

# Overview

Market governance seeks to create a competitive marketplace for sourcing yield for the VOLT cryptocurrency. The first step toward this is accurately accounting for the yield earned within the system, as well as the deviation (if any) between actual and target surplus buffer and liquid reserve ratios, to determine the right aggregate system rate to pay out to VOLT holders.

On top of this, there will be a system by which VCON holders can allocate a certain share of the protocol controlled value among yield venues, earning VCON incentives based on their performance. In the initial system, VCON will be nontransferable and there will be no liquidations.

## PCV Accounting

In order to accurately assess the amount of PCV in the system over a given period of time, the VOLT system will need to maintain a CTWA (cumulative time weighted average) of the PCV. This will be done by snapshotting the PCV balance when a user mints or redeems VOLT using a Peg Stability Module, or when a VCON holder moves PCV. The snapshot must take place at the end of each block so that the TWAP is resistant to flash loan attacks.

The main index that the PCV TWAP will track are two values, the first value is the cumulative PCV from all time and periods. This will be calculated with the following formula, *ctwaPCV* is the Cumulative Time Weighted Average of the PCV,  $s_i$  will be equal to the PCV at a given period in time when a user interacts with the system, and  $\Delta t$  will be equal to the difference in time between the last call to calculate PCV and the current time.

$$ctwaPCV = \sum_{i=0}^n (s_i * \Delta t)$$

The second value that will be tracked is the previous period's cumulative PCV. This will be used to calculate the PCV across a period of time which will determine the fee split at the end of the period. Time Weighted Average PCV for a period will be calculated using the following formula where *ctwaPCV* is the cumulative time weighted average of PCV for a period of time. The subscripts in the formula denote the period in which the *ctwaPCV* is being measured from, with  $n$  being the most recent period.

$$\Delta t = end\ time - start\ time$$
$$ctwaPCV_n = (ctwapPCV_n - ctwapPCV_{n-1}) / \Delta t$$

This formula will measure the time weighted average PCV over the entire period, thus protecting the protocol from malicious actors that could spam the system with multiple checkpoint actions across many different blocks.

Yield paid out for a given period will use the following formulas, where  $s$  equals the Surplus Buffer Split Ratio,  $t$  is the target surplus buffer to pcv ratio,  $twPCV$  is the time weighted average PCV for the period, and  $y$  is yield paid during a period:

$$s = \text{Surplus Buffer} / twPCV / t$$

$$y = \text{Previous Period Interest} * s$$

In a hypothetical example where the surplus buffer is 100, PCV is 1000, and  $t$  is 1/10, all yield earned in the underlying venues will be passed on to VOLT holders in the next period.

## Yield Oracle

In both the MVP and final market governance system, we must keep track of the yield the protocol earns in venues. In the MVP system, VCON rewards will be calculated based on the performance of individual VCON holders. Later, this will be needed to determine how much of the protocol yield is available to VCON holders.

Whenever funds go in or out of a venue, the system should account for the yield earned since the most recent log as an index value per venue. This will occur either when a VOLT holder mints or redeems using a PSM, or when a VCON holder deposits into or withdraws from a venue. When they modify their position or call a function to compound their rewards, the venue index is updated and compared to their initial index value.

## VOLT Rate

The Volt Rate will be determined based on two factors:

- The average yield generated by market governance over the recent period
- The average surplus buffer ratio over the recent period

In the MVP, the Volt Rate will never exceed the market governance yield. The reason to do so in the future is when the protocol has sound but illiquid assets and needs liquidity, but in the MVP there will be no illiquid PCV deposits in the Volt system. Market governance will pass on the full underlying yield when the surplus buffer is at or above target, and reduce yields when the surplus buffer is below target. This facilitates surplus buffer growth and discourages dangerously fast expansion.

# VCON PCV Allocation

By default, PCV will be unallocated and placed into PSM's (Peg Stability Module) so that VOLT users can quickly and cheaply redeem their VOLT for stablecoins. All PSMs are subject to rate limits so that if there is a loss in a yield venue, it can be fairly accounted for across the system instead of those VOLT holders who are fast to redeem getting out ahead while others absorb more than their share.

VCON holders will be able to allocate their pro rata share of the PCV (Protocol Controlled Value). In the final design, holders will earn a portion of the yield they generate in excess of the VOLT rate. In the early stage, they will instead receive nontransferable VCON rewards proportional to their performance.

The formula for how much PCV an individual VCON holder can allocate is as follows, where  $aPCV$  is the allocatable amount of PCV for a given VCON holder,  $iVCON$  is the amount of VCON the holder has staked in market governance, and  $pVCON$  is total VCON participating in market governance. The reserve factor is the portion of PCV excluded from market governance, primarily for the purpose of providing low cost liquidity in Volt's PSMs.

$$aPCV = iVCON / (iVCON + pVCON) * (PCV - Reserve Factor)$$

# VCON Rewards

Yield generated by VCON holders is tracked by having a share price in each individual yield venue. Anytime yield is generated beyond the initial capital deposited into the system, that yield can be recorded in a permissionless fashion and be used to increase both a venue index and the VOLT target price over the next period. Each VCON holder that allocates will have a share price associated with their account which will be used to track their profits over time, based on the indexes of the venues they deposit into and the VOLT price. This way, in a situation where only a few VCON holders allocate to start, the system will pay out the earliest VCON allocators as they have a larger claim on the PCV. Holders who underperform the average will not earn much, while those who outperform will receive substantial VCON reward.

# Market Governance Controller

In order for the system to track  $pVCON$ , which is how many VCON are participating in market governance, there will be a central Market Governance Controller smart contract that simply records how many VCON have been staked in the system. This way, there is an easy way to determine what a user's pro rata share of the PCV is.

# Accounting of Losses

While the final market governance system will include methods to liquidate underperforming VCON holders or account for losses in venues trustlessly, the initial version will rely on intervention by governance in these extraordinary cases.