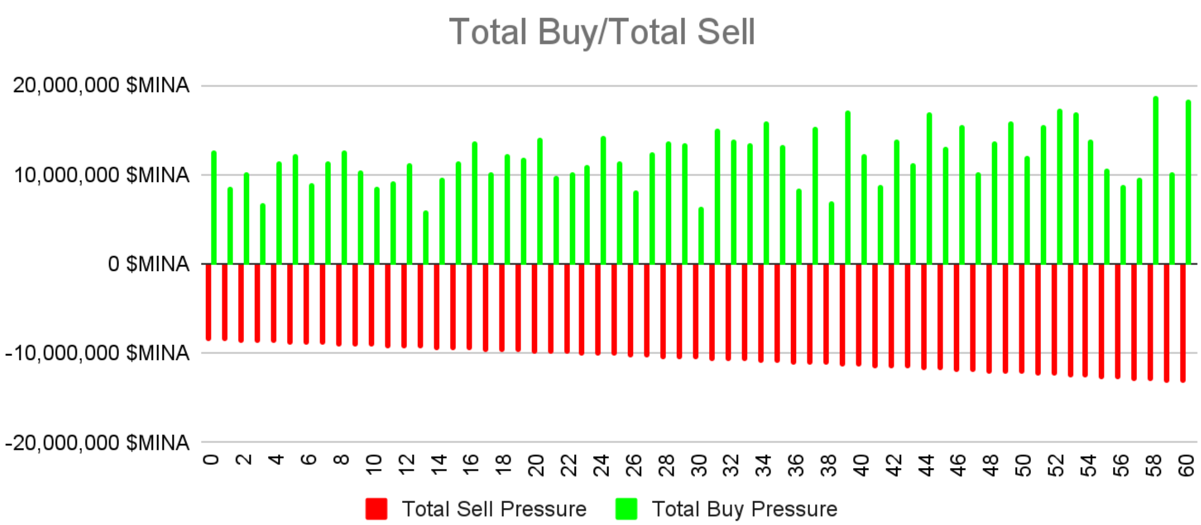
-2,000,000 $MINA
-3,000,000 $MINA
-4,000,000 $MINA
-5,000,000 $MINA
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
Buy/Sell Pressue


Total Buy/Total Sell
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10,000,000 $MINA
0 $MINA
-10,000,000 $MINA
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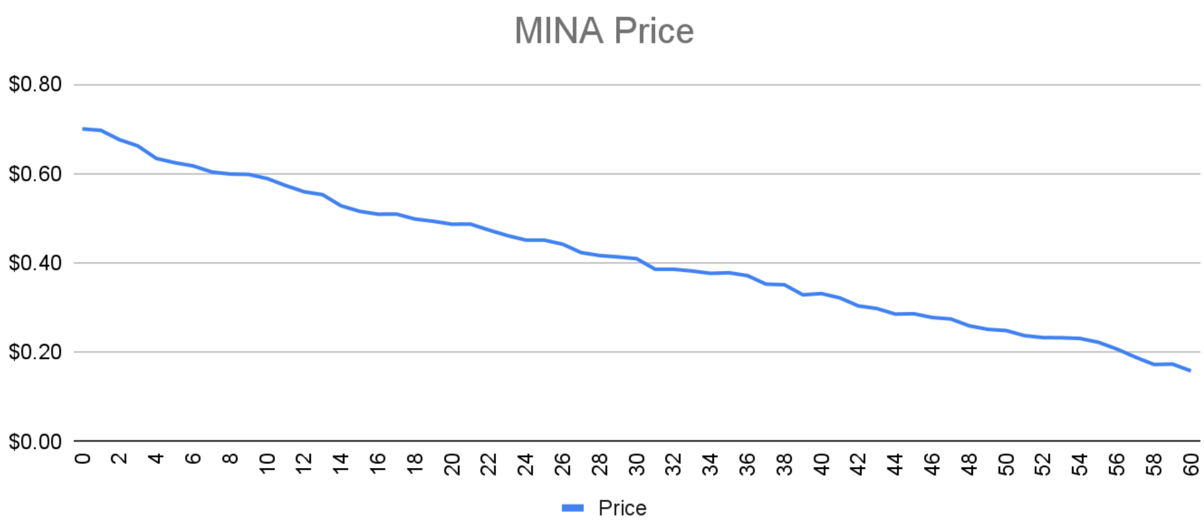
Total Sell Pressure
Total Buy Pressure



Risks Identified

The analysis identifies several critical risks that could affect the long-term sustainability and growth of the Mina Protocol:

- **Sell Pressure:** Sell pressure consistently outweighs buy pressure in most cases.
- **Block Producer Rewards:** Despite the increasing number of Mina tokens allocated to block producers via inflation, token performance results in declining profitability over time.
- **Treasury:** The current economic model does not include mechanisms to replenish the treasury, which is vital for funding ecosystem growth, grants, and strategic initiatives.

Different Scenarios

This subsection explores the impacts of various protocol changes on the simulation, evaluating their potential to mitigate identified risks and enhance long-term sustainability. The approach begins by assessing the impact of each change as an independent solution. The most impactful changes are then filtered and combined to develop an optimized "best-case scenario."

For each scenario, only the parameters explicitly mentioned are modified. All other parameters remain consistent with those described in the base scenario unless otherwise specified. This ensures comparability across scenarios and isolates the impact of the proposed changes.

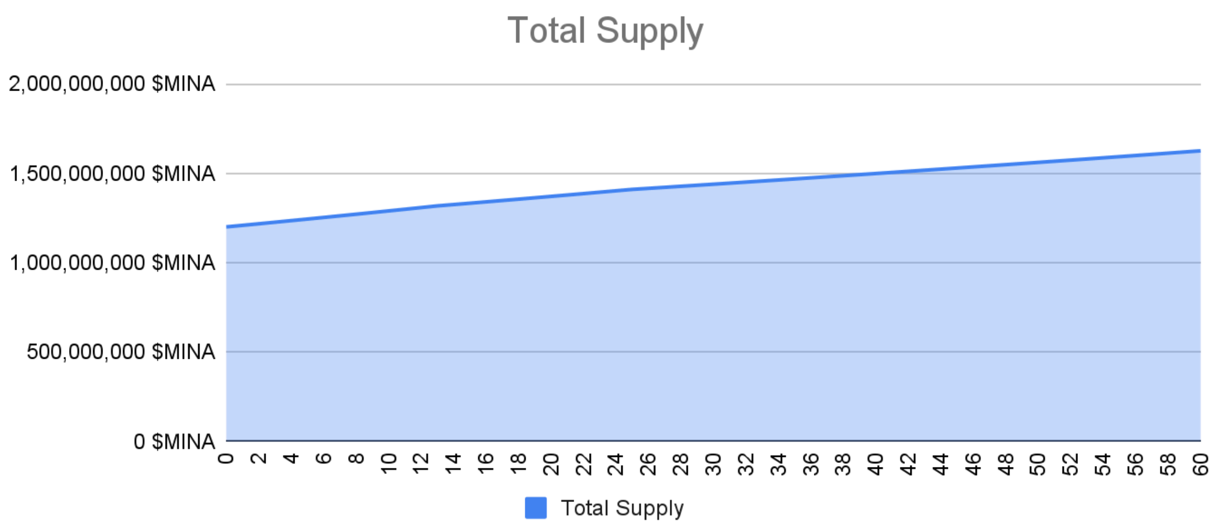
Inflation

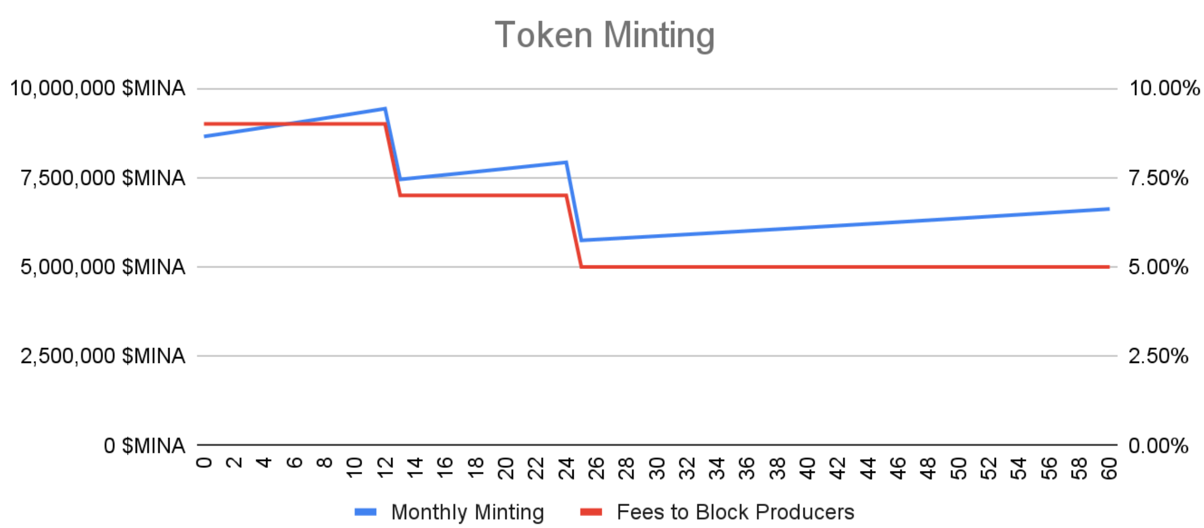
1. Objective: Analyze the impact of reducing the inflation rate
2. Proposed Change: Lower the inflation rate incrementally from 9% to 7%, and then to 5%

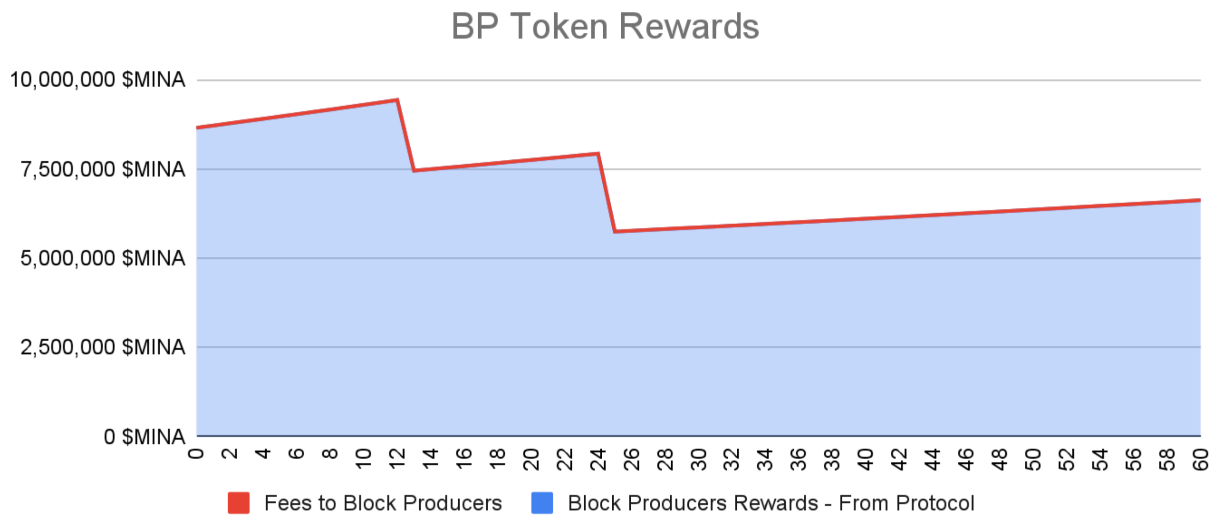
3. Hypothesis: Reducing inflation is expected to lower sell pressure and stabilize the token price over time
4. Assumptions:

Inflation	%	9%	7%	5%

5. Results







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7,500,000 $MINA
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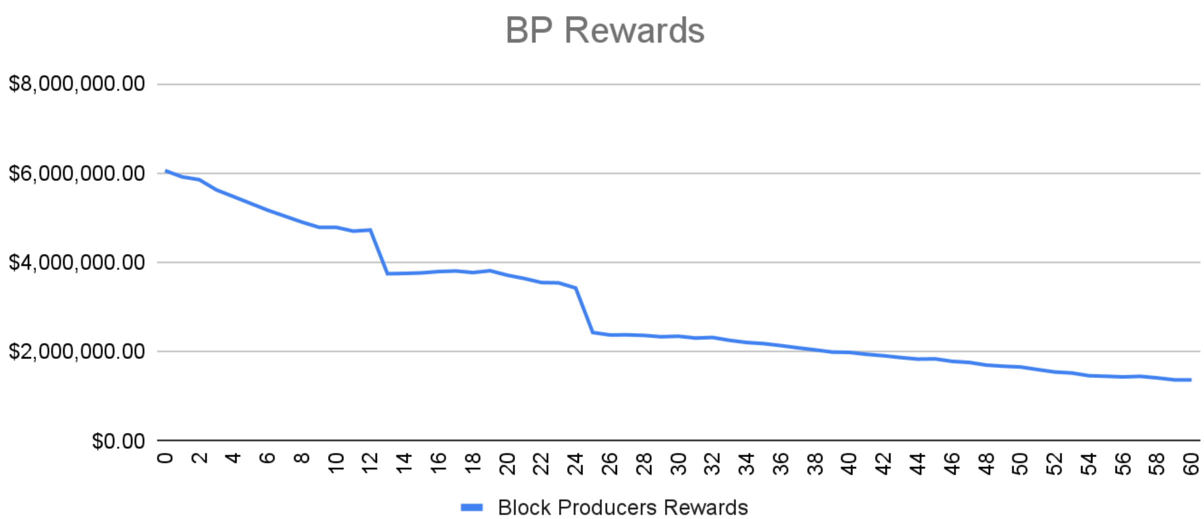
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
Fees to Block Producers
Block Producers Rewards - From Protocol



BP Rewards
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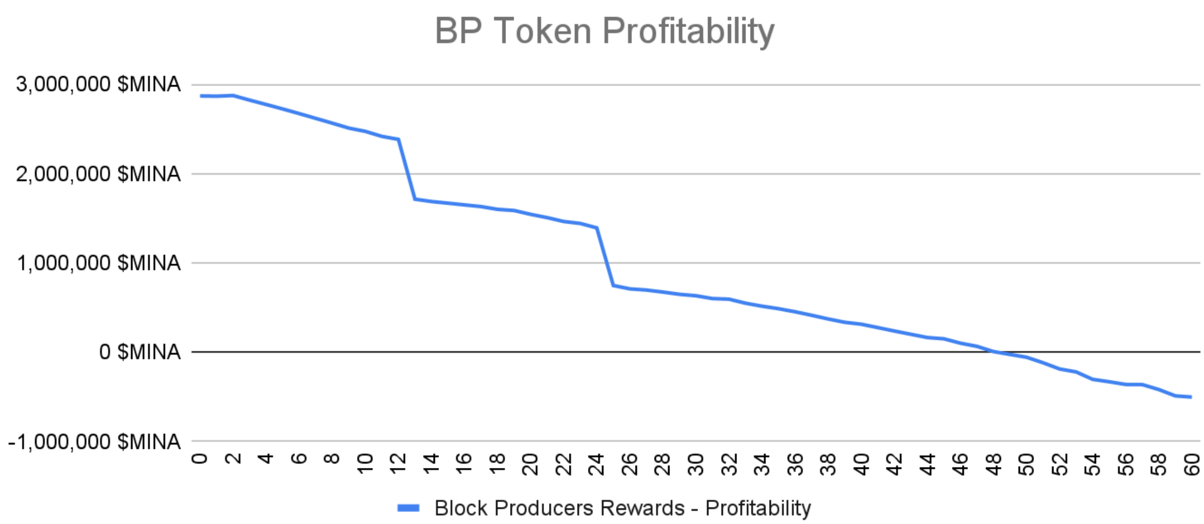
$6,000,000.00
$4,000,000.00
$2,000,000.00
$0.00
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
Block Producers Rewards


BP Token Profitability
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2,000,000 $MINA
1,000,000 $MINA
0 $MINA
-1,000,000 $MINA
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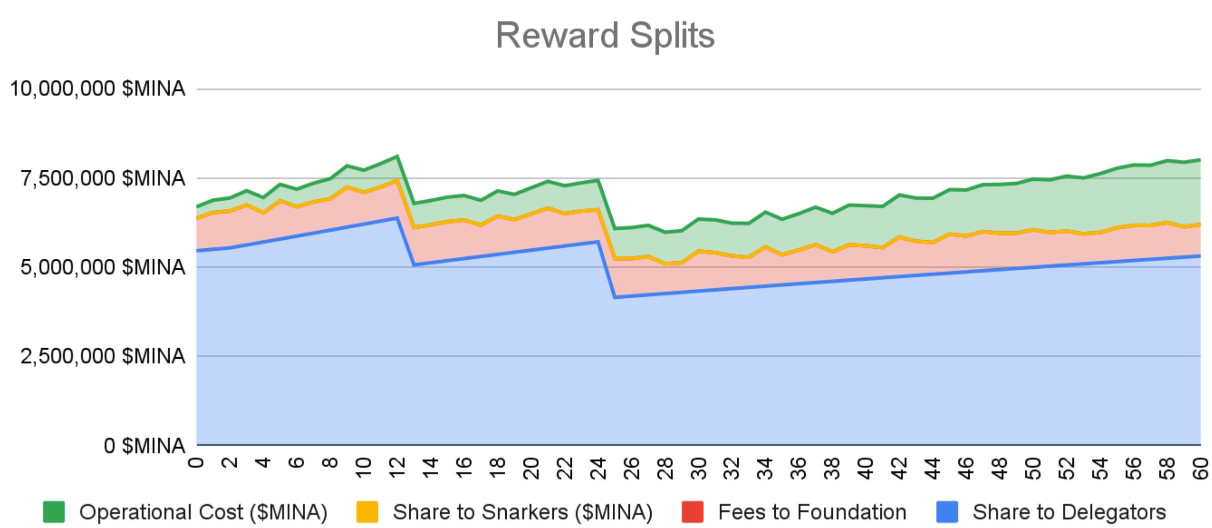
Block Producers Rewards - Profitability


Reward Splits
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7,500,000 $MINA
5,000,000 $MINA
2,500,000 $MINA
0 $MINA
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
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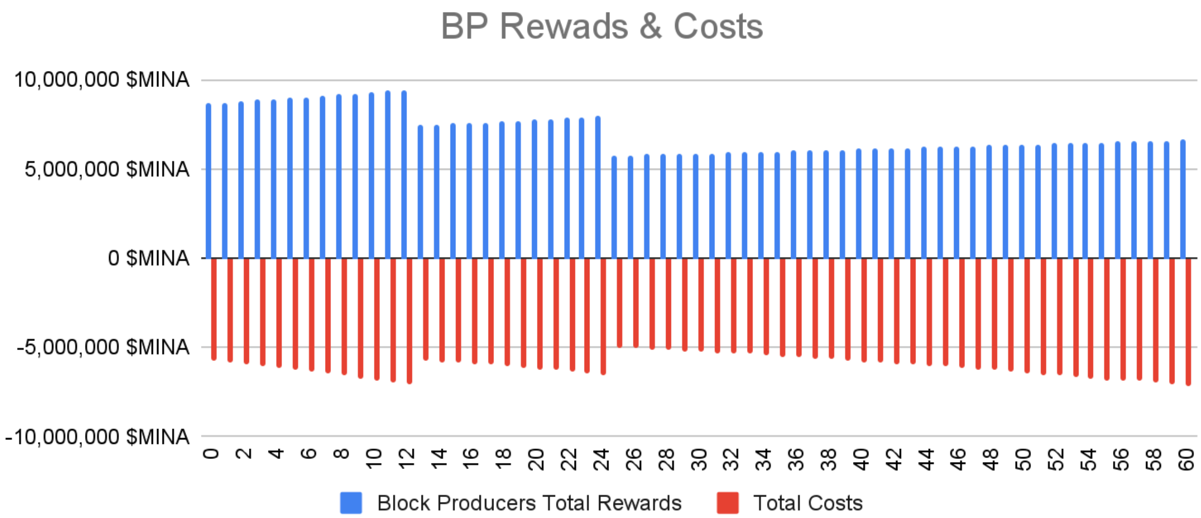
Share to Snarkers ($MINA)
Fees to Foundation
Share to Delegators


BP Rewards & Costs
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5,000,000 $MINA
0 $MINA
-5,000,000 $MINA
-10,000,000 $MINA
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2
4
6
8
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20
22
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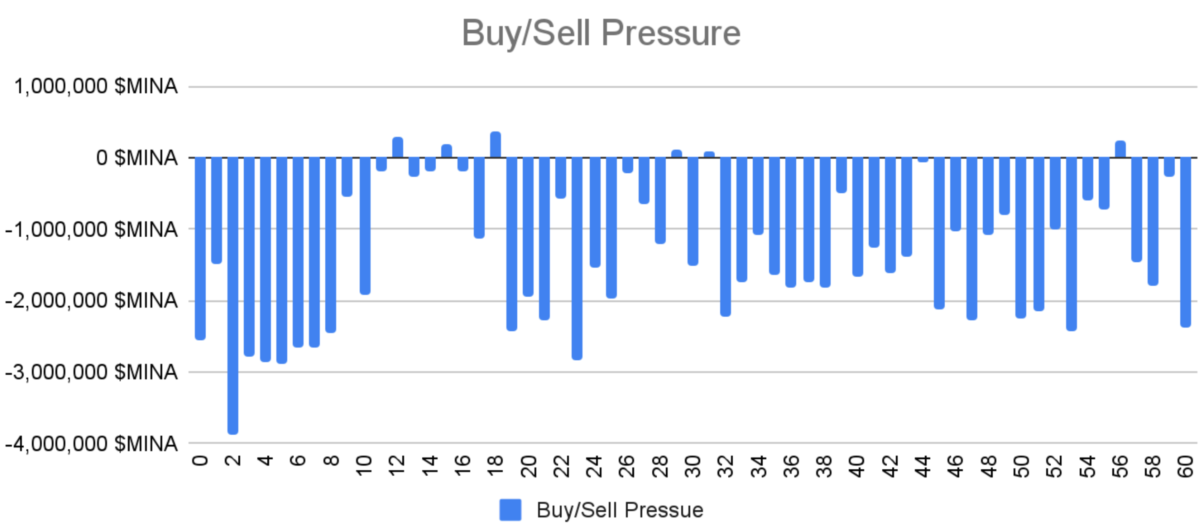
60
Block Producers Total Rewards
Total Costs


Buy/Sell Pressure
1,000,000 $MINA
0 $MINA
-1,000,000 $MINA
-2,000,000 $MINA
-3,000,000 $MINA
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0
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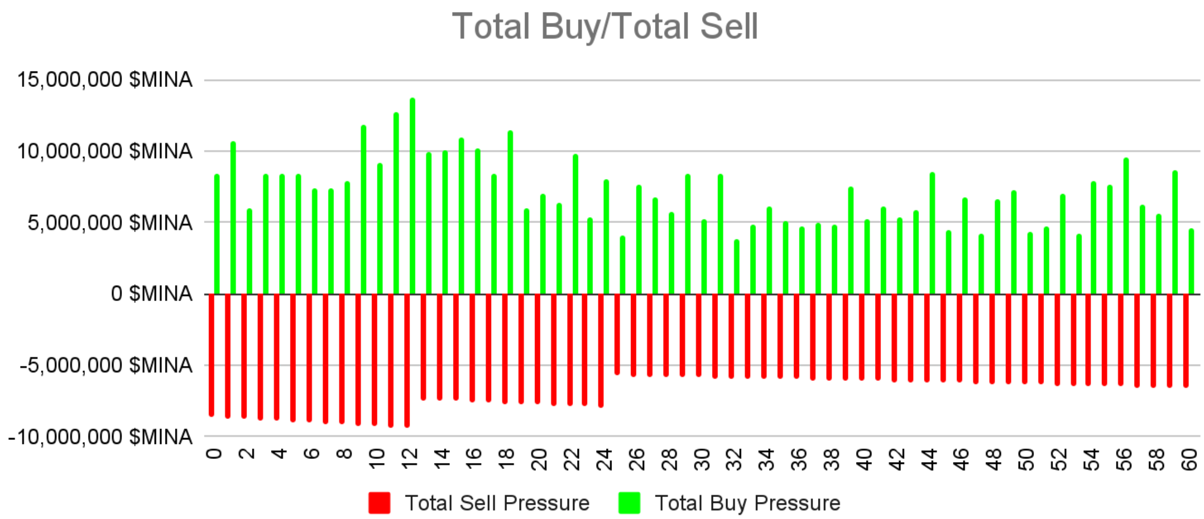
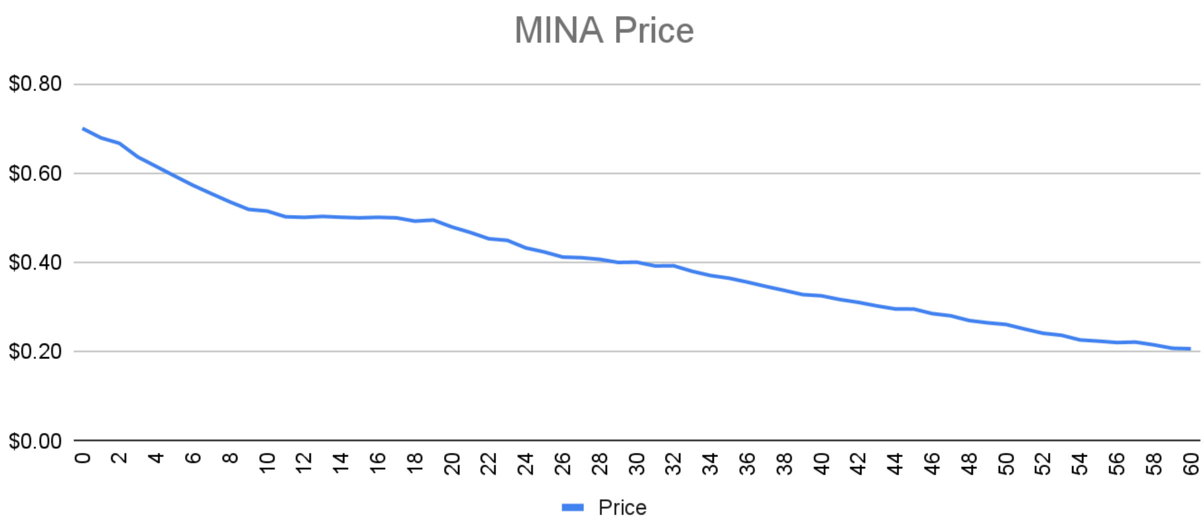
60
Buy/Sell Pressue





6. Discussion

Reducing inflation effectively reduces sell pressure, which is positively reflected in the token price when compared to the base scenario. However, this change leads to a gradual decline in Block Producers' profitability over time, potentially impacting their long-term participation incentives.

Introduction of protocol fee

1. Objective: Analyze the impact of introducing a protocol fee, currently zero
2. Proposed Change: Include a 0,03 mina fee per transaction, combined with a percentage of fees going to treasury and another go as a burning mechanism. The strategy is tested using average and high transaction volume.
3. Hypothesis: Protocol fees can increase the buy pressure of the token, replenish the treasury and ensure further incentives for the participants through price stabilization
4. Assumptions:

4.1. Average Volume

Transactions - Target Number	#	300,000,000

Protocol Fees	
Number of tokens	*0.30%*

Protocol Fees	
Share to Treasury	*20%*
Share to Burn Mechanism	*80%*

4.2. High Volume

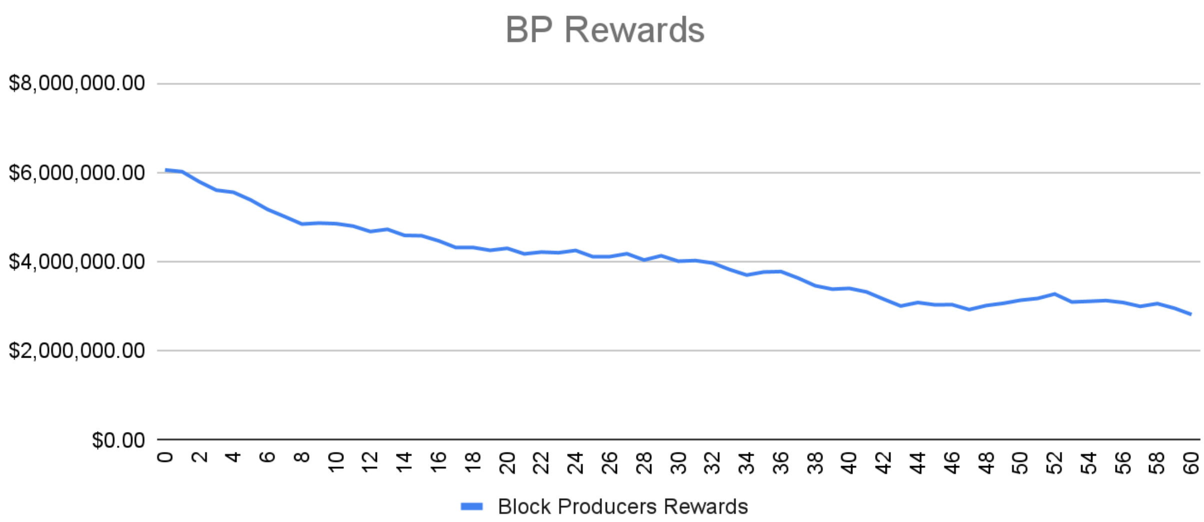
Transactions - Target Number	#	1,500,000,000

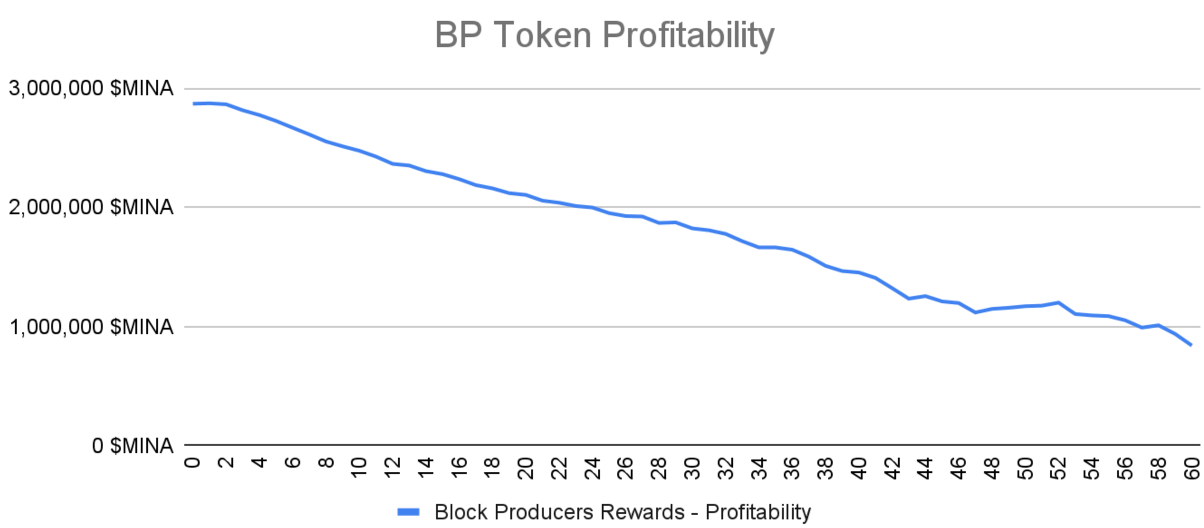
Protocol Fees	
Number of tokens	*0.30%*

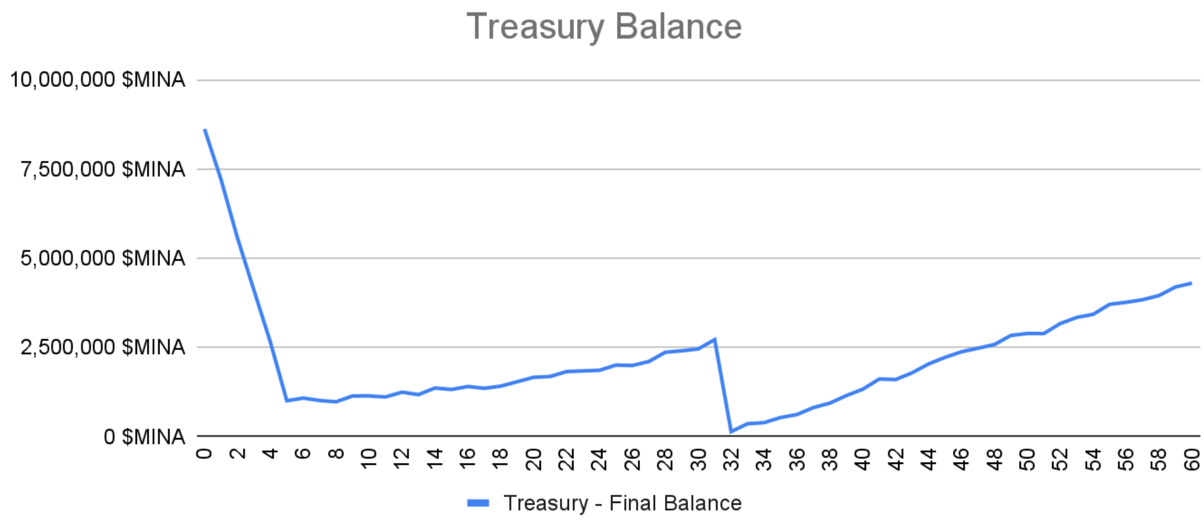
Protocol Fees	
Share to Treasury	*20%*
Share to Burn Mechanism	*80%*

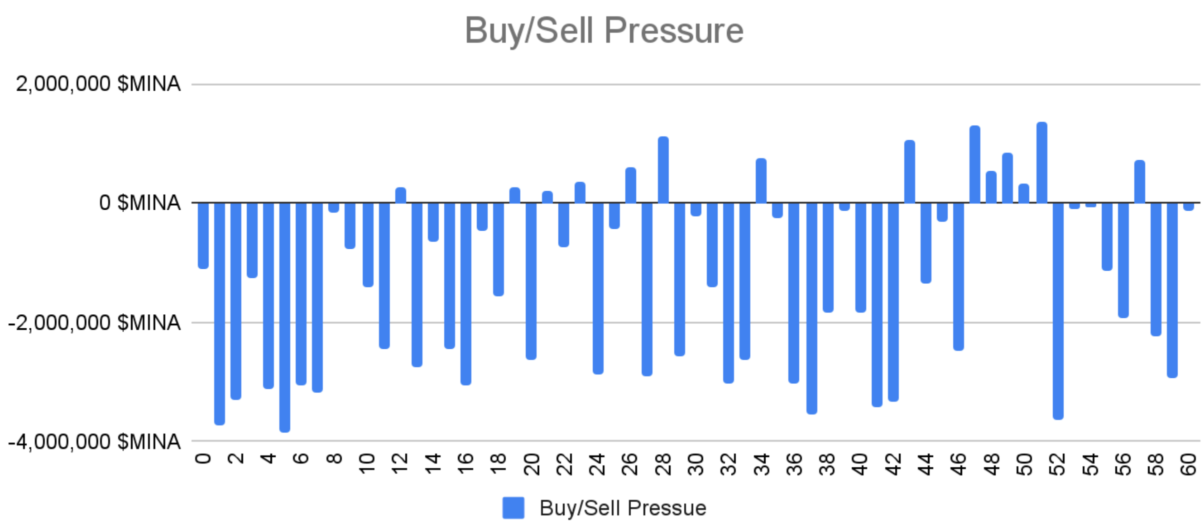
5. Results

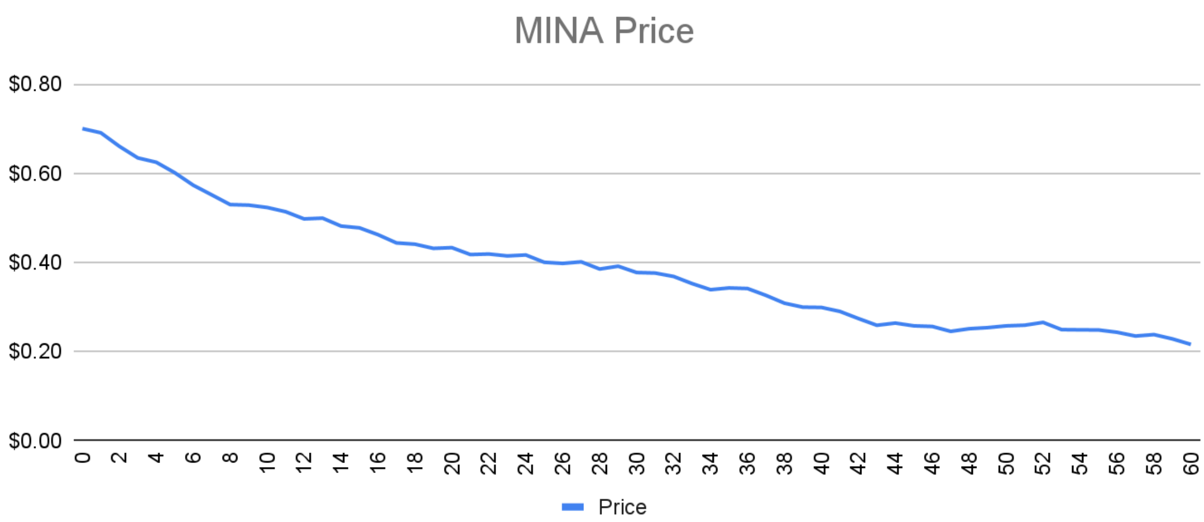
5.1. Average Volume



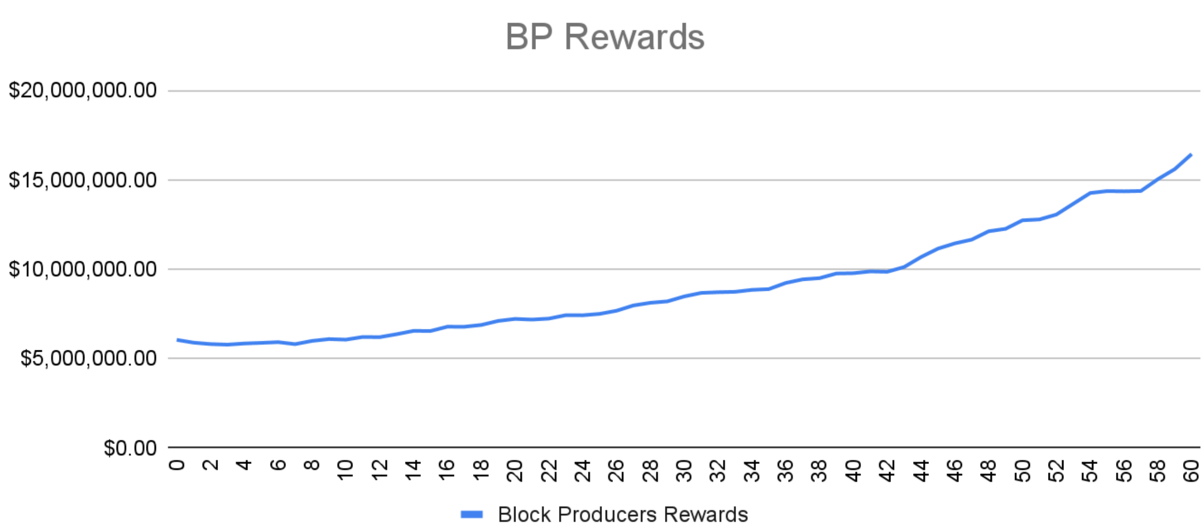


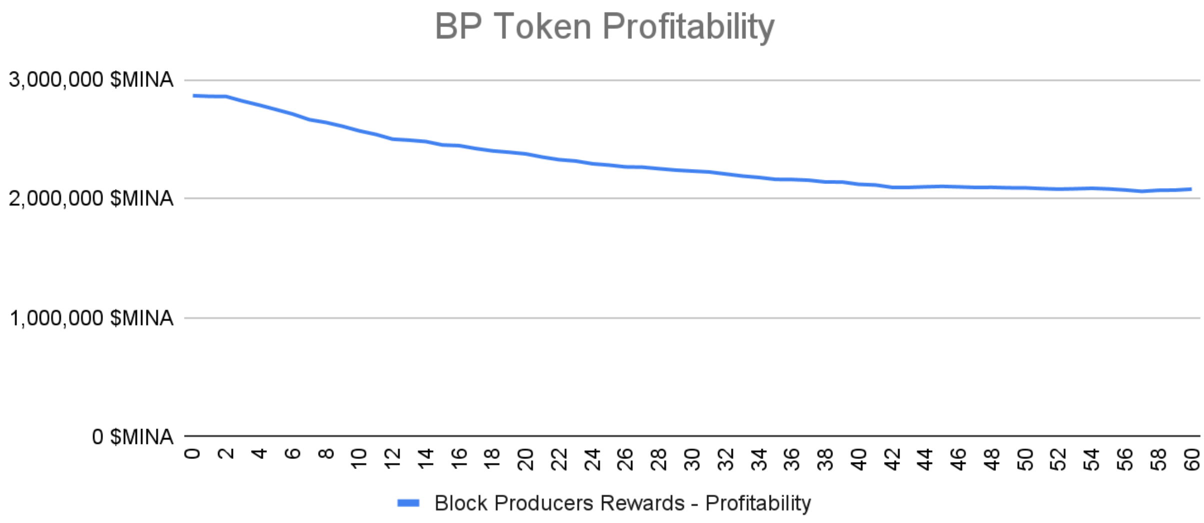

Treasury Balance
10,000,000 $MINA
7,500,000 $MINA
5,000,000 $MINA
2,500,000 $MINA
0 $MINA
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
Treasury - Final Balance

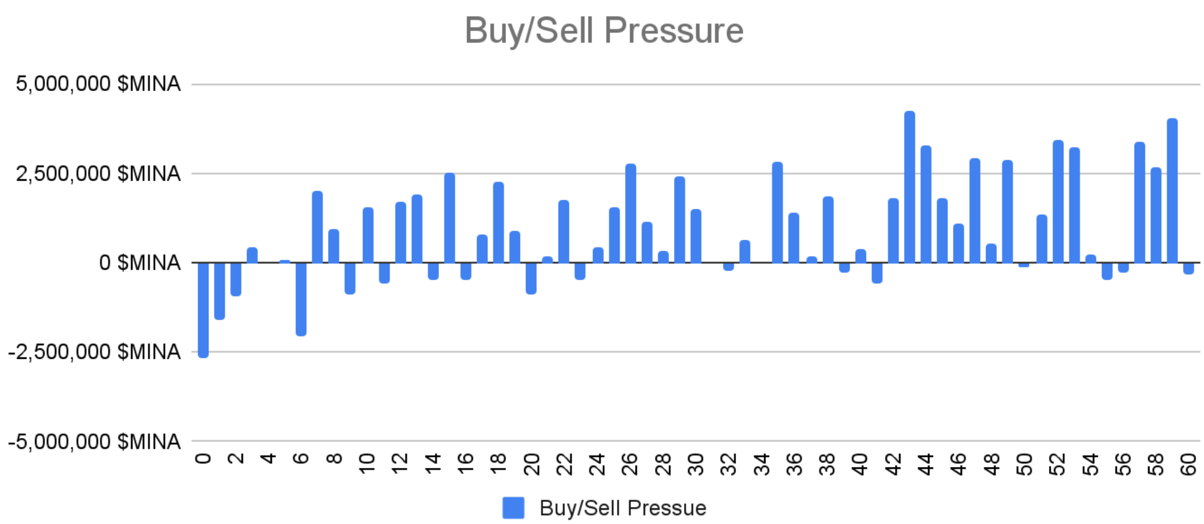

Buy/Sell Pressure
2,000,000 $MINA
0 $MINA
-2,000,000 $MINA
-4,000,000 $MINA
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
Buy/Sell Pressue

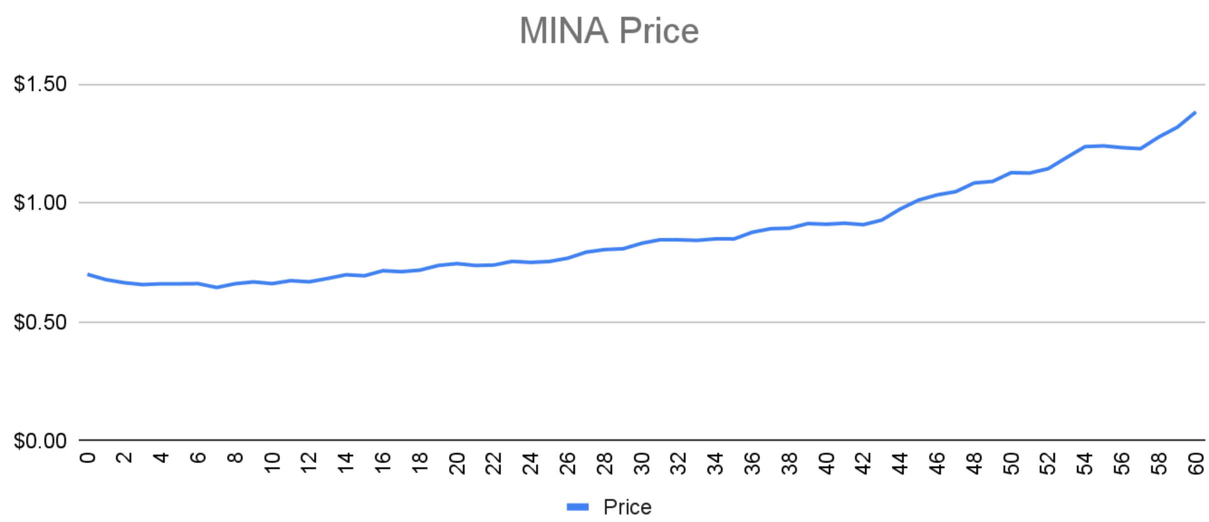


5.1. High Volume




BP Token Profitability
3,000,000 $MINA
2,000,000 $MINA
1,000,000 $MINA
0 $MINA
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
Block Producers Rewards - Profitability


Buy/Sell Pressure
5,000,000 $MINA
2,500,000 $MINA
0 $MINA
-2,500,000 $MINA
-5,000,000 $MINA
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
Buy/Sell Pressue



6. Discussion

The introduction of protocol fees has the potential to increase buy pressure and enhance participants' profitability. This impact is modestly evident in the average transaction volume scenario but becomes significantly more pronounced if, in addition to the fees, Mina successfully increases the overall transaction volume.

Block Rewards Split

1. Objective: Analyze the impact of redirecting a portion of the block rewards back to the foundation
2. Proposed Change: 20% of the block rewards are kept in the treasury
3. Hypothesis: Introducing a replenishment mechanism for the foundation is expected to strengthen the long-term sustainability of the protocol by securing consistent funding for ecosystem growth, without compromising agent participation.
4. Assumptions:

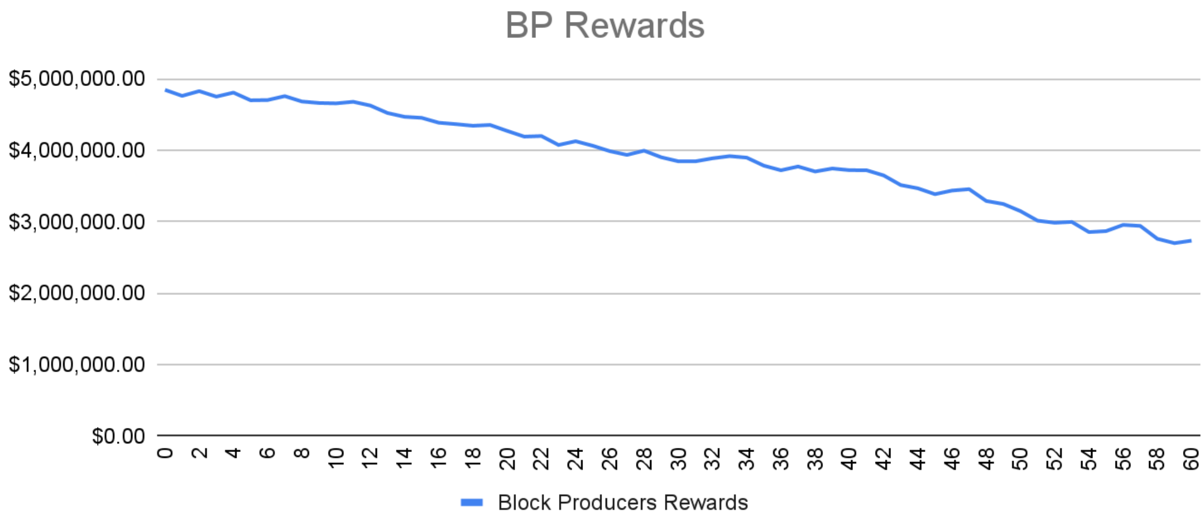
Block Rewards	
Share to Block Producers	*80%*
Share to Treasury	*20%*

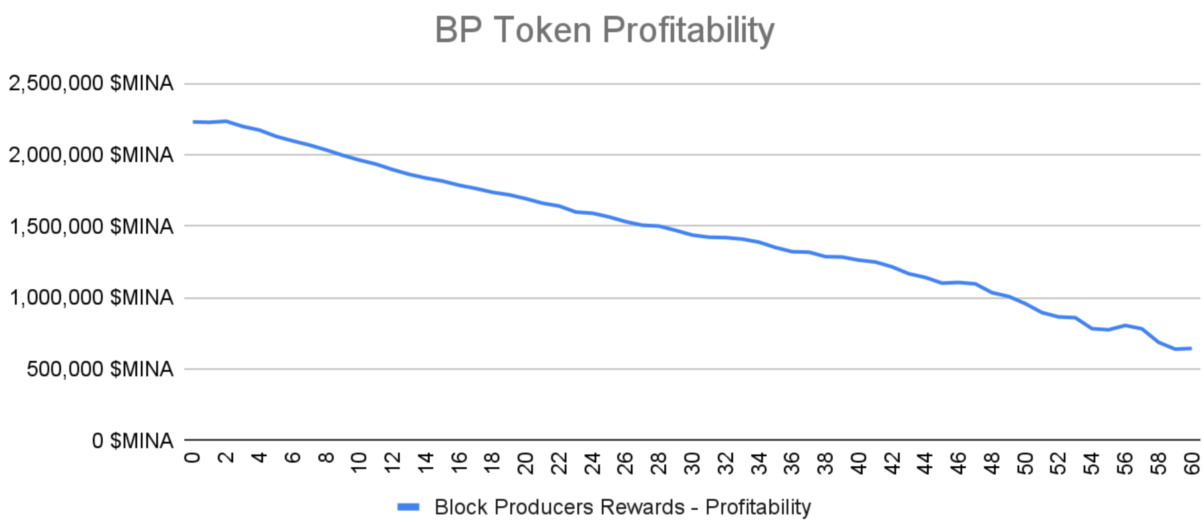
Speculative Buy Pressure	
Monthly Percentage	*30%*

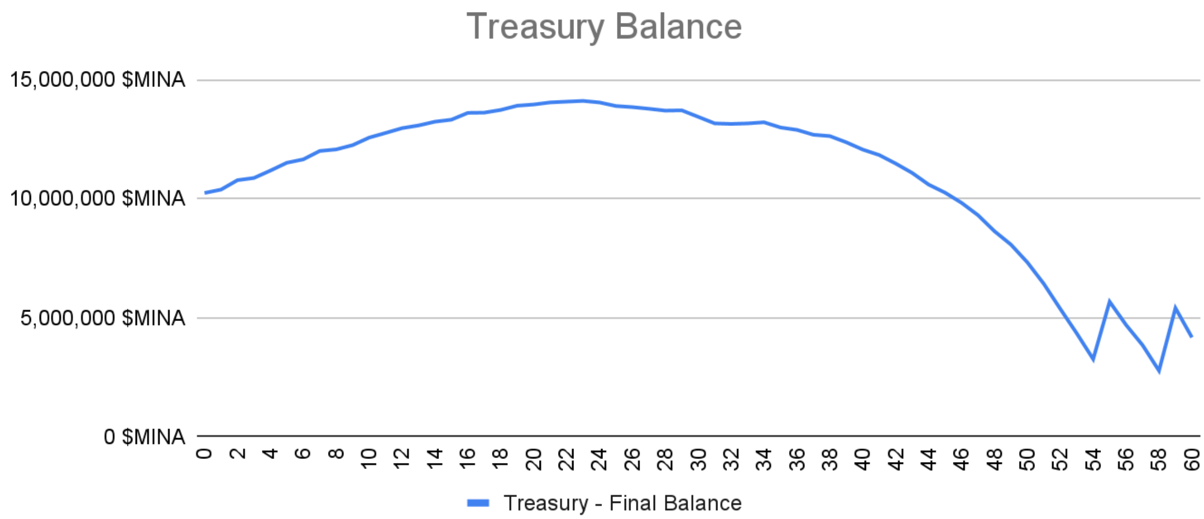
Tokens Held

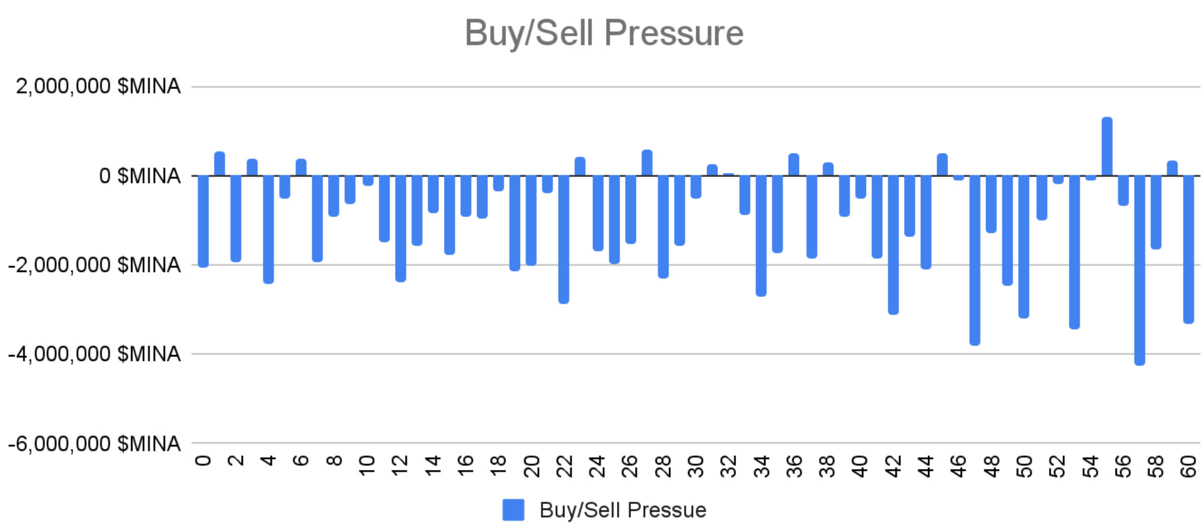
Monthly Percentage	*60%*

5. Results






Treasury Balance
15,000,000 $MINA
10,000,000 $MINA
5,000,000 $MINA
0 $MINA
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
50
52
54
56
58
60
Treasury - Final Balance


Buy/Sell Pressure
2,000,000 $MINA
0 $MINA
-2,000,000 $MINA
-4,000,000 $MINA
-6,000,000 $MINA
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
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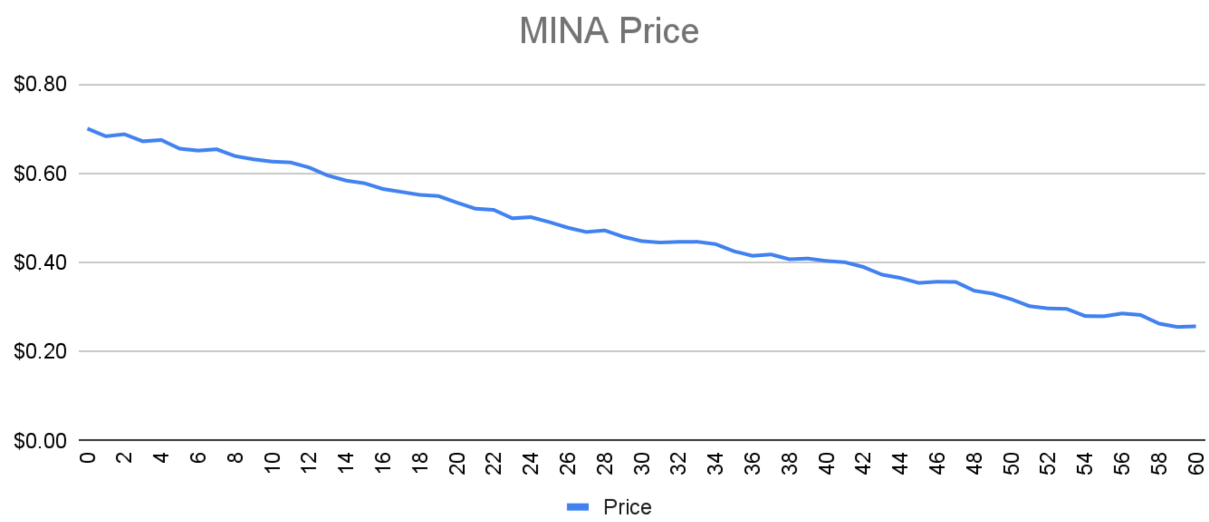
34
36
38
40
42
44
46
48
50
52
54
56
58
60
Buy/Sell Pressue



6. Discussion

Introducing a split of block rewards to the treasury ensures steady growth mechanism while reducing sell pressure over time. The resulting price stability also supports the profitability of block producers.

Token Locking

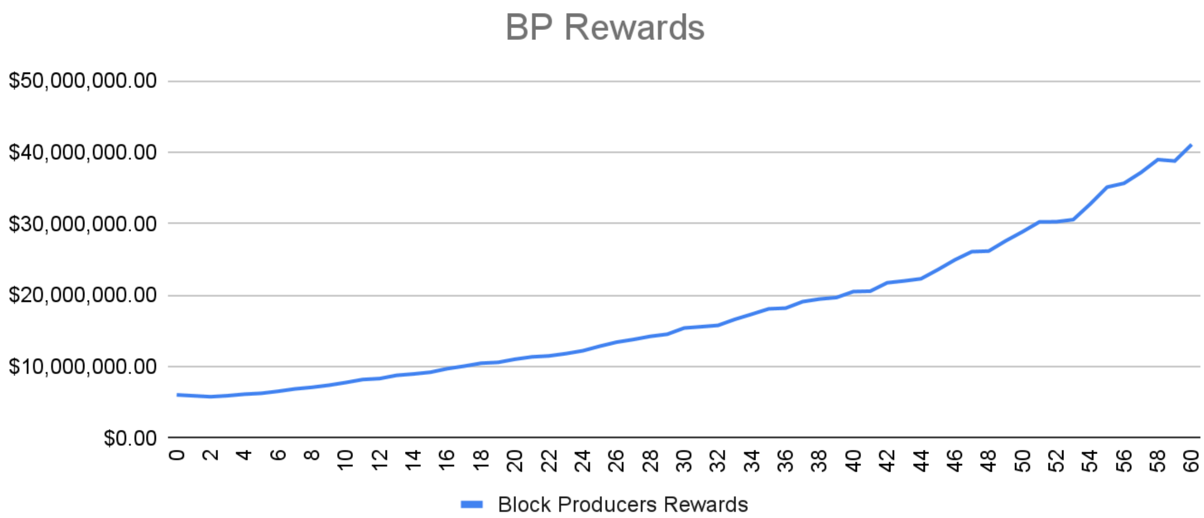
1. Objective: Analyze the impact of introducing token locking
2. Proposed Change:Introduce token locking and consider its value to be 30% of the previous no token locking option
3. Hypothesis: Introducing token locking can create significant buy pressure, while maintaining block producers' profitability
4. Assumptions:

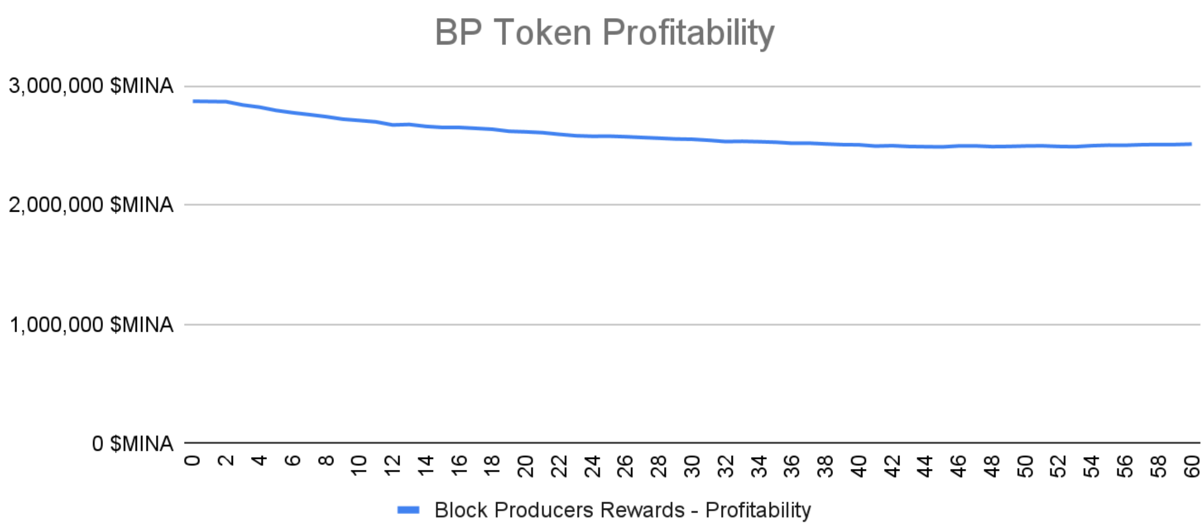
Staking	
Tokens locked	*30%*
Fee cut	*5%*

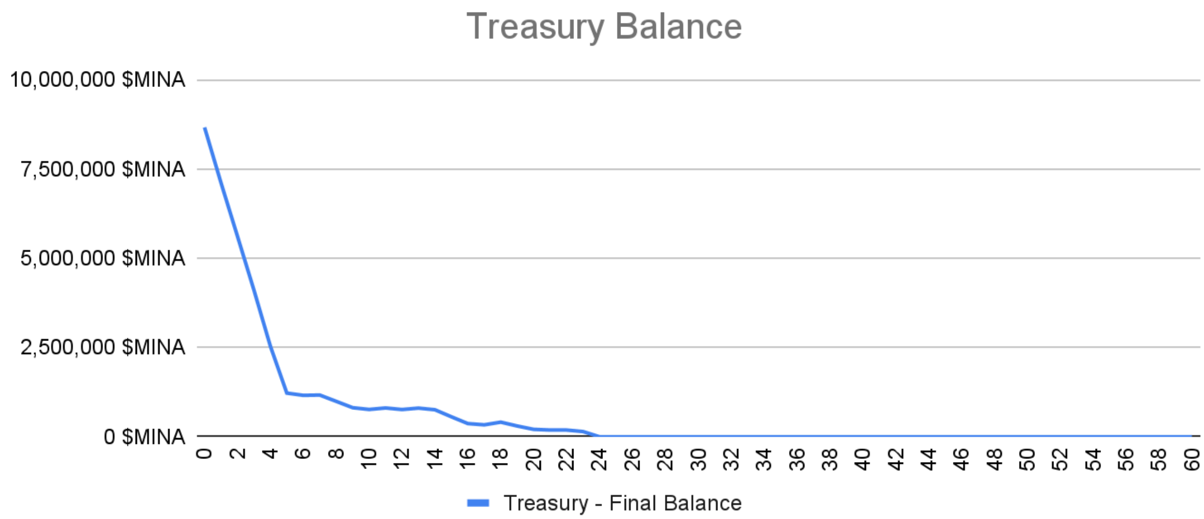
Speculative Buy Pressure	
Monthly Percentage	*30%*

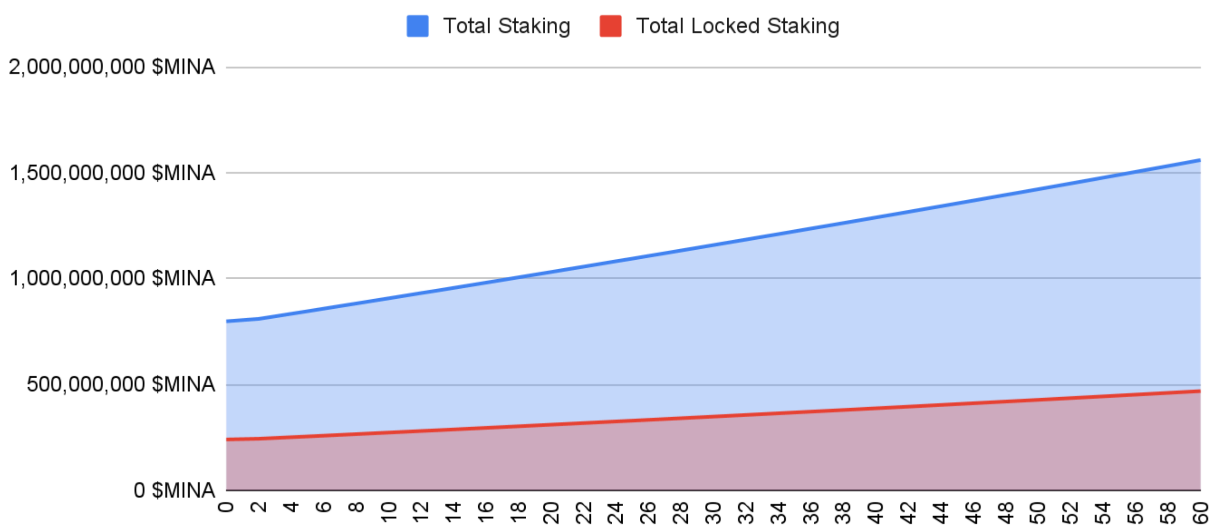
Tokens Held	
Monthly Percentage	*60%*

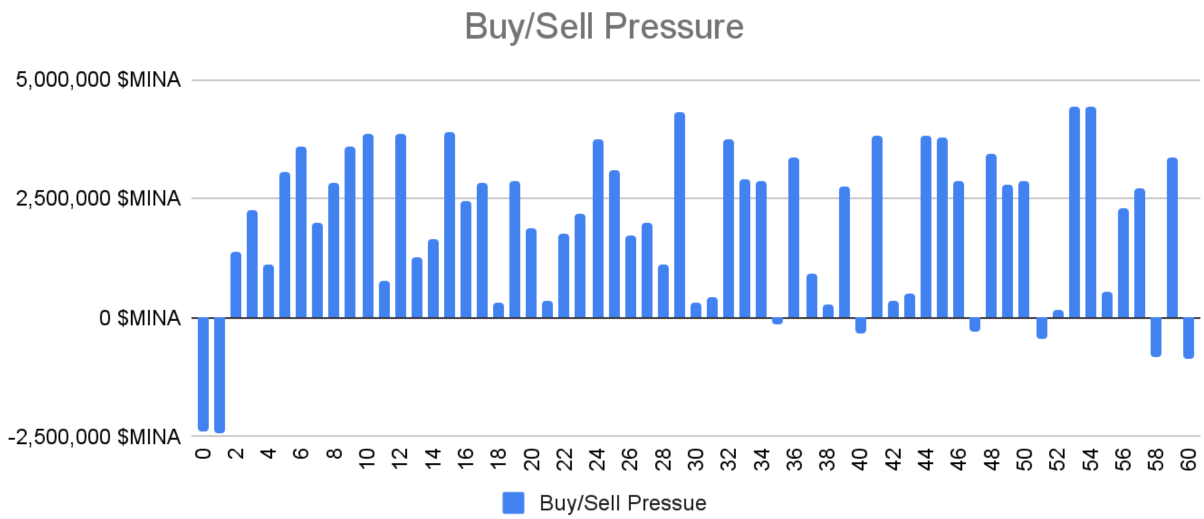
5. Results

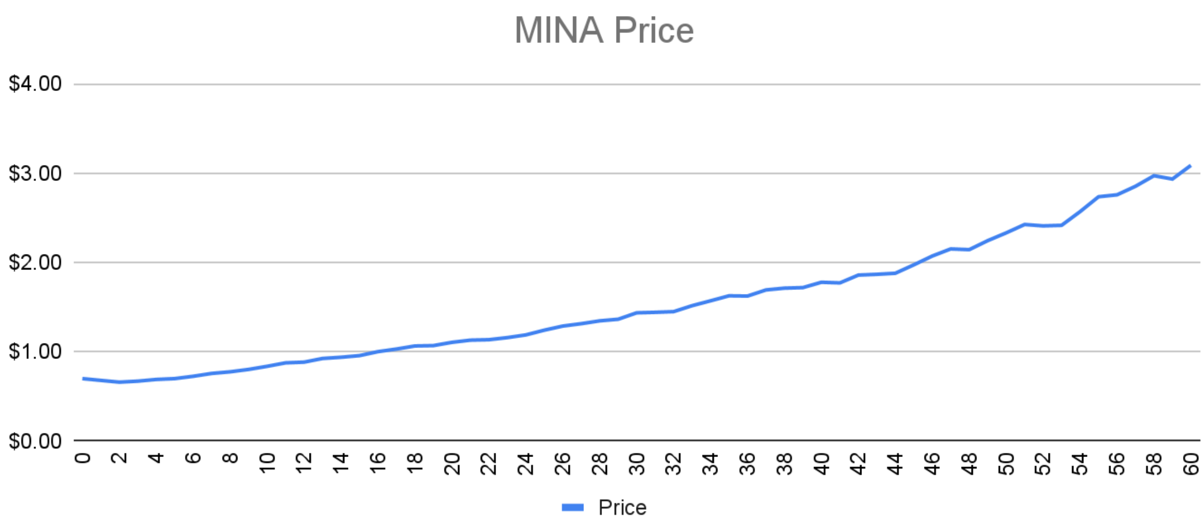

BP Rewards
$50,000,000.00
$40,000,000.00
$30,000,000.00
$20,000,000.00
$10,000,000.00
$0.00
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
Block Producers Rewards


BP Token Profitability
3,000,000 $MINA
2,000,000 $MINA
1,000,000 $MINA
0 $MINA
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
Block Producers Rewards - Profitability


Treasury Balance
10,000,000 $MINA
7,500,000 $MINA
5,000,000 $MINA
2,500,000 $MINA
0 $MINA
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
Treasury - Final Balance


Total Staking
Total Locked Staking
2,000,000,000 $MINA
1,500,000,000 $MINA
1,000,000,000 $MINA
500,000,000 $MINA
0 $MINA
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60





6. Discussion

Token locking significantly increases buy pressure, even when the total amount is reduced to 30%. Due to the resulting price stability, block producers' profitability is also enhanced.

Optimal Scenario

1. Objective: Combine effective strategies together
2. Proposed Change: Introduce token locking, treasury cut, fees, and reduced inflation
3. Hypothesis: The combination of the parameters can ensure sustainable buy pressure, token performance, treasury growth, and block producers' profitability over the months
4. Assumptions:

Inflation	%	9%	7%	5%

Block Rewards

Share to Block Producers	*80%*
Share to Treasury	*20%*

Protocol Fees

Share to Treasury	*20%*
Share to Burn Mechanism	*80%*

Staking

Tokens locked	*30%*
Fee cut	*5%*

Mina Cost per Transaction

Number of tokens	*0.03*

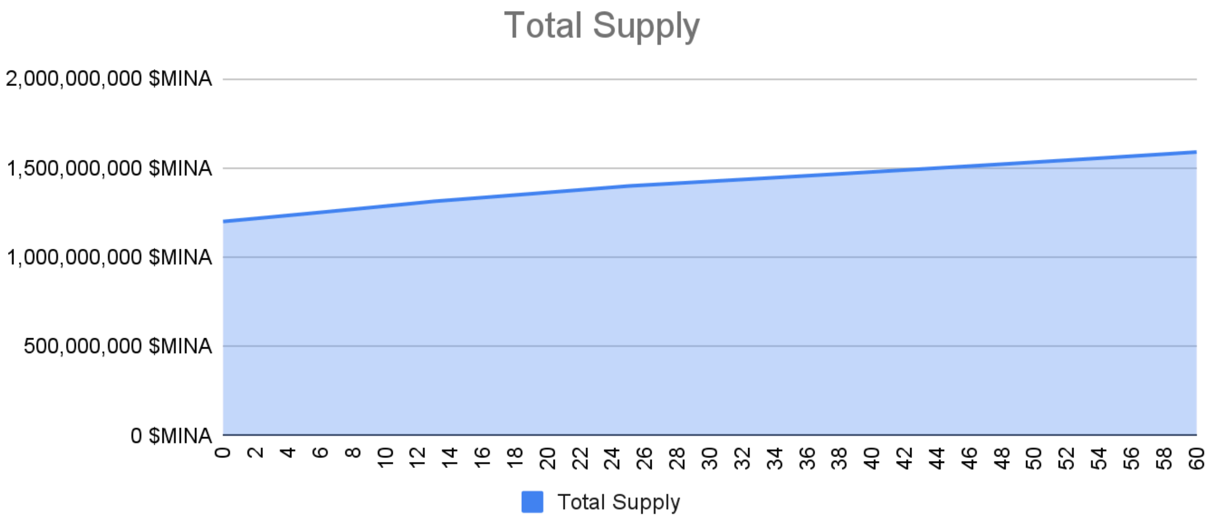
Speculative Buy Pressure

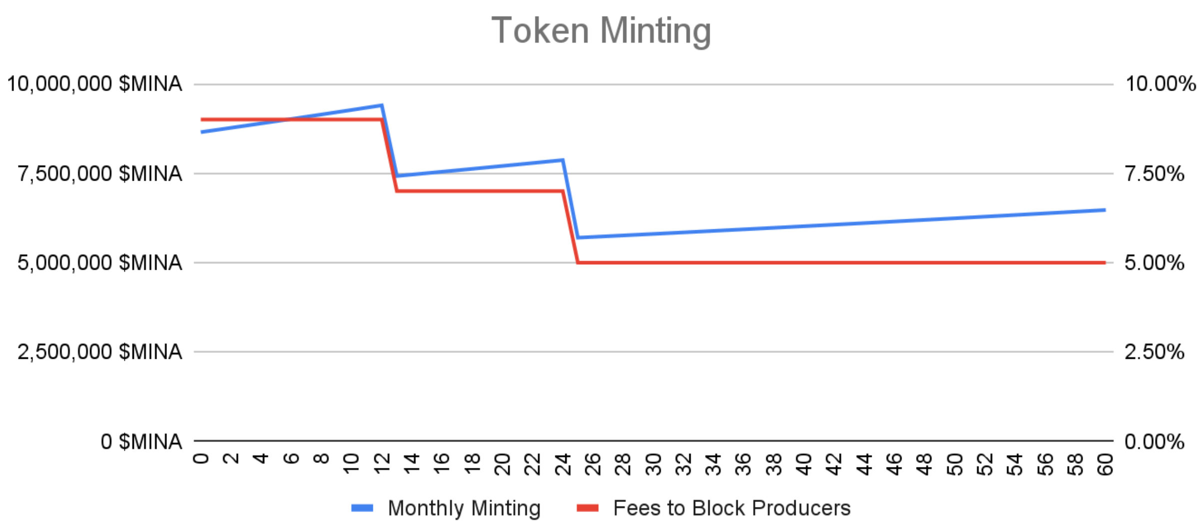
Monthly Percentage	*30%*

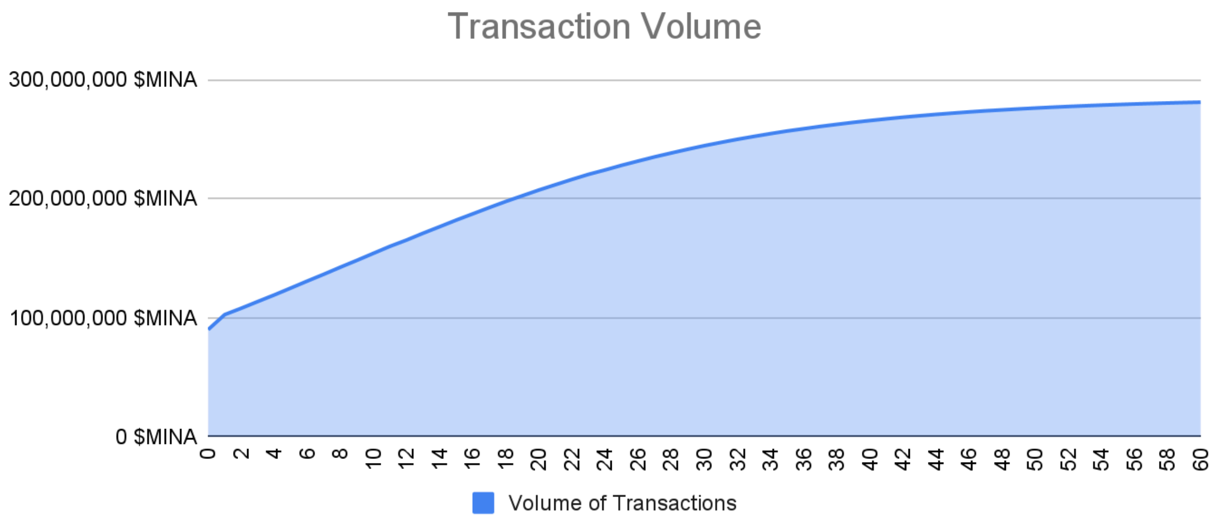
Tokens Held

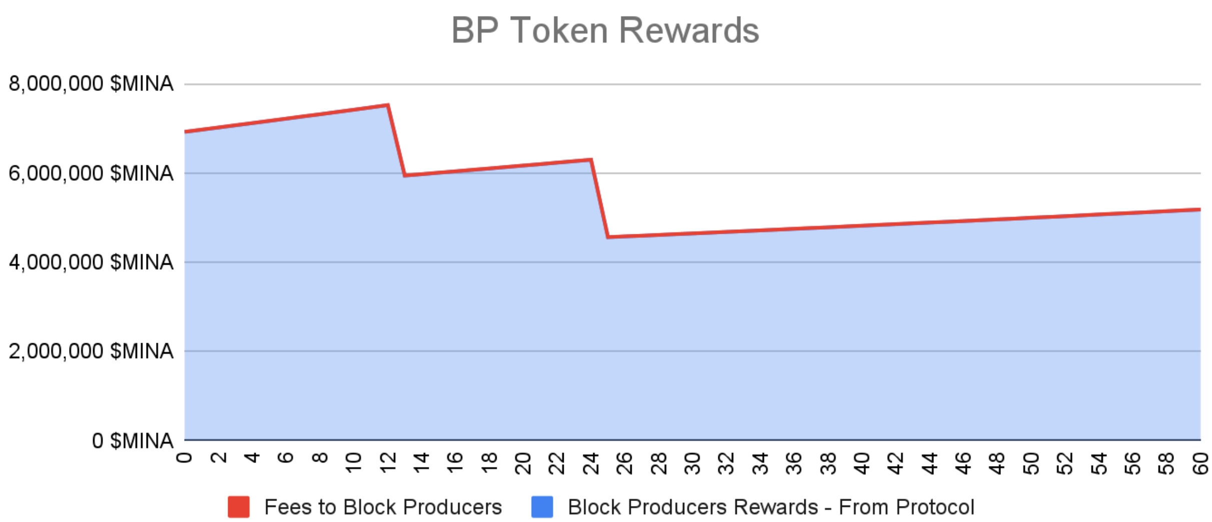
Monthly Percentage	*60%*

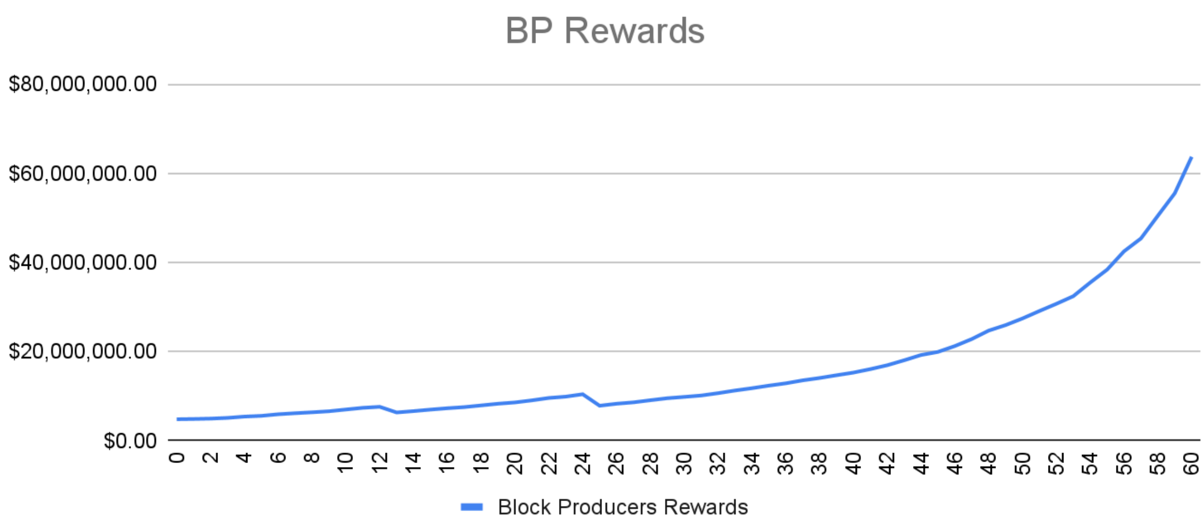
5. Results

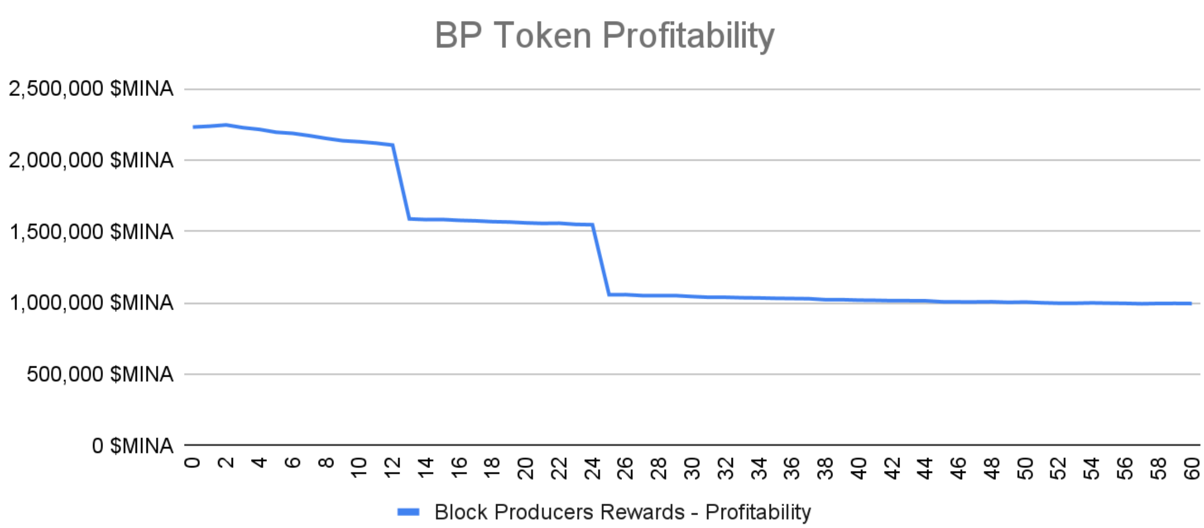

Total Supply
2,000,000,000 $MINA
1,500,000,000 $MINA
1,000,000,000 $MINA
500,000,000 $MINA
0 $MINA
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
Total Supply

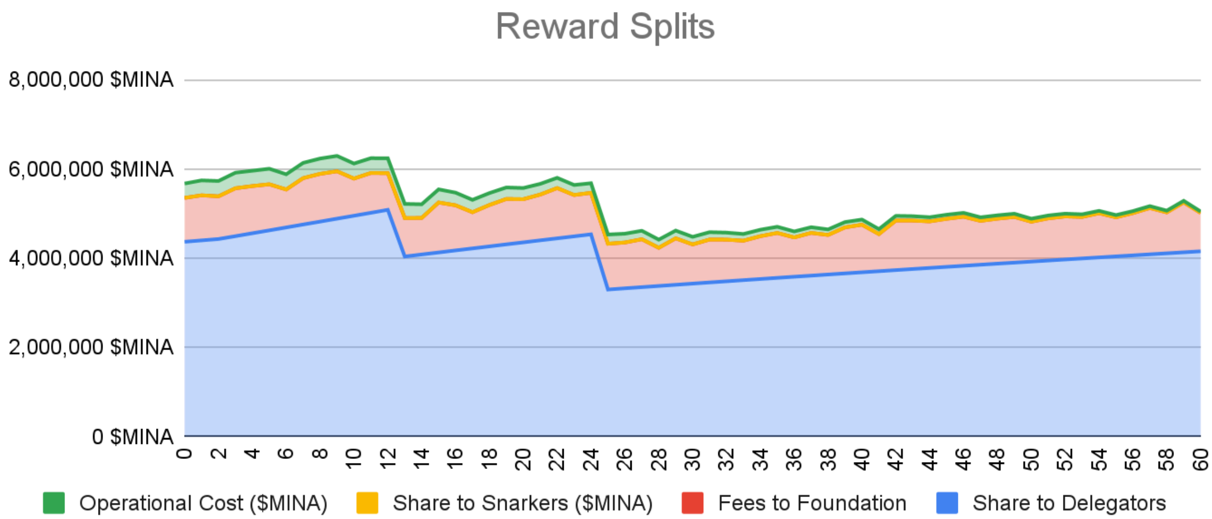

Token Minting
10,000,000 $MINA
7,500,000 $MINA
5,000,000 $MINA
2,500,000 $MINA
0 $MINA
10.00%
7.50%
5.00%
2.50%
0.00%
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
Monthly Minting
Fees to Block Producers

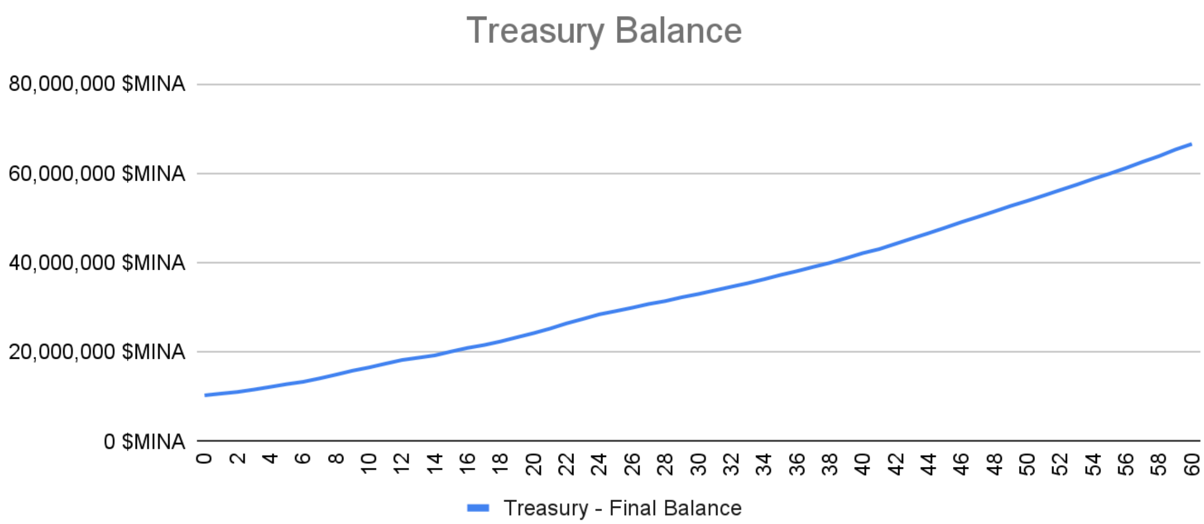

Transaction Volume
300,000,000 $MINA
200,000,000 $MINA
100,000,000 $MINA
0 $MINA
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
Volume of Transactions

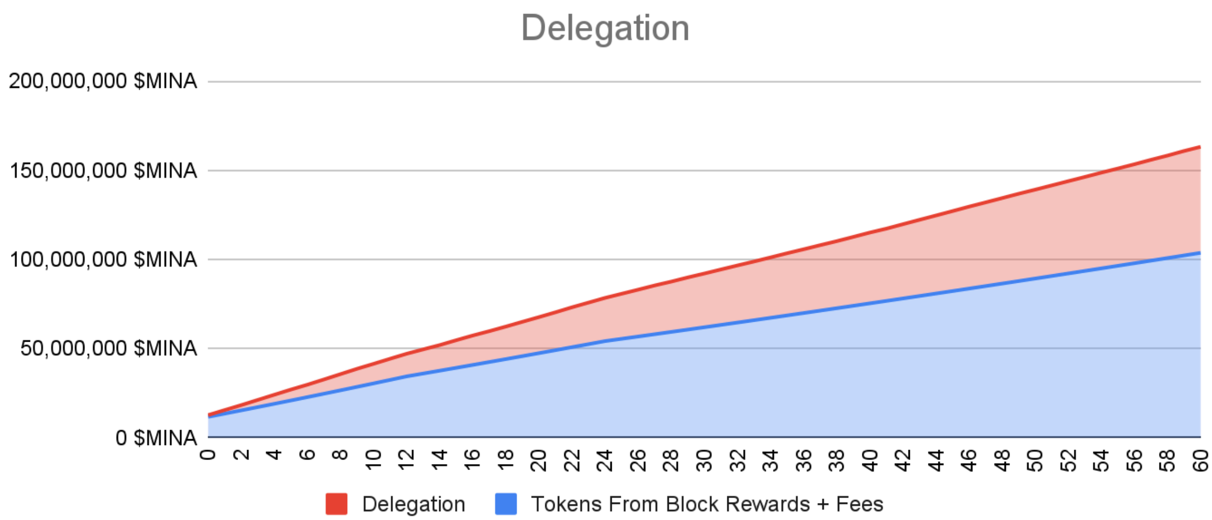

BP Token Rewards
8,000,000 $MINA
6,000,000 $MINA
4,000,000 $MINA
2,000,000 $MINA
0 $MINA
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
Fees to Block Producers
Block Producers Rewards - From Protocol

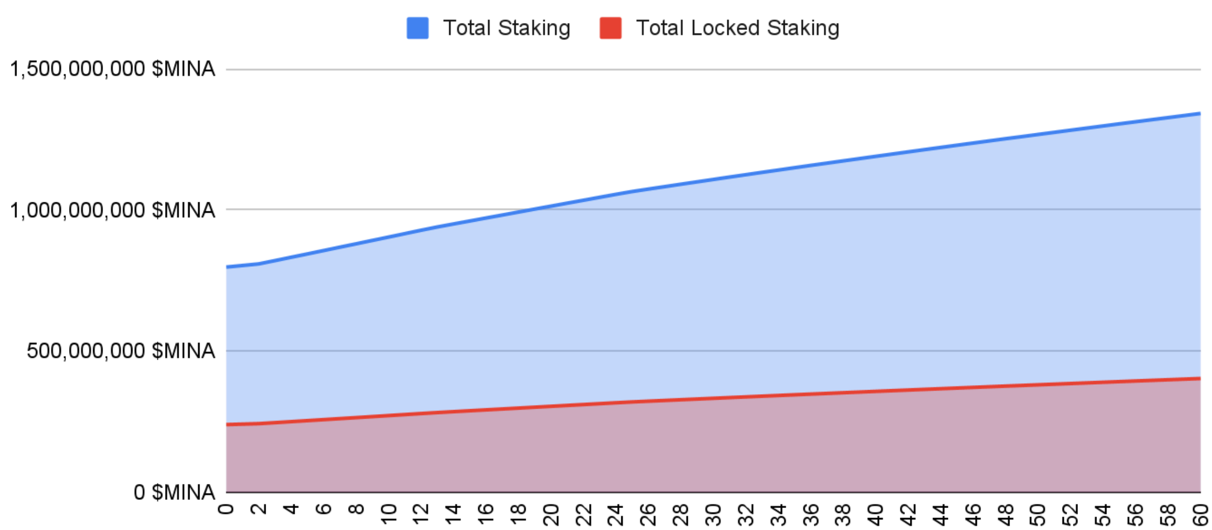

BP Rewards
$80,000,000.00
$60,000,000.00
$40,000,000.00
$20,000,000.00
$0.00
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
Block Producers Rewards

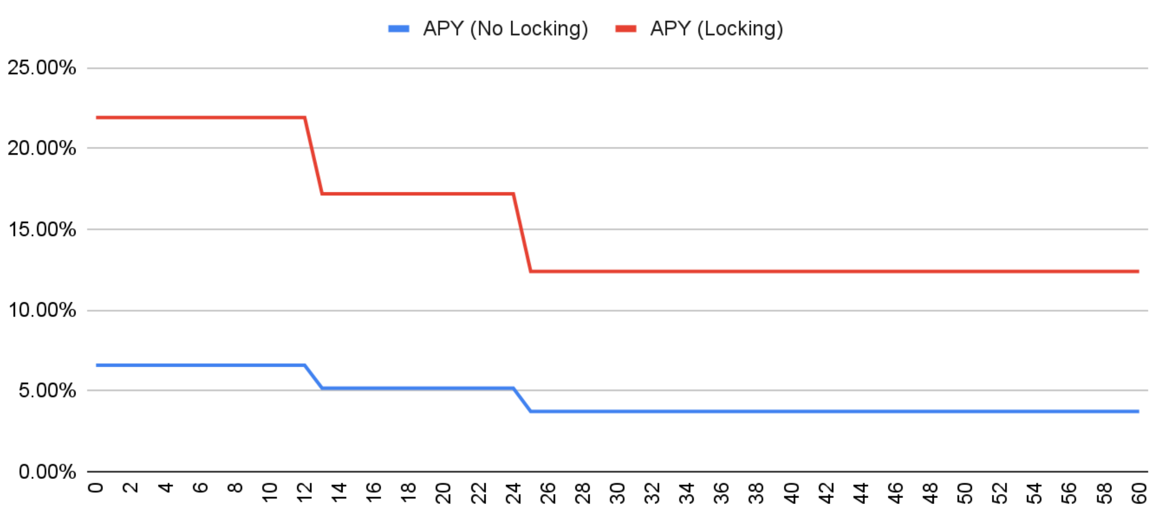

BP Token Profitability
2,500,000 $MINA
2,000,000 $MINA
1,500,000 $MINA
1,000,000 $MINA
500,000 $MINA
0 $MINA
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
Block Producers Rewards - Profitability

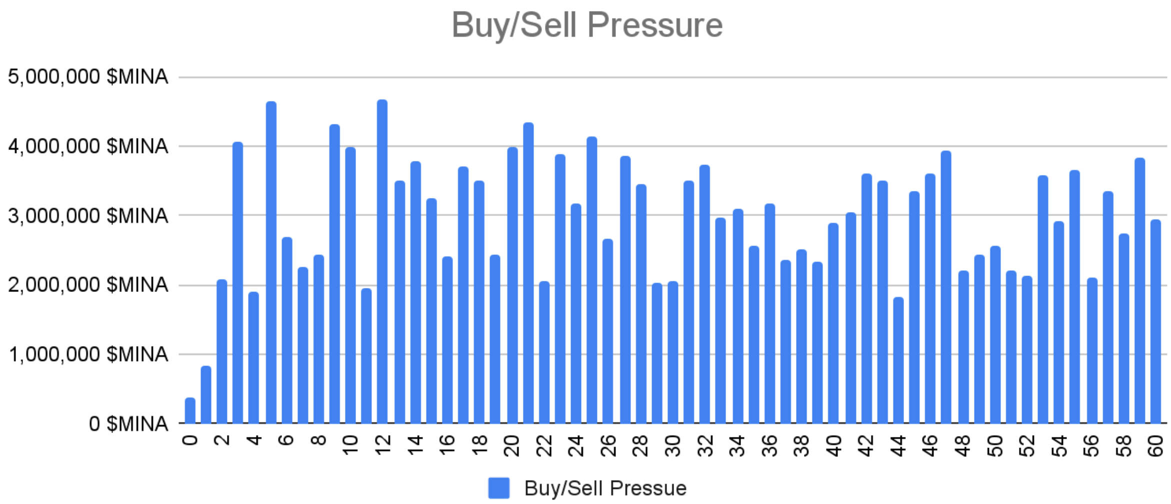

Reward Splits
8,000,000 $MINA
6,000,000 $MINA
4,000,000 $MINA
2,000,000 $MINA
0 $MINA
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
Operational Cost ($MINA)
Share to Snarkers ($MINA)
Fees to Foundation
Share to Delegators

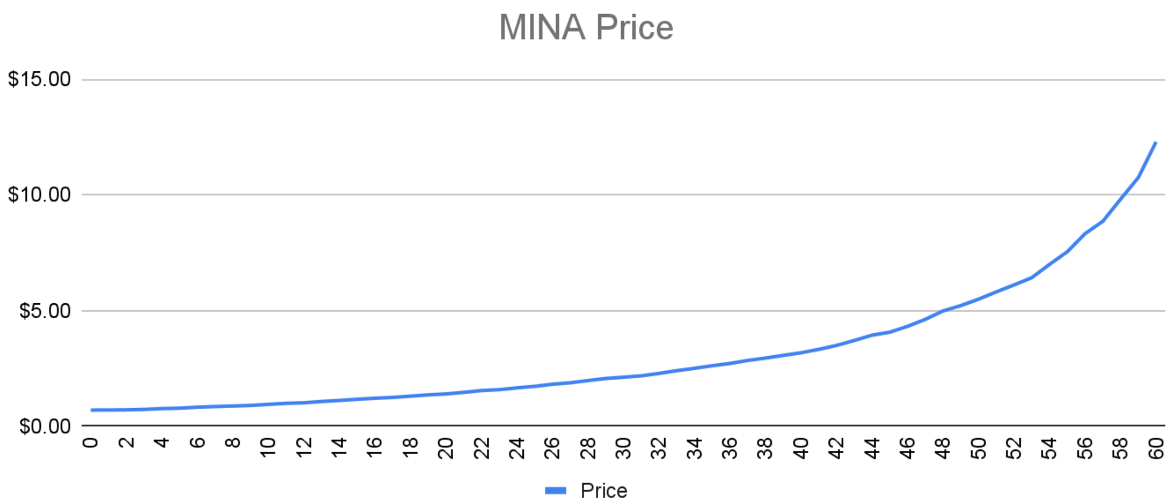

Treasury Balance
80,000,000 $MINA
60,000,000 $MINA
40,000,000 $MINA
20,000,000 $MINA
0 $MINA
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
Treasury - Final Balance


Delegation
200,000,000 $MINA
150,000,000 $MINA
100,000,000 $MINA
50,000,000 $MINA
0 $MINA
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
Delegation
Tokens From Block Rewards + Fees


Total Staking
Total Locked Staking
1,500,000,000 $MINA
1,000,000,000 $MINA
500,000,000 $MINA
0 $MINA
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60


APY (No Locking)
APY (Locking)
25.00%
20.00%
15.00%
10.00%
5.00%
0.00%
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60


Buy/Sell Pressure
5,000,000 $MINA
4,000,000 $MINA
3,000,000 $MINA
2,000,000 $MINA
1,000,000 $MINA
0 $MINA
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
Buy/Sell Pressue


MINA Price
$15.00
$10.00
$5.00
$0.00
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
Price