

# R5: Emissions & Economic Framework

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**Abstract.** This paper outlines the proposed supply distribution and emission mechanics for the implementation of the R5 Network.

## 1. EMISSIONS & SUPPLY CREATION

We propose a hybrid halving mechanism to be employed, in which the block reward decreases exponentially until block 128,000,000. These halving intervals - referred to as “Super Epochs” - are defined by block ranges based on powers of two. After block 128,000,000, the reward remains fixed. The schedule is outlined below:

Block Interval	Reward
[1] 1 – 4,000,000	2
[2] 3,000,001 – 8,000,000	1
[3] 8,000,001 – 16,000,000	0.5
[4] 16,000,001 - 32,000,000	0.25
[5] 32,000,001 - 64,000,000	0.125
[6] 64,000,001 - 128,000,000	0.0625
[7] 128,000,000 – 1,290,406,400	0.03125

At block 1,290,406,400 the supply is expected to reach 66,337,700 coins, after which point no more coins will be created and the miner rewards will be that of the accumulated transaction fees for each block that is mined.

This dynamic ensures that the supply growth increases linearly relative to the number of Super Epochs, and logarithmically relative to time, while the rewards are reduced exponentially and the number of blocks in each Super Epoch increase exponentially.

To calculate the approximate yearly emissions of new coins under this scheme we can use the equation below:

$$X = R \times \left(\frac{60}{A}\right) \times (24 \times 365)$$

Where X represents the number of approximate yearly emissions of new coins, R the

reward rate for the specific Super Epoch, and A the target block time in seconds, which is, in this case, 7.

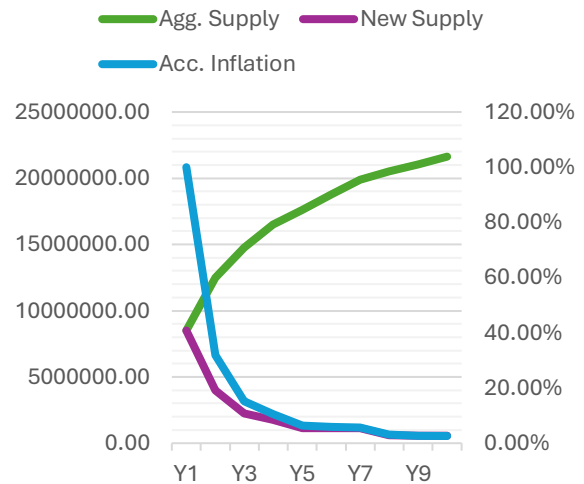
The proposed structure of the Super Epochs also ensures that, except for the first and last, 4,000,000 coins are created during each Super Epoch, which helps with predictability and should assist in stabilizing markets.

The supply creation chronology should closely follow the schedule below:

Super Epoch	Blocks in Super Epoch	Aggregated Supply*
1	4,000,000	8,000,000
2	4,000,000	12,000,000
3	8,000,000	16,000,000
4	16,000,000	20,000,000
5	32,000,000	24,000,000
6	64,000,000	28,000,000
7	$\infty$	66,337,700

\* At the end of the epoch or at the end of the emission cycle on Super Epoch 7.

Below, a chart that illustrates expected supply growth for the initial 10 years of the protocol based on the metrics provided.



	Agg. Supply	New Supply	Acc. Inflation
Y1	8,505,142.86	8,505,142.86	100.00%
Y2	12,505,142.86	4,000,000.00	31.99%
Y3	14,757,714.29	2,252,571.43	15.26%
Y4	16,505,142.86	1,747,428.57	10.59%
Y5	17,631,428.57	1,126,285.71	6.39%
Y6	18,757,714.29	1,126,285.72	6.00%
Y7	19,884,000.00	1,126,285.71	5.66%
Y8	20,505,142.9	621,142.86	3.03%
Y9	21,068,285.7	563,142.85	2.67%
Y10	21,631,428.6	563,142.86	2.60%

It is important to note that a proof-of-work consensus inherently result in less consistent block times, so some deviation from the chart and table presented is to be expected.

Based on the proposed economic policy scheme, we can infer that:

- The exponential reduction of supply on each new Super Epoch will serve as an incentive for miners to consistently participate in securing the network throughout its initial years,
- The exponential increase in the number of blocks per new Super Epoch should promote a decrease in market volatility as the protocol ages,
- When the protocol reaches its final Super Epoch, it is expected for it to be consolidated enough that transaction fees should generate enough revenue for mining participation not to be of concern,
- The supply distribution scheme allows for price discovery in the initial Super Epochs, with a gradual path toward price stabilization up until and after the beginning of Super Epoch 7 – or the final Super Epoch,

### **Uncle Blocks and Rewards**

We propose that each block append up to 2 uncle blocks. This increases the protocol overall security and mitigates network delay issues. However, uncle block rewards should be deliberately set to zero with the intent of giving the protocol a more rigid and clear emissions policy.

### **Supply Allocation and Pre-mining**

Although a controversial topic, historically speaking, protocols that have launched with tokens and coins pre-allocated have had a much higher rate of long-term success, when compared to those that did not.

This can be attributed to a few factors, but more evidently: a. lack of funding for continuous development post-launch; b. constrained liquidity; and c. complex and ineffective funding dynamics for community initiatives.

*Lack of funding for continuous development.* Often means that paying and maintaining basic infrastructure becomes a complex and divisive matter and can lead to centralization as very few are willing to, or have the means to fund infrastructure for a project

indefinitely, without the prospect of future gains.

*Constrained liquidity.* Can hinder the expansion of the protocol for three main reasons: 1. Exchanges must source their own liquidity when trying to list the project; 2. Decentralized finance becomes dependent on whale holders to provide liquidity for all the other users, leading to centralization and a misalignment of interests; and 3. It becomes harder for the protocol to attract both users and developers if on and off-ramps are costly and cumbersome due to the low liquidity available.

*Complex and ineffective funding dynamics for community initiatives.* Simple community events and initiatives that would otherwise benefit the protocol can become divisive and difficult to pull off, as funding of such initiatives – a marketing campaign, for example – becomes hostage to the will of several community members that may not have aligned opinions as to how these initiatives should be conducted and funded.

We propose that out of the total supply of 66,337,700 coins, 2,000,000 coins (or approximately 3%) are used to fund the initial development and further growth of the protocol after its launch.

The pre-allocation funds should be pooled and managed by the protocol's main maintainer – R5 Labs - with community participation and full transparency.

Whilst the pre-allocated funds may provide for initial funding of the project, emphasis should be placed by R5 Labs in structuring ways to create a constant flow of revenue generation that will ensure the long-term success of the protocol.

## **2. SUPPLY DISTRIBUTION**

Supply distribution is set to happen through the creation of new coins via mining, and the payment of transaction fees.

Any new supply is to be exclusively distributed via mining rewards, where miners are rewarded with new coins after successfully validating a new block.