BRIGHTPOOL
FINANCE

TRADE SMARTER WITH **AI REWARDS**

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1. Introduction

1.2 Defi Landscape

The DeFi ecosystem transfers solutions from traditional financial markets into a decentralized world, adding new qualities and opportunities. We can add assets to lending protocols or provide liquidity to a decentralized exchange and earn interest. We can mint synthetic assets (which track the value of real-world assets), buy or sell options, etc. Today's DeFi platforms provide innovative solutions and business models that couldn't be created in the traditional financial ecosystem without needing a centralized and trusted third party. The decentralized space enables many more opportunities and allows for higher levels of financial creativity. The Brightpool team took on a challenge to create a protocol that will not only use solutions from traditional financial markets but will benefit from an efficient token economy and decentralization so that a **new type of decentralized exchange,** with the true essence of DeFi, is formed.

1.2 Abstract

Brightpool Finance is not just another cryptocurrency exchange. It stands out because it actually pays you to trade. Unlike traditional exchanges, where you might pay fees to make trades, Brightpool rewards you every time you place an order. This groundbreaking approach is made possible through a unique system that benefits all users.

Get Paid to Trade: Simply by using Brightpool to make your cryptocurrency trades, you earn rewards. It's our way of saying thank you for contributing to our platform's activity.

Innovative Liquidity Pool: At the heart of Brightpool is our special fund, known as the Native Liquidity Pool. This pool is crucial for completing trades on the platform. But here's the twist – it doesn't just rely on user deposits to grow. Instead, it expands as the platform profits from trading activities. This means the more Brightpool is used, the stronger and more valuable this pool becomes.

Dedicated Pools for Currency Pairs: Each type of currency trade on Brightpool is supported by its own specific pool, paired with a unique token. For example, our first pool is for Ethereum (ETH), associated with the BRIX token. This system allows for efficient and flexible trading across different cryptocurrencies.

Starting from Zero: Initially, each pool's token supply is zero. Tokens are then created based on trading activities – specifically, the orders you place. This ensures a fair and dynamic distribution of rewards.

Governance and Control: The platform is governed by the BRI token. Holding this token gives you a say in how Brightpool operates, including decisions about its future direction. It's part of our commitment to ensuring that Brightpool remains a platform that serves its users' needs.

Brightpool is designed to be more than just a place to trade cryptocurrencies. It's a community where your contributions are directly rewarded and where you have a voice in its evolution. By trading on

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Brightpool, you're not just participating in the crypto economy – you're helping to shape an innovative platform that rewards its users and offers a sustainable model for growth.

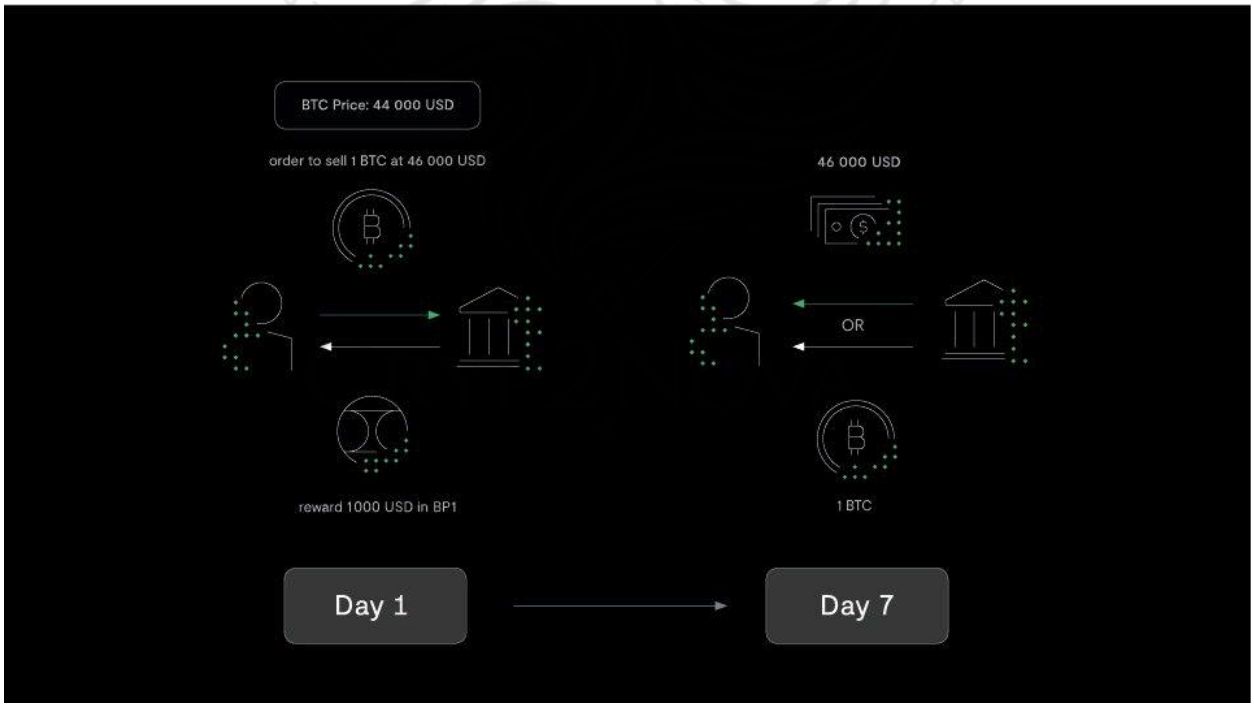
2. Platform

This section explains the major components of the Brightpool Finance platform. It includes the main DEX platform and the various internal pools of Brightpool Finance.

2.1 Trading

Brightpool revolutionizes the decentralized exchange (DEX) scene by introducing the capability for users to place limit orders. This feature enables traders to specify prices at which they wish to buy or sell cryptocurrencies, diverging from the standard DEX model of immediate execution at prevailing market prices through an Automated Market Maker (AMM) system. Brightpool enhances this with a distinctive time-locking mechanism, allowing traders to secure their funds for a chosen duration — the maturity period — which can range from 1 hour to 28 days, with a default setting of 1 day. This approach ensures that orders are only executed after the maturity period has elapsed, granting traders greater strategic control over their transactions and aiding in the stabilization of the market.

2.1.1 How does it work in practice?



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Let's assume that the price of Bitcoin (BTC) is 44 000 USD, and you would like to sell it for 46 000 USD. You connect your wallet to Brightpool and place an order for selling 1 BTC for 46 000 USD with a 7-day maturity period. **Then, your BTC is locked in a Brightpool smart contract – the Order Pool** (explained in section 2.2.1). **After 7 days, if the price of BTC is equal to or higher than 46 000 USD, your order is filled, and you receive 46 000 USD. If the price reaches, i.e., 48 000 USD, you still receive what you requested – 46 000 USD. If the BTC price doesn't reach 46 000 USD (at the maturity date), you receive your 1 BTC back.**

As a reward for freezing your assets, you receive BP1 – the presumed native token of the BTC Pool (notice: BRIX token could also be used for this purpose, depending on what the final pool structure will be). The order reward in the form of BP1 tokens is immediately transferred to your wallet just after an order is placed. When writing, the amount of BP1 tokens received as a reward for the previously mentioned order should be worth around 1000 USD. This value is estimated based on the Black-Scholes model application. The incentive is calculated by a special module – BS.AI®.

2.1.2 Order Settlement

Brightpool streamlines trading by aggregating prices from various decentralized exchanges (DEXs) to secure the most favorable settlement price for orders. Initially funded by Brightpool, the Treasury Pool expands with platform-generated revenue, guaranteeing sufficient funds for trade settlements. This pool, comprising diverse crypto assets and stablecoins, supports the majority of trades. Should the pool's funds be insufficient for an order, Brightpool leverages external DEXs such as SushiSwap, QuickSwap, 1Inch, and Uniswap to fulfill the requirement. With an initial focus on the Arbitrum network due to its low transaction fees, Brightpool aims to extend its operations to other cost-efficient blockchain networks, enhancing trading efficiency platform-wide.

a) Settling Your Trades

In Brightpool, you have the flexibility to set the completion time for your orders to various intervals, including 1, 3, 5, 7, 14, 28 days, or even as short as 1 hour. When the selected duration for your order expires, Brightpool commits to finalizing the trade within 15 minutes. This limited timeframe is designed to prevent any potential impact on the market price of the assets involved in your trade, ensuring that we can source additional funds if necessary without affecting the asset's price adversely. Our goal is to settle trades precisely on schedule, but this 15-minute margin allows us to manage and complete all transactions efficiently.

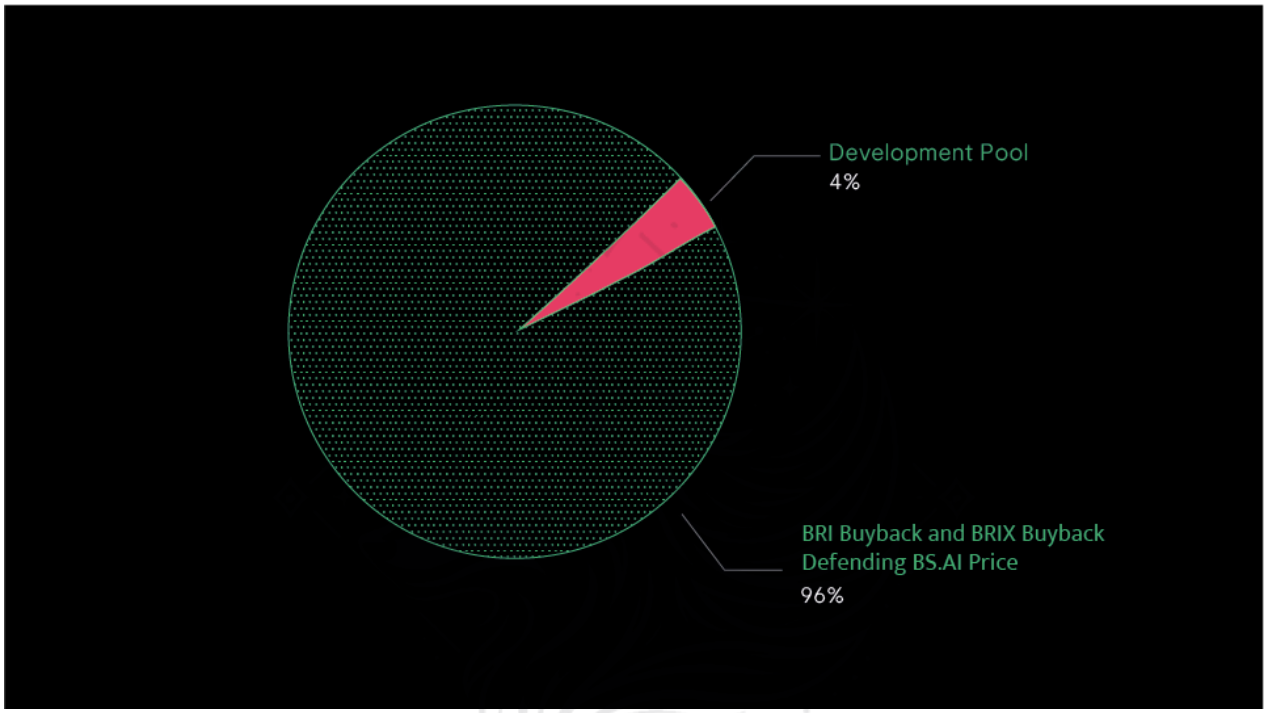
b) Order Spread

Imagine you want to buy Bitcoin. If its average price is $40,000 and you try to buy it for $1,000, that's not really practical and could cause issues, much like unwanted traffic slows down a network. To prevent this,

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Brightpool rewards orders that are within a realistic price range. This range is based on the current price and how much it typically goes up or down. As a rule, if your order's price is more than 30% off the current price, you won't be rewarded for it. This encourages placing orders that are likely to be fulfilled and beneficial for everyone.

2.1.3 Order Profit.



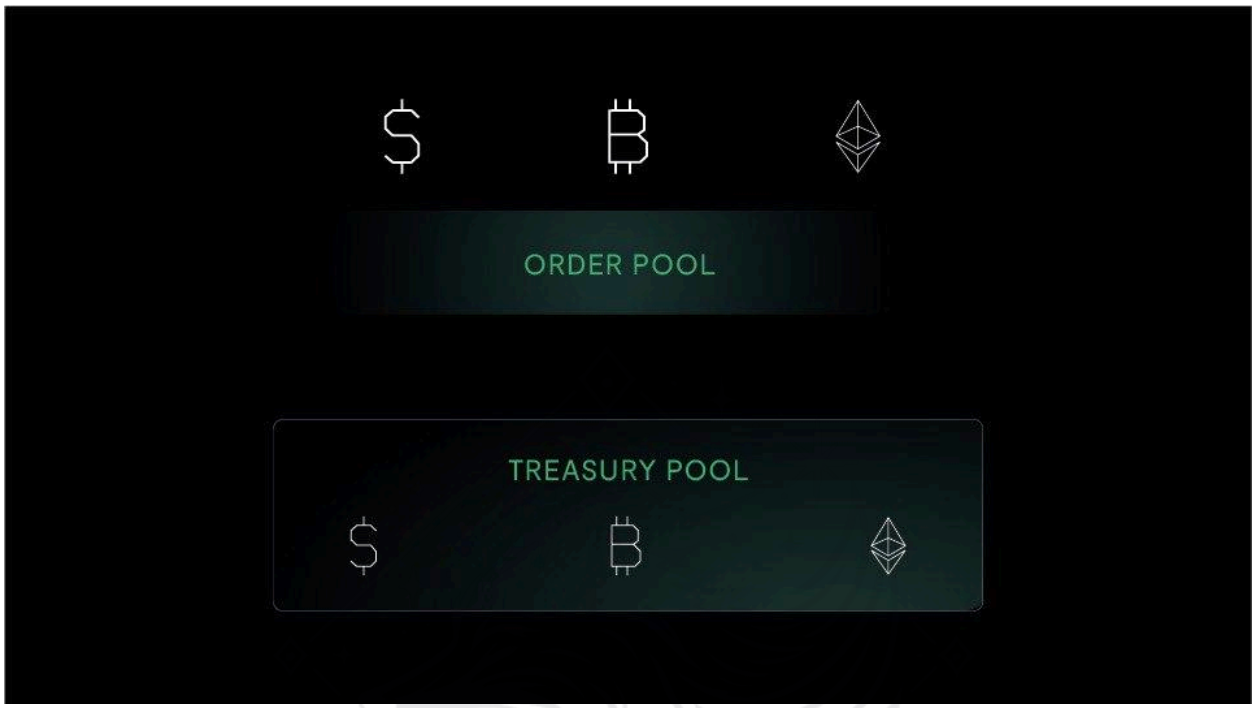
At Brightpool, our profit model is structured around the successful finalization of trades, where profits are made if the settlement price is above the strike price for sell orders or below it for buy orders. This mechanism ensures that Brightpool benefits from market movements in any direction. Since there are no other costs involved, we use the terms "profits" and "revenue" interchangeably.

Profits generated are allocated between two primary pools to facilitate the platform's operations and drive future enhancements:

- **Treasury Pool (96% of Profits):** The majority of our earnings are directed here, supporting the platform's operational needs. This includes ensuring liquidity for trade settlements, maintaining listings on external exchanges, and conducting token buybacks to stabilize their value.
- **Development Pool (4% of Profits):** A dedicated portion for the platform's development team, focusing on continuous improvement and innovation. This investment in the platform's future aims to enhance user experience and expand service offerings.

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2.2 The Pools



Brightpool operates with two internal pools: the Treasury Pool and the Development Pool, alongside the Order Pool, which is managed through smart contracts. Each pool serves a distinct purpose within Brightpool's ecosystem, contributing uniquely to its overall functionality and success.

2.2.1 Order Pool

Initially, if Brightpool doesn't have enough in its Treasury Pool to settle your trade, it will use external exchanges to ensure your order is executed. There are no additional costs for users.

When you initiate a trade on Brightpool, your assets are securely stored in a designated area known as the Order Pool via a secure smart contract. This ensures that your trading assets remain distinct from the exchange's main funds, represented as NFTs in your wallet, until the trade concludes.

Brightpool offers a unique feature where your locked assets can generate additional income through yield farming on partner platforms in the future, providing an opportunity to earn while you wait for your trade to settle.

Upon the trade's maturity, for example, after seven days, you will either retrieve your asset if the trade is unsuccessful or, if successful and the market has moved favorably, Brightpool secures a profit. For instance, if you aimed to sell 1 BTC for 46,000 USDT and the settlement price is 47,000 USDT, Brightpool

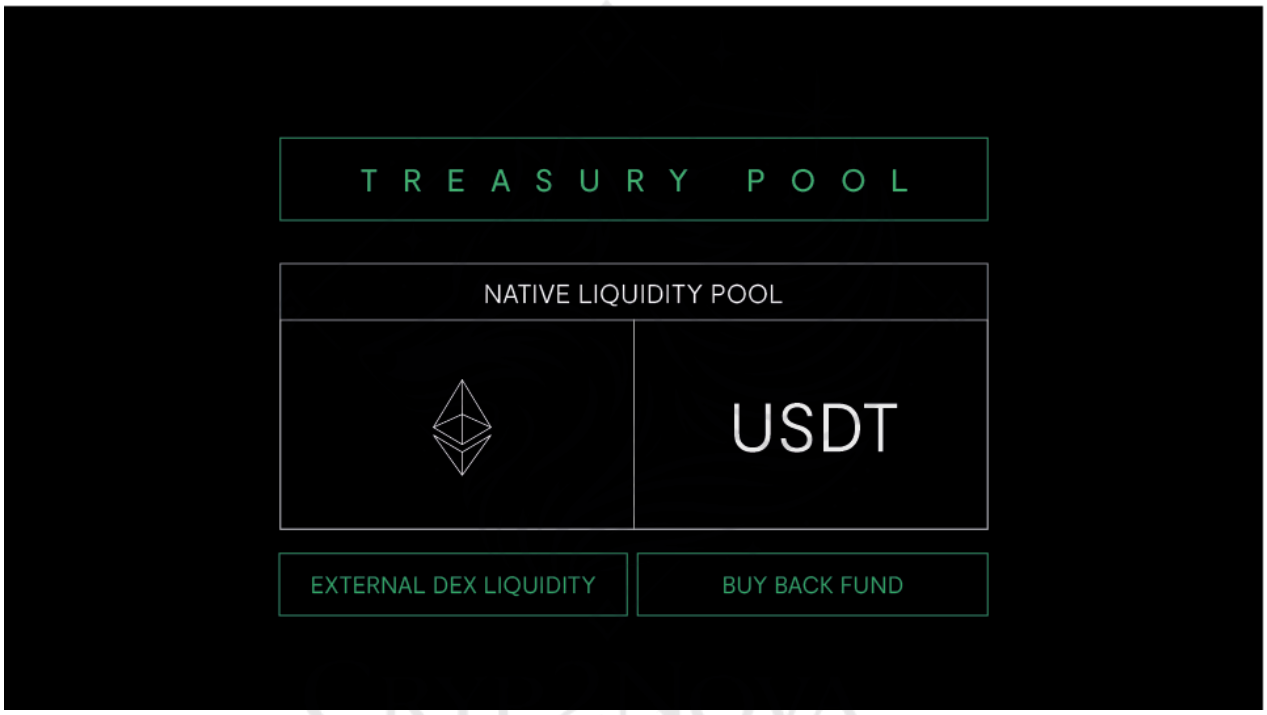
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realizes a profit, and you receive your 46,000 USDT. Such profits are allocated to the Treasury Pool, supporting the exchange's functionality, and the Development Pool, funding advancements and new projects.

2.2.2 Treasury Pool

The Treasury Pool is the heart of Brightpool, managing the funds needed to keep trades moving smoothly. It helps settle trades, ensures Brightpool tokens can be traded on other platforms, and even supports buying back Brightpool tokens to manage their value.

The Treasury Pool's funds are divided into pre-set proportions and are automatically allocated into the following reserves:



How It Works:

- **Revenue Generation:** When trades are settled, they generate money for Brightpool. Most of this money (96%) goes into the Treasury Pool, helping it grow. This includes both the actual trade value and any extra profit made.
- **Native Liquidity Pool:** Brightpool doesn't use traditional liquidity tokens, unlike other exchanges. Instead, part of the money made from trades directly increases the funds available for future trades. This pool gets bigger with every trade, automatically adjusting to support all trading activity on Brightpool.
- **Future Prospects:** With community approval, Brightpool plans to use these funds to earn more money through other DeFi platforms, increasing rewards for token holders.

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- **Token Trading:** Brightpool tokens will be available on external exchanges, too. The Treasury Pool also supports these tokens to ensure their price remains stable, benefiting from a system designed to reduce price volatility.
- **Buyback Strategy:** If pool tokens fall below the BS.AI® price, the platform would buy token pools back and remove them from circulation to help increase their value. The BRI is also bought backed when the price of the BRIX token is stable and secure above the BS.AI® price. The pool tokens' price (BRIX) is the most important to sustain the model.

2.2.3 Development Pool

The Development Pool is allocated for fostering platform growth and innovation, supported by 4% of the exchange's profits. It funds software updates, user experience improvements, and marketing initiatives. Importantly, it also finances community-voted projects, guiding Brightpool's evolution according to user preferences.

How Trading Works on Brightpool: A Simple Example

Imagine you want to sell 1 BTC for 46,000 USDT. Here's what happens:

Placing Your Order: You set up a sell order for your 1 BTC at the desired price. Your Bitcoin is then securely locked in what we call the Order Pool.

Earning Rewards: Our model, BS.AI®, calculates a reward for placing your order and pays out in Brightpool's pool tokens.

The Execution Check: After 7 days, we check if the price of 1 BTC is at or above your asking price of 46,000 USDT:

- If the price is lower, your 1 BTC is unlocked and returned to you.
- If the price is higher, your BTC is used to fund the Treasury Pool, and you receive 46,000 USDT from our liquidity reserves.

2.3 User Profit – Dual ROI

User profit is generated in 2 ways in the Brightpool Finance ecosystem.

Earning Rewards for Orders

When you place a trade on Brightpool, you start earning right away. For every order you make, we reward you with BRIX tokens (our Ethereum pool native token). The amount you earn is calculated through our special BS.AI® algorithm, which could mean rewards worth up to thousands of dollars based on what you're trading.

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Making Money with Yield Farming

Yield farming is a lucrative strategy to enhance earnings from your cryptocurrency holdings. On Brightpool, the moment you place an order, such as purchasing Bitcoin with 46,000 USDT, your funds are not idle. You have the option to engage in "farming" these funds on one of our affiliated platforms, like Curve Finance. This initiative allows your 46,000 USDT to accumulate interest until the execution of your trade. After the trade is finalized, you receive back your original investment along with any accrued interest. This method serves as an effective way to augment your capital, providing additional income atop the rewards for conducting transactions on Brightpool. This functionality will be implemented in further stages of the platform's development (see Roadmap).

3. Tokens

3.1 Pool Tokens

Pool tokens are a key part of Brightpool, created for specific trading pairs. They're not just any tokens; they serve multiple purposes on our platform, making trading more rewarding and flexible.

When you trade on Brightpool, you are rewarded with pool tokens. For instance, if you're trading in our Ethereum pool, you'll earn BRIX tokens. The quantity of tokens you receive is determined by our BS.AI ® algorithm each time you place an order. This is our way of thanking you for trading with us and encouraging you to keep your assets in the trade until its completion. Please note that it is possible to create multiple token pools, for example, 'majors', 'exotics', etc.

Changed your mind? No worries. We understand that you might sometimes wish to cancel your trade. If that's the case, our system will calculate the number of pool tokens you need to pay, based on the current value of your trade. Due to market fluctuations, this amount may be higher or lower than what you initially received. To cancel, you'll need to pay the recalculated amount in pool tokens. Alternatively, you can choose to make this payment in BRI, with the amount determined by the current values of BRI and the token pool.

If you cancel an order and return pool tokens, we burn them, meaning they're permanently removed from circulation. This helps keep the value of the remaining tokens more stable for everyone.

In the future, pool tokens will also be used to execute swaps from the Treasury Pool.

3.1.1 Order Rewards

On Brightpool, every time you place a trade, you earn pool tokens. The number of tokens you get as a reward depends on a few key things:

- **The size of your trade:** Larger trades can earn more tokens.
- **Your trade's limit price:** This is the price you're willing to buy or sell at.

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- **How long you lock in your trade (Maturity Period):** You can choose periods like 1h, 1, 3, 5, 7, 14, or 28 days. Longer periods might earn more tokens.
- **The current market price:** What the asset you're trading is currently worth.
- **Traffic rate:** What is actual demand for orders.
- **Volatility and other factors:** Our BS.AI®, a smart pricing system, looks at the market's ups and downs (volatility) and other elements to calculate your reward.

Think of earning rewards on Brightpool a bit like yield farming, where you earn returns for locking in your crypto. However, there's a bonus: if the market moves in favor of your trade during the lock-in period, not only do you get your reward in pool tokens, but your trade executes at a favorable price.

3.1.2 Order Reward Limits

Traffic Rate

To ensure fairness in Brightpool's rewards system and maintain the stability of our token values, we impose daily limits on the number of pool tokens distributed. This measure prevents potential devaluation that could occur from the rapid minting of tokens due to large or automated orders.

How It Works:

Token Release Rate: We maintain a steady release of 1 BRIX token per second to control supply and ensure ecosystem stability.

Daily Cap: Initially, we're set to release 86,400 BRIX tokens daily, establishing our baseline for daily distribution.

Growth and Limits: While the daily release amount can increase, it will not surpass 130% of the baseline on any given day, safeguarding the pool's value.

Reward Calculation: Rewards for orders are determined by a specific formula that accounts for the pool's size, adjusting rewards based on availability. If the cap is reached, distribution pauses until the pool resets to its daily base level.

This framework is designed to prevent exploitation through automated orders and ensure that large trades do not disproportionately affect the token's value, thereby maintaining a fair trading environment for all participants.

Order size reward limits

To guarantee a fair opportunity for all participants to earn rewards, irrespective of their trade size, Brightpool implements a unique adjustment mechanism known as the slippage function.

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- **Big Orders, Smaller Rewards:** The slippage function increasingly applies to larger orders, effectively reducing the rewards received. This mechanism is crucial to prevent large orders—often placed by major players or 'whales' in the cryptocurrency market—from monopolizing the reward system, thereby preserving a fair share of rewards for smaller traders.

- **Balancing the Scale:** By implementing this method, smaller orders experience less reward reduction, ensuring that regular users, not just the large-scale traders, find compelling incentives to trade on Brightpool. This approach underscores our dedication to providing an equitable trading environment for all participants.

Through such reward adjustments, Brightpool strives to maintain a welcoming and rewarding environment for all users, regardless of their investment size. Our goal is to ensure fairness and promote a democratic ethos within the realm of cryptocurrency trading.

Order Reward Size	
10 ETH	100% reward
20 ETH	190% reward
30 ETH	280% reward
40 ETH	370% reward
50 ETH	460% reward
60 ETH	550% reward
70 ETH	640% reward
80 ETH	730% reward

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90 ETH	820% reward
100 ETH	910% reward
110 ETH	1000% reward
120 ETH	1090% reward
130 ETH	1180% reward
140 ETH	1270% reward
150 ETH	1360% reward
160 ETH	1450% reward
For each 10 ETH worth order, we subtract the next 10% of the reward accordingly.	

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3.1.3 Halving

At Brightpool, our rewards system is specifically designed to generously benefit early adopters, featuring a dynamic structure that evolves alongside our exchange's growth.

What Happens As We Grow:

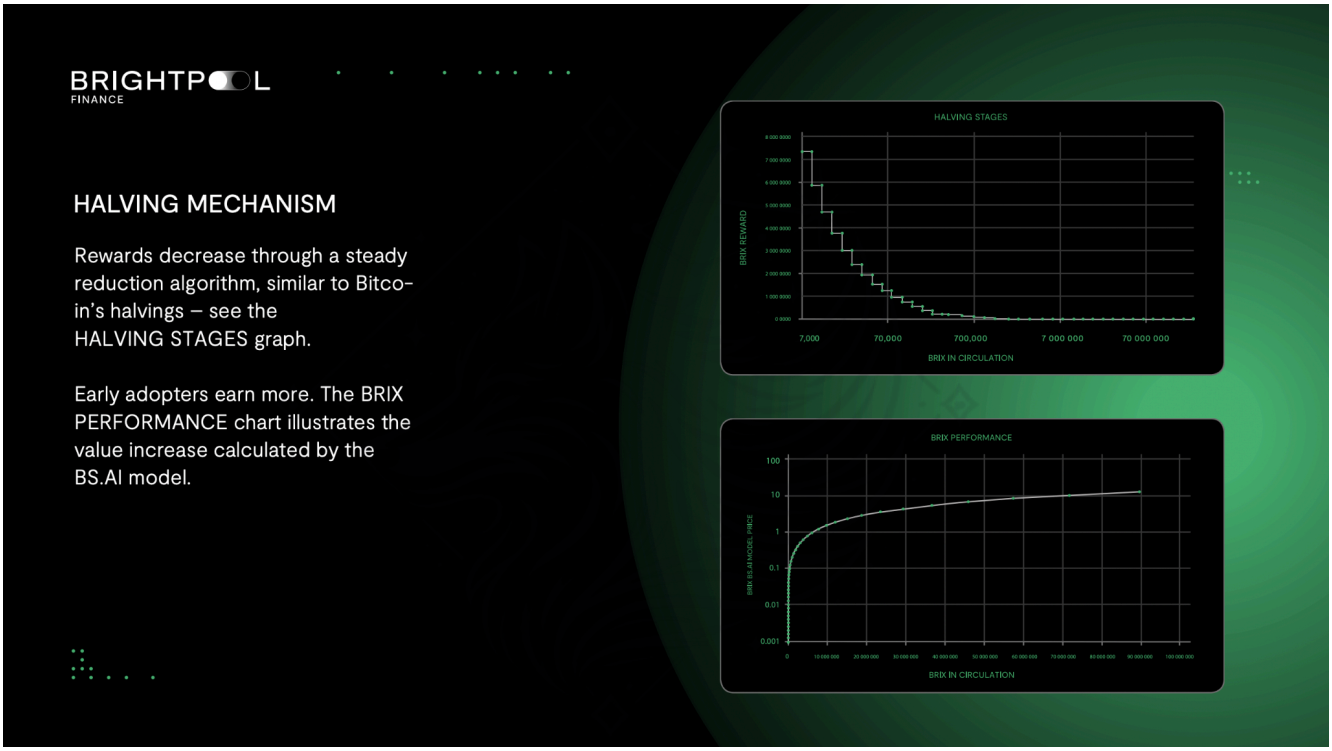
- **Early Advantage:** Early traders on our platform receive the highest possible rewards, as a token of our appreciation for their early support and trust in our journey.
- **Scheduled Reductions:** As our user base and trading volume expand, the rewards for each order will decrease by 20% at every stage, as outlined in the table below. This strategy, inspired by

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Bitcoin's supply control mechanisms, is designed to secure the long-term sustainability of our platform.

- **Reward Schedule:** A precise schedule is employed to adjust pool token rewards, activating when the total tokens in circulation reach certain predefined thresholds. This strategy guarantees fair distribution of rewards and efficient management of token supply.

This strategy encourages early adoption and active engagement, propelling the platform's growth while safeguarding the long-term value of our tokens.



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BRIX IN CIRCULATION	BRIX REWARD
7 562	7 346,8397
9 452	5 877,4718
11 815	4 701,9774
14 769	3 761,5819
18 461	3 009,2655
23 077	2 407,4124
28 846	1 925,9299
36 058	1 540,7440
45 072	1 232,5952
56 340	986,0761
70 425	788,8609
88 031	631,0887
110 039	504,8710
137 549	403,8968
171 936	323,1174
214 920	258,4939
268 650	206,7952
335 813	165,4361
419 766	132,3489
524 707	105,8791
655 884	84,7033
694 444	80,0000
819 855	67,7626
1 024 819	54,2101
1 281 024	43,3681
1 601 280	34,6945
2 001 600	27,7556
2 502 000	22,2045
3 127 500	17,7636
3 909 375	14,2109
4 886 718	11,3687
6 108 398	9,0949
7 635 497	7,2760
9 544 372	5,8208
11 930 465	4,6566
14 913 081	3,7253
18 641 351	2,9802
23 301 689	2,3842
29 127 111	1,9073
36 408 889	1,5259
45 511 111	1,2207
56 888 888	0,9766
71 111 110	0,7813
88 888 888	0,6250
888 888 888	0,3125

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3.1.4 Unique Features in a Crypto Space

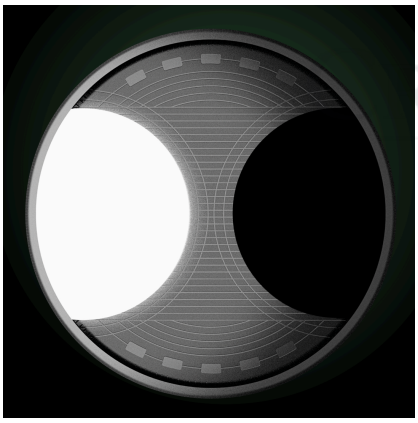
BRIX as a Hedging Instrument

Brightpool introduces BRIX tokens as an innovative hedging tool for its users, especially during the initial phase focusing on ETH-USDC trading pairs. The Treasury Pool, a combination of these tokens and stablecoins, offers rewards to BRIX token holders, aligning their interests with the platform's success. As market volatility spikes, not only does the exchange's revenue increase, but so does the Treasury Pool's value, leading to enhanced rewards for BRIX holders. Designed to capitalize on market movements in any direction, Brightpool ensures efficient order settlement and profit generation, irrespective of market conditions. This mechanism secures profits that bolster the Treasury Pool's value and, consequently, the rewards distributed to BRIX token holders, making it a mutually beneficial ecosystem for all participants.

BRIX: The Crypto Market's Volatility Index

BRIX is poised to serve a dual role within the cryptocurrency market, akin to a volatility index but with direct investment benefits. Its value is expected to climb alongside market volatility, reflecting how both upward and downward price movements can amplify Brightpool's profits and, in turn, augment the Treasury Pool's worth. This contrasts with traditional volatility indices like the VIX, which forecasts volatility in the S&P 500 primarily for informational purposes. BRIX stands apart by directly capitalizing on increased market volatility, transforming it from a mere indicator to a valuable asset. As volatility surges, so does BRIX's value, presenting token holders with a novel way to hedge against market uncertainties. This unique characteristic of BRIX not only marks it as a significant hedging tool but also as an attractive investment option in the volatile cryptocurrency landscape.

3.2 BRI – Governance Token



From its inception, Brightpool champions a decentralized approach by integrating a DAO (Decentralized Autonomous Organization). Holding BRI tokens grants you voting power on pivotal platform developments, such as the introduction of new trading pairs or modifications to the rewards structure, emphasizing user-driven governance.

To preserve the value of BRI tokens, Brightpool employs a strategic buyback and burn policy. Profits from transactions trigger the repurchase of BRI tokens, which are then permanently retired from circulation, progressively enhancing their scarcity. Starting with an initial supply of 2^{26} (67M) tokens, the goal is to methodically decrease this count to just 2^{10} (1024). This reduction strategy not only elevates the value of remaining tokens but also centralizes decision-making authority among users as the platform evolves, ensuring a more concentrated and effective governance model.

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How Can You Use BRI Tokens?

BRI tokens aren't just for governance purposes; they have several uses on the platform:

- **Crypto Swaps:** You will use them to swap cryptocurrencies directly from our Treasury.
- **Order Management:** Need to cancel an order? BRI tokens can be used for that.
- **Boosting Rewards:** Enhance your earnings with BRI tokens. For instance, if you're set to receive 10 BRIX as a reward for making a trade, using 10 BRI can double your reward to 20 BRIX. This feature incentivizes the use of BRI tokens within the ecosystem, directly increasing the value received from transactions.
- **Early Access:** Get into new pools before anyone else with BRI tokens.
- **The BS.AI® model:** integral to our platform, is also available as an API for external use, payable with BRI tokens. This expands the utility of BRI tokens beyond Brightpool, offering valuable analytical tools to a wider audience.

4. Business Model

4.1 How does Brightpool generate profit?

In our unique financial model, profit generation is strategically executed through a precise order and settlement process. Initially, an investor places an order to sell 1 BTC at a price of $46,000, setting the sell order duration to 7 days, during which the market price is at $44,000. Upon the completion of this period, should the value of BTC rise to $48,000, Brightpool intervenes by transferring $46,000 to the user while retaining the BTC. This action results in a direct profit for Brightpool of $2,000 in BTC, post-settlement. This mechanism illustrates how Brightpool capitalizes on specific market orders to generate earnings. The profits derived from such transactions can be accurately predicted using sophisticated economic models, which are elaborated upon in the subsequent sections of this document.

Consider selling an item (like a house) at a specified price, where someone pays you in advance for the opportunity to sell it at a higher price. If they manage to sell it for more, they profit, while you receive your desired price. In this analogy, Brightpool acts as the party attempting to sell at a higher price. However, unlike a real estate transaction where the agent may keep all the profit, Brightpool shares its profits with its users, fostering a mutually beneficial environment.

4.2 BS.AI®

Brightpool leverages a unique system known as BS.AI®, which draws inspiration from the Nobel Prize-winning Black-Scholes-Merton Model (BSM), renowned for its options pricing formula in finance. Similar to an options trade, your transactions on Brightpool have a designated price and a deadline for

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settlement. This parallel allows us to apply an enhanced version of the BSM model to determine the rewards for your orders.

Understanding the BSM Model:

The BSM model is designed for a balanced outcome in traditional markets, meaning it aims for a no-loss, no-gain scenario over time. But Brightpool tweaks this model for the crypto market, focusing on making profits during times of high price volatility – when prices suddenly go up or down.

Why Volatility Matters:

Cryptocurrencies often experience price swings. Brightpool capitalizes on these to generate profits, with larger swings after calm periods being particularly lucrative. This makes the platform's pool tokens valuable for hedging against market volatility.

AI and Predicting Market Moves:

We've upgraded the BSM model with AI for improved predictions of market volatility in cryptocurrencies like Bitcoin and Ethereum. This AI model, analyzing market data for trend forecasting, adds intelligence to our trading strategy. It utilizes on-chain data and will be accessible via API in the future.

4.3 Black-Scholes-Merton Model (BSM)

Black-Scholes-Merton is a mathematical model used for option pricing. It's widely used by investment banks for pricing options. It was invented by one of Goldman Sachs' partners named Fisher Black.

Published in 1973, the Black-Scholes Option Pricing Model was revolutionary because it was the first model that computed rather than predicted option pricing. Before the publication of their research, option prices were determined entirely by human judgment, just like prices in many other markets are set. This revolutionized investing and ultimately led to a Nobel Prize in 1997. Today, every major investment bank uses the BSM model.

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As explained in chapter 2.3, orders placed on the Brightpool exchange have a few similarities with options. Below we will examine how BSM works with options and how it was integrated into the Brightpool business model.

An option is a financial derivative; an instrument that derives its value from an underlying asset. An option gives buyers a right, but not an obligation, to buy (or sell) an asset at a stated price within a specific timeframe. There are two basic types of options. A *call* option gives a holder the right to buy the underlying asset, while a *put* option gives a holder the right to sell.

The stated price on an option is known as the *strike price* K. The date in an option contract is known as the *expiration date* or *maturity*. *American* options can be exercised at any time up to the expiration. *European* options can be exercised only on the expiration date itself. Valuation and analysis of European options are generally easier, and this type of contract is chosen by Brightpool.

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It is important to notice that a buyer of an option has a right, not an obligation, to exercise the option. For that right, the buyer pays a so-called *premium*. The premium is compensation for the risk taken by an option's seller (*writer*). The main assumption of BSM is that percentage changes in the underlying instrument in a short period of time are normally distributed. The standard derivation of the BSM equation can be found in a number of sources. With some adjustments, it can be used in many asset classes, including cryptocurrencies (such as BRI).

In the BSM model asset price behavior is defined as the following:

$$dS_t = \mu S_t dt + \sigma S_t dW_t$$

where S_t is the asset price at the time t, μ is the expected drift rate (i.e. average drift per unit of time), σ is a standard deviation and W_t is a standard Brownian motion. The full derivation of the BSM equation can be found in a number of sources. The formulas for the prices at the time t of a European call option on a non-dividend-paying asset are:

$$C(S,t) = S_t\Phi\left(d_1\right) - e^{-r(T-t)}K\Phi\left(d_2\right)$$

where:

$$d_1 = \frac{log\left(\frac{S_t}{K}\right) + \left(\frac{r+\sigma^2}{2}\right)(T-t)}{\sigma\sqrt{T-t}}$$

$$d_2 = d_1 - \sigma\sqrt{T-t}$$

and $\Phi(.)$ is the Cumulative Distribution Function of the standard normal distribution. The relation between the current market price of an underlying instrument S_0 and the strike price K is referred to as an option's moneyness. If $S_0 = K$ the option is *at-the-money* (ATM). An *in-the-money* (ITM) option would give the buyer a positive cash flow if it were exercised. An *out-of-the-money* (OTM) option would result in negative cash flow for a buyer.

Brightpool will offer users a chance to place buy or sell limit orders on specified time periods in the future. This is effectively an option contract transaction between Brightpool and its users. At the starting point only OTM strike prices will be allowed; a logic that is consistent with limit orders. This means that if a user wants to send a sell order, the limit (*strike*) price K must be above the current market price S_0. Similarly, the price for a buy order must be placed below the current market price. For such orders, users will receive a premium in BRI tokens (BRI). BRI can be exchanged inside Brightpool or can be traded on other exchanges where it is listed.

4.4 Pricing and Volatility for Crypto Assets

The BSM model and its variations are remarkably robust. However, any model is only a mathematical simplification of reality. Therefore, it is crucial to identify and address its main risks and limitations.

For options, we can begin by using a simple delta hedge portfolio as the starting point:

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$$C - \Delta S_t$$

where C is the value of the long call option, S_t is the underlying price at the time t, and Δ (delta) is the number of units we short. By the end of the next time step, the underlying asset changes to S_{t+1}. We need to assess how an option's value changes due to a small change in the price of an underlying asset. This can be approximated by a second-order Taylor Expansion. The range to which the price of an asset may increase or decrease is referred to as its *volatility* σ – it is the standard deviation of the underlying asset's returns. On average:

$$\left(S_{t+1} - S_t\right)^2 \cong \sigma^2 S^2$$

We also know that an option's price will decrease due to the passing of time by an amount denoted by θ. We can also assume that holding a position is impacted by an interest rate r. Therefore, a position after a small change in the price of underlying assets can be expressed as:

$$\frac{1}{2}\sigma^2 S^2 \Gamma + \theta + r\left(C - S_t\right)$$

where Γ (gamma) is the rate of change of an option position's delta with respect to the price of the underlying asset. Strictly speaking, Γ comes from Taylor Expansion, and it is the second derivative of the option price.

However, the price change is not directly visible. Only the square of the price is visible through the volatility term. The magnitude of price change is the most important factor as to whether one makes a profit. Brightpool is the buyer of an option, so the expected profit would depend on the difference between implied volatility $\sigma^2_{implied}$ and realized volatility σ^2. Implied volatility $\sigma^2_{implied}$ is the forecast of a likely movement in an underlying asset's price. It is an assumption made by counterparties at the time of the transaction. Realized volatility σ^2 is the true volatility known after the option's expiration. Therefore, the profit would be proportional to:

$$\frac{1}{2}S^2\Gamma\left(\sigma^2_{implied} - \sigma^2\right)$$

The overall steps to maturity; the total financial result for the position can be expressed as[1]:

$$\frac{1}{2}\left(\sigma^2_{implied} - \sigma^2\right)\int e^{-rt} S^2 \Gamma\left(\sigma_{implied}\right) dt$$

This is the reason why Brightpool has built and implemented a forecasting model to assess expected volatility and minimize the risk of overvaluing paid option premiums. The existing options market for cryptocurrencies is not yet developed sufficiently, so the limited external option price sources cannot be relied on to calculate implied volatility. A responsible market maker cannot solely rely on simple historical measurements. In quantitative finance, there are a few classic solutions for such a situation.

[1] E. Sinclair, *Volatility Trading*, John Wiley & Sons, 2008, p. 8-12, 87-96

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Perhaps the most well-known is the Exponentially Weighted Moving Average Model[2]. This takes the following form:

$$\sigma_t^2 = \lambda\sigma_{t-1}^2 + (1 - \lambda)r_{t-1}^2$$

where r^2 is the squared log return and λ is a smoothing parameter (usually between 0.94 and 0.97). The issue with this method is that volatility is a mean-reverting process. Low volatility is likely to be followed by periods of higher volatility. EWMA does not include this fact. However, it was incorporated into another famous model – the Generalized Auto-Regressive Conditional Heteroskedasticity model (GARCH)[3]. Variance in this model depends on past p returns and past q variances.

$$\sigma_t^2 = \omega + \alpha_1 r_{t-1}^2 + \ldots + \alpha_p r_{t-p}^2 + \beta_1\sigma_{t-1}^2 + \ldots + \beta_q\sigma_{t-q}^2$$

Parameters ω, α and β are calculated with maximum likelihood estimation. The likelihood function for a GARCH(1,1) model is given by:

$$\prod_{i=1}^{t}\left[\frac{1}{\sqrt{2\pi\sigma_i^2}}e^{\left(\frac{-r_i^2}{2\sigma_i^2}\right)}\right]$$

Long-term average variance can be calculated as $V = \frac{\omega}{(1-\alpha-\beta)}$. The expected value of variance on a future point in time $t + k$ is expressed by[4]:

$$E\left(\sigma_{t+k}^2\right) = V + (\alpha + \beta)^k\left(\sigma_t^2 - V\right)$$

This model is a good starting point. However, in the cryptocurrency market, for most assets, there are so-called "on-chain data" available, serving as a unique source of insight into market dynamics. By combining such data with recent developments in the machine learning field, Brightpool is on a path to building a *sui generis* methodology that outperforms existing solutions.

It should be noted that *at-the-money* volatility estimation needs to be extended for lower and higher prices (lower and higher Δ). The expected volatility for these prices is not equal to one at the center where $S = K$. The reason behind this is that market participants consider that lognormal distribution understates the probability of extreme movements in underlying asset prices. This fact was confirmed by many researchers in various markets. Even daily changes in price exceed five or six standard deviations. The lognormal model used in the BSM pricing solution predicts that we should hardly ever experience this happening. As a result, the BSM model underestimates volatilities and prices for *deep-out-of-the-money* options. It doesn't pose a threat to Brightpool but makes paid premiums lower. With increasing transaction volume Brightpool will gradually switch to a valuation model based on a more complicated stochastic process called a Variance-Gamma process, proposed by Madan, Carr, and Chang. Such a process allows for random jumps and provides control over the skewness and kurtosis of the return distribution[5]:

[2] H. Blum, J. Yu, *Forecasting Volatility: Evidence from the German Stock Market*, Market International Conference on Modelling and Forecasting Volatility, 2001
[3] T. Bollerslev, *Generalized Auto-Regressive Conditional Heteroskedasticity*, Journal of Econometrics 31, 1986, p. 307-327
[4] J. Hull, *Options, Futures and Other Derivatives*, 2002, Fifth Edition, p. 383
[5] D. Madan, P. Carr, E. C. Chang, *The Variance-Gamma Process and Option Pricing*, 1999

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$$S_t = S_0 e^{\left[rt + X_t(\sigma,\theta,\nu) + \omega t\right]}$$

where $X_t(\sigma, \theta, \nu)$ is the Variance-Gamma process. Calculating the Cumulative Distribution Function of such a process is very challenging. To avoid this issue, we use a solution called the characteristic function. Generally, a characteristic function φ is the Fourier Transform of the density function f of a random variable X. The characteristic function $\varphi_T(u)$ can define the probability distribution of the price S of the underlying asset. Based on this, Carr and Madan defined a so-called modified-call option price $c_T(k)$:

$$c_T(k) = e^{\alpha k} C_T(k)$$

where $C_T(k)$ is the initial price of the call option with maturity T and log-strike k. $\alpha > 0$. $C_T(k)$ is calculated as:

$$C_T(k) = \frac{e^{-\alpha k}}{\pi} \int_0^{\infty} e^{-ivk} \psi_T(v) dv$$

where ψ_T is the Fourier transform of $c_T(k)$:

$$\psi_T(v) = \frac{e^{-rT} \phi_T(v-(\alpha+1)i)}{\alpha^2 + \alpha - v^2 + i(2\alpha+1)v}$$

The value of the Put option can be calculated from parity rule or sign changing in α. With the presented solution, premiums paid to users should be even higher and closer to the concept of *fair value*.

The cryptocurrency options market is at an early stage of development. However, new market solutions will be introduced in the coming years. This is not a threat to Brightpool's market position because Brightpool is not an options brokerage company nor an options exchange. Brightpool will benefit from market development in many ways. Knowing option prices for a range of higher and lower prices enables the ability to calculate an implied volatility curve (*volatility smile*). Knowing a few basic points (delta 0.5. 0.25, 0.10, etc.), Brightpool has a tool to quantify the *broad market* volatility curve. It will be done with a method called Akima Interpolation[6]. The Akima interpolation is a continuously differentiable sub-spline interpolation. For a set of points $p_i = p\left(x_i\right)$ the curve between two of them can be expressed as:

$$y = p_0 + p_1\left(x - x_i\right) + p_2\left(x - x_i\right)^2 + p_3\left(x - x_i\right)^3 \text{ where } x_i \leq x \leq x_{x+1}$$

The weights p in this equation are determined with slopes (derivatives) $\frac{dy}{dx} = t_1$ at $y = y_1, x = x_1$ and $\frac{dy}{dx} = t_2$ at $y = y_2, x = x_2$ using the following equations:

$$p_0 = y_1,$$

[6] H. Akima, A new method of Interpolation and Smooth Curve Fitting Based on Local Procedures, Journal of rh ACM, Volume 17, Issue 4, 1970, p. 589 - 602

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$$p_1 = t_1,$$

$$p_2 = \frac{\left[\frac{3(y_2 - y_1)}{(x_2 - x_1) - 2t_1 - t_2}\right]}{(x_2 - x_1)},$$

$$p_3 = \frac{\left[\frac{t_1 + t_2 - 2(y_2 - y_1)}{(x_2 - x_1)}\right]}{(x_2 - x_1)^2}$$

The slope t of the curve is determined by:

$$t_i = \frac{\left(|m_{i+1} - m|m_{i-1} + |m_{i-1} - m_{i-2}|m_i\right)}{\left(|m_{i+1} - m_i| + |m_{i-1} - m_{i-2}|\right)} \text{ where } m_i = \frac{(y_{i+1} - y_i)}{(x_{i+1} - x_i)}$$

The series of curves at different maturities creates a volatility surface. This *market-derived* volatility surface will be a perfect controlling mechanism. It will give Brightpool the ability to monitor inside volatility levels and compare them to market consensus. An automated mechanism can be introduced to prevent bigger discrepancies and keep arbitrage opportunities at a low and stable level.

4.5 Risk Profile

The risk of Brightpool's Order Pool can be examined using the measures commonly referred to as Greeks. Each Greek measures a different dimension associated with the risk in an option position. Among them, the following 3 are crucial for any market-making and trading solution:

a) Delta Δ – The delta of an option is a rate of change of the option price with respect to the price of the underlying asset. For ATM options, delta has a value of 0.5. OTM options have a delta closer to 0.0. Similarly, ITM options have a delta value closer to 1.0. If an option's value benefits from the rising price of an underlying asset, the delta is positive. If an option's value decreases from the rising price of an underlying asset, the delta is negative. As such, the value of the delta is an indication of the size of the directional risk of the portfolio. With increasing order volume, Brightpool is going to virtually maintain a *delta-neutral* position because of an expected balance in incoming orders. This is an inherent *hedging* trait that eliminates the necessity of looking for a hedging solution on the market.

b) Theta θ – The theta of an option (or an options portfolio) is the rate of change of the value of an option with respect to the passage of time. Theta is often referred to as the *time decay* of the option/portfolio. Theta can be loosely understood as the daily portion of the premium. Bought options have negative theta. Sold options have positive theta. It is possible to neutralize theta by selling options on the market. However, it is misleading to put theta in the same category of hedging parameters as delta. There is no uncertainty about the passage of time. Therefore, it does not make much sense to hedge against it. As a result, many market professionals regard theta as a descriptive statistic, not a risk measure. Brightpool, as an option buyer, will hold a short theta position.

c) Vega ν – The vega of an option (or an options portfolio) is the rate of change of the value of the option/portfolio with respect to the volatility of an underlying asset. Long (bought) options positions have positive vega. Short (sold) options positions have negative vega. As was pointed out earlier, the change in volatility is the primary source of risk and profit for Brightpool. Brightpool will hold a positive

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vega position which means that it will take losses during decreasing volatility periods and make profits during rising volatility periods.

According to the above description, the risk profile of Brightpool is relatively simple. There is no intended directional risk because of the intrinsic delta hedge. There is no hedge against time because its passage is a certainty. Brightpool has a risk exposure due to the changes in volatility. Market volatility has a cyclical and mean-reversion nature. This leads to the conclusion that Brightpool will bear short-term liquidity risk in periods of decreasing volatility. This risk will be secured by the crypto assets held by Brightpool.

A premium value calculated by Brightpool's BS.AI® can be considered a standard *fair value*. This means that in a perfect market environment, this premium is adequate compensation for the probability of being exercised by a buyer (the chance the option will be ITM). This value will be then accordingly reduced, giving Brightpool a small but stable long-term advantage. This is the users' input into Brightpool's growth. This statistical advantage is also the primary source of keeping portfolio risk in check, which is a long-term guarantee for pool tokens to increase in value.

This mechanism is focused on users' benefits and the growth of the network effect. Even if a user's limit order is executed at a price that is no longer attractive with respect to the current market price, the user receives a premium in pool tokens. The value of pool tokens is a function of Brightpool's profit, so this profit will come back to the user either way.

If we compare Brightpool's orders to options, we might say that Brightpool pays for the right to buy or sell crypto assets for initially agreed prices. This fact has important consequences from a risk management perspective. Brightpool's risk is limited to paid premiums. On the contrary, the profit potential is unlimited, and this will be most strongly manifested during sharp drops and rises in cryptocurrency prices.

5. Tokens Economy

Brightpool adopts a different approach by ensuring a fair and gradual release of tokens, unlike many DeFi projects that release all tokens at once, often reserving a large portion for creators, which risks significant price drops if those tokens are sold.

How Tokens Are Released:

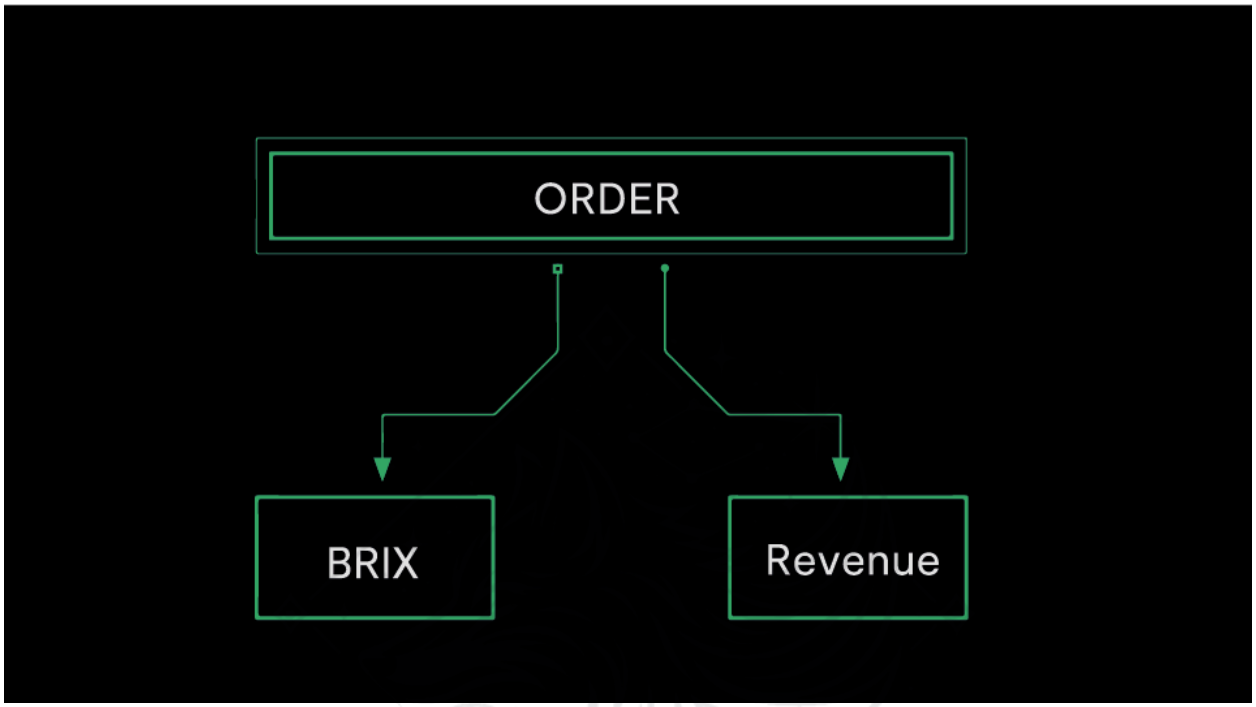
- **For the Team and Early Backers:** BRI Tokens given to the team, investors, and advisors are released over time, following a clear schedule that includes a cliff period and vesting. This method prevents large, sudden sales that could hurt the token's value.

- **For the Community:** Our method for community members to earn tokens is through what we term Proof-Of-Bid (we also call it Proof-Of-Risk). Tokens are rewarded for conducting trades on our platform, with new tokens being minted only upon placing orders. This system underscores our project's ethos and our dedication to equitable practices.

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This strategy is designed to protect the value of Brightpool tokens and ensure the distribution process is secure and beneficial for our entire community, avoiding the pitfalls seen in other crypto projects.

5.1 Proof of Bid



Brightpool introduces a novel approach to generating and distributing tokens known as Proof-of-Bid (PoB). Here's how it simplifies:

- **Earn Tokens by Trading:** In Brightpool, new pool tokens are created exclusively when a trade is placed. This direct link ensures that every new token represents a real action on the platform: a user making a trade.
- **From Trade to Token:** Each pool token awarded to users is directly associated with a specific trade. This means the pool token supply grows only as a result of active trading, making each token a reflection of genuine trading volume on Brightpool.
- **Revenue Supports Tokens:** When trades reach their maturity and are settled, the exchange expects to make a profit, thanks to market movements predicted by the BS.AI® system. This profit is then allocated to the Treasury Pool, underpinning the financial ecosystem of Brightpool.

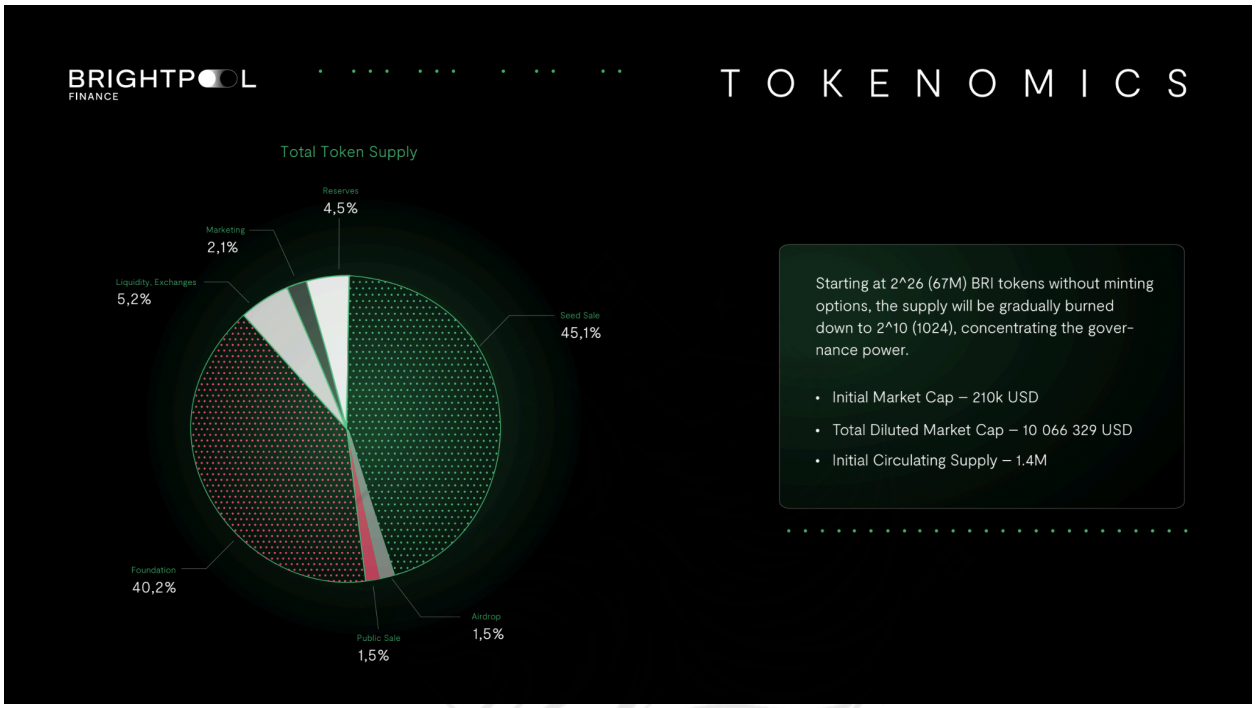
The Role of New Pool Tokens:

- **Supported by Profits:** Every new pool token issued under the Proof-of-Bid model is backed by the Treasury Pool, which is fueled by the exchange's revenue from settled trades.

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- **A Self-Sustaining Cycle:** Creating new pool tokens through trading activities initiates a growth cycle. As more trades are settled, the exchange's revenue increases, enhancing the Treasury Pool's resources and, by extension, the value backing each pool token.

5.2 BRI Token Supply



5.3 Cliff & Vesting

All BRI tokens will be subjected to a cliff period. After the cliff period, they will be released according to the linear vesting periods, as shown in the table below.

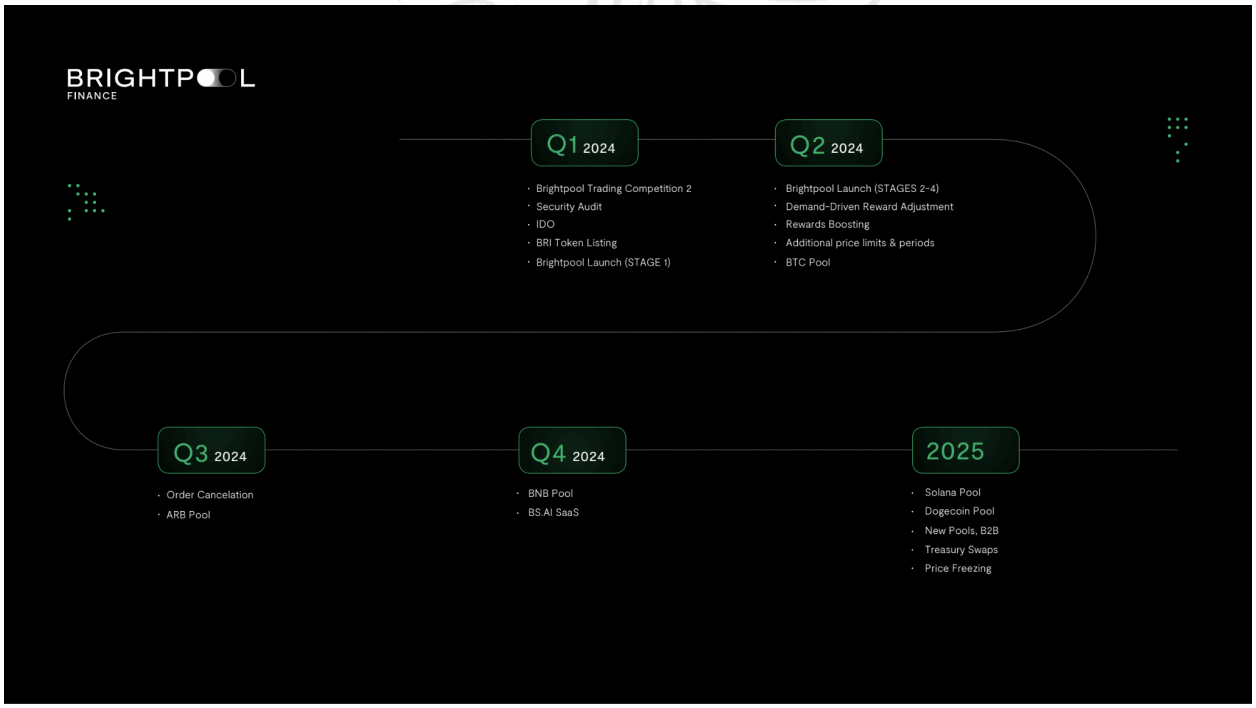
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VESTING PERIODS	
Seed Sale	5% TGE, 6 month Cliff then 6 months linear vesting
Public Sale	20% TGE, 1 Month Cliff, then each month 20%
Foundation	0% TGE, cliff 6 months, later linear vesting over 12 months
Airdrop	0% TGE, Strategic release
Marketing	0% TGE, cliff 4 months, later linear vesting over 15 months
Reserves	0% TGE, cliff 12 months, later linear vesting over 24 months
Platform Iniciatives	0% TGE, Depends on the platform volume
Liquidity, Exchanges	Strategic release as per CEX / DEX listing, liquidity.

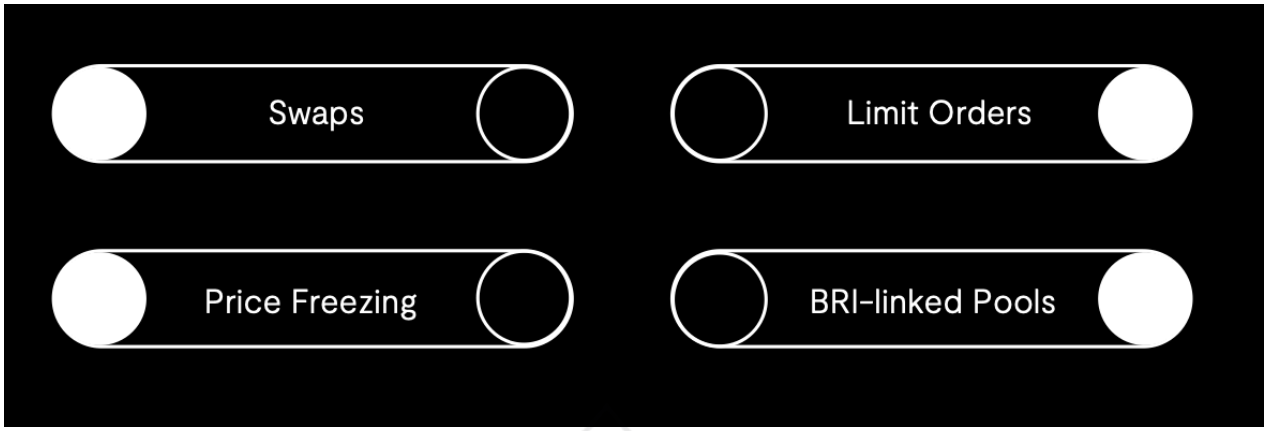
6. Roadmap

Below is our estimated schedule of project development:



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7. A long-term vision



Envisioning the future of Brightpool unfolds a realm where innovation meets practicality, transforming the way we interact with digital assets. As we stride into this future, Brightpool emerges not just as a platform but as a cornerstone in DeFi, redefining the paradigms of cryptocurrency trading and liquidity management. Here's a glimpse into the groundbreaking features and enhancements we anticipate:

A Revolutionized Platform with Advanced Trading Mechanisms

Brightpool is set to pioneer with its array of features that cater to the nuanced needs of the modern trader. At the forefront, we introduce Limit Orders, Price Freezing, and Swaps without the traditional constraints of Liquidity Providers (LPs). This evolution signifies a leap towards autonomy and efficiency in trading practices.

- **Swaps without LPs:** At the core of Brightpool's innovation lies the groundbreaking approach to cryptocurrency exchanges. By facilitating swaps without the traditional need for Liquidity Providers (LPs), Brightpool significantly reduces the dependency on user-supplied liquidity. This leap forward not only enhances the platform's efficiency but also broadens its accessibility, making it a beacon of innovation in the DeFi space.
- **Limit Orders Reinvented:** Brightpool reimagines limit orders, integrating them into our unique ecosystem. This feature empowers users with precision and control over their trading strategies, enhancing the predictability and profitability of their investments.
- **Price Freezing:** The Treasury Pool feature is a testament to Brightpool's commitment to innovation, offering users the unique ability to freeze prices. Imagine locking in the price of ETH at $2500 for 30 days, a feature that not only hedges against market volatility but also redistributes profits through the buyback of BRI and pool tokens. This service, facilitated by payments in native pool tokens or BRI tokens, utilizes our proprietary BS.AI® model to ensure equilibrium between demand and supply, guaranteeing coverage for all positions.
- **BRI-linked Pools:** Diversification and inclusivity are key tenets of Brightpool's future. By including tokens from all traded pairs and inviting external projects to create their pools using our BS.AI®

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model, we not only enhance our platform's liquidity but also contribute to a vibrant ecosystem. Commissions generated support the buyback of tokens, reinforcing their value and the platform's economic foundation.

- **Farming:** A detailed exploration of our farming mechanisms is available on page 10, offering insights into how users can further benefit from participating in our ecosystem.

The Horizon: A Vision of Growth and Integration

In essence, the future of Brightpool is one of innovation, inclusivity, and growth. We are on a mission to redefine the landscape of DeFi, making it more accessible, efficient, and secure for everyone. By continuously evolving and adapting, Brightpool is not just preparing for the future; we are shaping it.

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