

# CHSB Yield 2.0

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## **Abstract**

The CHSB Yield 2.0 program is a fair, community-centric and sustainable approach to incentivise the growth of SwissBorg's ecosystem. It is based on a system of tiers that allows for very attractive returns for most CHSB holders, while still guaranteeing a satisfactory return for large holders and improving the health of our ecosystem in the long term.

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## Introduction

This white paper explains the motivations and the mechanism behind the CHSB yield 2.0 program, an initiative to revamp the CHSB yield to attract new users and grow SwissBorg's ecosystem. We detail the components of the calculation, factors that influence it, and illustrate the concept with examples

## Motivation

Classical economic theory tells us that the value of a network grows alongside the number of users in the network. The internet is a good example of this network effect dynamics: if only one computer was connected to the network, it would have hardly any utility. As more and more computers get connected, the incentives for new joiners increase. We see a similar pattern when comparing the number of Bitcoin holders with its price: the more people joining the ecosystem, the more everyone else benefits.

The same is true, of course, for the CHSB token. If all CHSB tokens were held by a single person, the value of CHSB would likely be zero. By attracting new users and decreasing the concentration of CHSB, we will grow the value of our ecosystem exponentially, while reducing volatility and the risk of one large sale dumping the price of the token.

If we want to attract new users, we need to provide a great incentive for purchasing CHSB and becoming Premium faster. The CHSB Yield Program is a great gateway for this, since it is the mechanism that allows CHSB holders to accumulate tokens and plan for the long term.

This is the first time a crypto investing app has offered smaller investors a way to boost their wealth and reach their goals at an even faster rate. In the wider CHSB ecosystem, smaller investors will be able to grow their CHSB holdings faster with the boosted yield, which will empower them to upgrade to Community Premium. After they upgrade, they can then benefit from a 1.5X yield multiplier on *all* yield-earning tokens in the SwissBorg app, along with reduced exchange fees. In this way, CHSB Yield 2.0 is truly empowering them to grow their crypto wealth.

By making CHSB and the CHSB Yield Program more attractive for small investors, the more we can boost CHSB adoption, and the more the ecosystem value will grow in the long term. With more demand for CHSB and less circulating supply, we can expect a price increase for the CHSB token.

## How the CHSB Yield 2.0 works

In this section, we will detail the key components of the program, and illustrate with a few concrete examples.

### The tiers system

The tiers consist of progressive CHSB intervals that divide the user's staked CHSB. Each tier is associated with a Daily Percentage Yield (DPY), which is converted to an approximate Annual Percentage Yield (APY) according to equation (1):

$$APY = (1 + DPY)^{365} - 1 \quad (1)$$

Equation (1) can be reversed to calculate the DPY based on the APY, as shown in equation (2):

$$DPY = (1 + APY)^{1/365} - 1 \quad (2)$$

The DPY of each tier defines how much CHSB rewards the user will earn on a given day, according to equation (3):

$$\text{Daily reward} = \sum_{i=1}^n \text{staked}_i * DPY_i \quad (3)$$

The DPY is periodically updated according to 3 factors, which will be detailed in the following sections.

### The distribution of CHSB holders in the yield program

SwissBorg's algorithm analyses how CHSB is distributed among holders in the yield program and optimises yield rewards in order to achieve the best utility possible while respecting the minimum return and budget constraints.

Inspired by a [discussion](#) by Vitalik Buterin, we have assessed different possible metrics to represent the CHSB distribution among holders. Whereas the Gini coefficient is a classical economics metric with an easy interpretation, it is not the best choice for a cryptocurrency context due to its difficulties in differentiating economic inequality and level of interest. Thus, we have decided to adopt one of Vitalik's suggestions and use a metric that better represents the lost utility from inequality, represented on equation (4).

$$\text{Lost utility} = \log\left(\frac{\sum_{i=1}^n x_i}{n}\right) - \frac{\sum_{i=1}^n \log(x_i)}{n} \quad (4)$$

## SwissBorg's Community Index

The goal of the Community Index is to determine a score based on the key figures of the SwissBorg ecosystem. A full explanation of how it is calculated can be found in the [original whitepaper](#). The Community Index plays an important role in CHSB Yield 2.0 by determining how much of the CHSB reward budget will be distributed in the next period.

## CHSB budget for the program

The CHSB budget is determined by SwissBorg, and adjusted on a periodic basis. As previously explained, it is closely related to the Community Index, as the latter defines the fraction of the budget that will be distributed.

## How daily rewards are calculated

The calculation of the CHSB reward payout is done on a daily basis for all users with an active CHSB subscription in the yield program. The calculation can be summarised in 5 steps:

1. Adjust the tier APYs according to the user's account type (standard, Community Premium or Genesis Premium)
2. Compute each tier's DPY by applying equation (2)
3. Assign the user's staked CHSB from the lowest to the highest tier
4. Multiply the staked amounts by the DPY to get the reward per tier
5. Sum all the tier rewards to find the daily reward payout

The reward payout of one day is automatically added to the user's yield staked amount, and will be allocated to the appropriate tier in the following day. It is important to note that since tiers have different DPYs, on the next day the user's effective return might be different from the previous day. As a result, it is not possible to derive a simple formula to calculate how much yield would be generated after a period of multiple days. The correct way to do this calculation is to iterate over the 5 steps described above, according to the desired number of days.

In order to better illustrate the concept, we will calculate the daily reward for two scenarios. In both cases, let's assume that the current tiers and Genesis Premium tier APYs are as defined in Table 1:

Tiers	Genesis APY
0-2,000	29.36%
2,000-10,000	10.44%
10,000-100,000	8.39%
100,000-1,000,000	6.13%
1,000,000+	4.48%

Table 1: Example tiers and percentage yield

**Example A: Genesis Premium user with 15,000 CHSB staked**

Since the user is Genesis Premium, we don't need to adjust the APY, and we can apply equation (2) to calculate the equivalent DPY. Next, we distribute the user's staked CHSB into tiers. Since the user has 15,000 CHSB staked, the first 10,000 will complete the first 2 tiers (0-2,000 and 2,000-10,000), and the remaining 5,000 will be allocated to the third tier. We now multiply these staked amounts by the DPY to find the reward generated by each tier.

Tiers	Genesis APY	Genesis DPY	Staked	Daily Reward
0-2,000	29.36%	0.071%	2,000	1.41
2,000-10,000	10.44%	0.027%	8,000	2.18
10,000-100,000	8.39%	0.022%	5,000	1.10
100,000-1,000,000	6.13%	0.016%	0	0
1,000,000+	4.48%	0.012%	0	0

Table 2: Example calculation for Genesis Premium user with 15,000 CHSB staked

Therefore, the user's daily reward will be  $1.41 + 2.18 + 1.10 = 4.69$ . The effective DPY and APY can be computed according to equation (5):

$$\text{Effective DPY} = \frac{\text{Daily Reward}}{\text{Staked amount}} = \frac{4.69}{15,000} = 0.03128\% \quad (5)$$

For our example, the effective DPY is 0.03128%, which can be converted to an approximate yearly rate of 12.1% using equation (1).

**Example B: Standard user with 15,000 CHSB staked**

Since a Genesis Premium user has a 2X multiplier on the APY, we need to divide the APY by 2 and calculate the corresponding DPY. The calculation then follows the same steps as explained in Example A.

Tiers	Standard APY	Standard DPY	Staked	Daily Reward
0-2,000	14.68%	0.038%	2,000	0.75
2,000-10,000	5.22%	0.014%	8,000	1.12
10,000-100,000	4.20%	0.011%	5,000	0.56
100,000-1,000,000	3.07%	0.008%	0	0
1,000,000+	2.24%	0.006%	0	0

Table 3: Example calculation for standard user with 15,000 CHSB staked

The user's daily reward will be  $0.75 + 1.12 + 0.56 = 2.43$ . The effective DPY is 0.01619%, with an approximate yearly rate of 6.1%.