



# WinNow DAO Token WHITEPAPER

This document is not final and will be updated regularly as WinNow DAO Token and Wonniw metaverse are developed.

## **Abstract**

Design of a persistent metaverse anchored to the blockchain in application of cooperative game theory. Application of decentralized finance yield farming principles through a DAO structure in replication of real world dynamics whose output multiplier is permanently updated through incentives and disincentives based on the collaborative capacity of citizens and mayors. Use of the WinNow cryptocurrency as a DAO token of the Wonniw metaverse.

## **SUMMARY**

- 1.....Introduction to game theory
- 2.....Wonniw metaverse as a cooperative game application based on Game Theory
- 3.....Initial Tokenomics
- 4.....First approach to the application of principles within the Wonniw metaverse.

### **1. Introduction to game theory**

Game theory is a discipline that studies mathematical models of strategic interaction between rational agents. Game theory has applications in various fields of the social sciences, as well as in logic, systems theory and computer science. Although originally focused on zero-sum games, in which each participant's gains or losses are perfectly balanced with those of the others, contemporary game theory applies to a wide range of behavioral relationships, and now generically indicates science. of logical decisions in humans, animals, and computers.

In the game theory model, the indispensable premise is that the goal is to win; everyone must be aware of the rules of the game, and be aware of the consequences of every single move. The move, or set of moves, that an individual intends to make is called a "strategy". Depending on the strategies adopted by all the players (or agents), each one receives a "pay-off" according to an adequate unit of measurement. This compensation can be positive, negative or null. A game is said to be "constant-sum" if for every win of one player there is a corresponding loss for others. In particular, a game that is "zero-sum" between two players represents the situation in which the payment is paid by one player to the other. The strategy to be followed is strictly determined if there is one that is satisfactory for all players; otherwise it is necessary to calculate and maximize the player's mathematical hope or expected value, which is the weighted average of the possible rewards (both positive and negative), each multiplied (weighted) by the respective probabilities of being assumed (i.e. of occurring).

In a game there are one or more contenders trying to win, that is, to maximize their winnings. Winning is defined by a rule (function) that quantitatively establishes what the contenders win according to their behavior. This function is called the "payments function". Each player can undertake a finite (or infinite, in the most abstract case possible) number of actions or decisions that determine a strategy. Each strategy is characterized by a consequence for the player who adopted it and which can be a reward or a penalty. The outcome of the game is ultimately completely determined by the sequence of their strategies and the strategies adopted by the other players.

But how to characterize the outcome of the game for each player? If the consequence of a strategy is measured in "monetary terms", each strategy can be matched with a value: a negative value will indicate a payment to the opponent, ie a penalty; while a positive value will indicate a win, ie the collection of a prize. The gain or loss due to the generic player associated with his strategy and the strategies taken in a given instant by all the remaining players is expressed by the monetary value indicated by the payout function. The decisions made by a player naturally clash or are in agreement with the decisions made by the other players and from similar situations various types of games arise (eg: cooperative or non-cooperative games).

A useful tool for representing the interactions between two players, two firms or two individuals is a double entry decision matrix or table. This decision table is used to show the strategies and payouts of a two-player game.

The decision matrix is therefore a representation through which we catalog all the possible results of the interactions between players and assign the value of the win that in each situation belongs to each player. Another form of representation concerns the sequence in which each decision is taken or the actions are conducted. This characteristic of each game can be described by means of a tree graph, representing every possible combination of bets by the contenders from an initial state to the final states where the winnings are shared.

## **2. Wonniw metaverse as a cooperative game application based on Game Theory**

A cooperative game occurs when the interests of the players are not in direct opposition to each other, but there is a commonality of interests. The players pursue a common goal, at least for the duration of the game, some of them may tend to associate to improve their "pay-off". The guarantee is given by binding agreements.

What is the mathematical representation of a commonality of interests? The concept of the union of single individual interests in a coalition or alliance is expressed

by the definition of essential game; while the value  $v$  of a generic coalition  $G$  is measured by a function called the characteristic function. Denoted by  $R =$  the set of  $n$  players, there can exist  $2^n - 1$  arbitrary subsets  $G \subseteq R$  representing a coalition such that  $G$  appears to the effects of  $I$  play as a single player. The characteristic function is precisely defined on the set of parts of  $R$ , i.e. on the set of all subsets  $G \subseteq R$  and associates a number to each coalition:  $V(G) := v$ . Naturally  $V(\emptyset) := 0$  as the payment for the empty coalition, the one made up of no players, is zero. An  $n$ -person game is said to be essential if

$$V(G_1) + V(G_2) + \dots + V(G_k) < V(R) \text{ with } k=1, \dots, 2^n - 1 \text{ e } G_i \cap G_j = \emptyset \text{ foreach } i \neq j.$$

Basically, an essential game is intrinsically of a cooperative nature when all the possible coalitions that can be constituted between the  $n$  players "see" that there is a value of the game  $V(R)$  that dominates the simple union of the payments achievable by the single alliances  $V(G_i)$ . In  $R$  all the players interact and from the reciprocal relationships they derive the mutual advantage  $V(R)$ .

There are two subgenres, NTU games and TU games.

#### *NTU games*

"Non Transferable Utility": non-transferable utility or without side payments. In these cases, in the field of industrial economics, in a situation of oligopoly the phenomenon of collusion can arise.

#### *TU games*

"Transferable Utility": a transferable utility or with side payments, in which there must be a means, money or other, for the transfer of the utility.

The division of the winnings takes place in relation to the role played by each player, according to his strategy and his agreements (for "TU games" the payments or transfers obtained during the game must be added).

In 2-person games with constant-sum payment function, by definition there are two sides  $G$  and  $R \cap G^c$ , the latter being the adverse coalition to  $G$  being the complementary set of  $G$ . Two-person games are such that for any coalition  $G \subseteq R$  we have

$$V(G) + V(R \cap G^c) = V(R)$$

Constant-sum two-person games therefore show that they are not essential, that is, their true nature is not of a cooperative nature. This last assertion is a mathematical theorem for whose formal proof we refer to the reading of Theorem 41 in E. Burger, Introduction to the Theory of Games. In constant sum games, if the players teamed up in  $R$  they would achieve the same result if they played separately:

$$V(G) + V(R \cap G^c)$$

In essential games, for which the adage "unity is strength" applies, players collaborating guarantee themselves a higher income than they would get by playing individually. In general, cooperation can be explicitly requested by the rules of the game: it is the case in which the game itself imposes for each player the choice

of one or more partners; or cooperation may arise because the payment function does not admit a priori a single value. The characteristic function simply describes how much a coalition gets from its opponents, but does not say anything about how the gains are divided among the allies of the coalition itself. John von Neumann and Oskar Morgenstern approached the problem of cooperative games by characterizing them by the fact that a coalition of individuals has reason to exist if and only if two conditions relating to the distribution of winnings among the members of the coalition occur. The two conditions are:

1) each division of the "gains" achievable among the players not belonging to the coalition is lower than the division of the "earnings" carried out among the players belonging to the coalition;

2) no division of gains within the coalition is superior to some other possible distribution of "gains" within the coalition.

Property 1) states that the coalition is winning because it is more profitable and, in conclusion, everyone would like to join. In summary, the solutions of the games must be efficient: there are no other solutions that improve the results achievable by the members of the coalition.

Property 2) ensures that the trust adopted within the coalition is free from internal contradictions that would undermine the mutual trust between members; in short, the winnings are distributed equally among all the members of the coalition without preferences or favoritism of any kind.

In this configuration, Wonniw metaverse will be constantly updated through the application of incentives and disincentives on yield anchored to the function of sustainability.

### **3. Initial Tokenomics**

To guarantee truly equal and dedicated access to a democratically collaborative utopia, the launch of the DAO WinNow token will have to take place directly on the market. There should be no pre-sales, initial allocations or tokens reserved for the team other than those purchased on the market. The only team wallet allowed will be the one reserved for marketing initiatives and dedicated to the development of the Wonniw metaverse. This wallet must remain in the availability of the team for as long as necessary for the launch of version 1.0 of the Wonniw metaverse, after the launch the wallet must be transferred to the DAO which will democratically indicate the actions to continue with the development of the Wonniw metaverse. The initial liquidity must be locked for a sufficient time (for example 20 years) so that the team cannot carry out malicious and harmful actions for the holders.

The number of tokens is fixed at 1,000,000,000,000,000. For the DAO WinNow token (\$WNNW), the possibility of making further mint beyond the initial ones with a hard cap equivalent to the first issue must be excluded. The Wonniw Coin (\$WWC) spending token will instead have an issue quantity initially set at 500 per block and the circulation will have to be managed through buyback and burning. The team will be able to reserve in the future, as a reward for the work done, a variable quota of (\$WWC) spending tokens but, as already explained above, it will be able to buy the DAO (\$WNNW) token only on the market and with the same rules reserved for all other investors.

In the initial phase of the distribution it will be essential to maintain a high liquidity of the WNNW/BNB pair for this reason a majority share of taxation (5%) will be dedicated to this purpose.

It will also be necessary to reward early holders with a decreasing share over time, up to the launch of the token at centralized exchanges. This fee, identified as reflection and directly allocated to the holders' wallets at each transaction, is set at 3% of each purchase / sale / transfer.

The wallet marketing will also have to be funded to allow the team to carry out all the necessary actions so that the WinNow token and the Wonniw metaverse can reach a public dimension of notoriety. The transaction fee dedicated to this purpose is initially set at 3%.

The taxes associated with each transaction are therefore initially set with these percentages:

5% Liquidity Pool

4% Holders

3% Marketing wallet

#### **4. First approach to the application of principles within the Wonniw metaverse.**

##### **LOCKED DESIGN**

To simplify initial development, each city will grow within predefined tracks, the choices of citizens, through the purchase of land and concessions, will determine the balance and development of each individual city, but within predefined areas for any type of building.

Each city may have an indeterminate number of each single building, but all the commercial / production buildings (which produce yield) in each city will have an exponential cost compared to the number of buildings of the same type already present in the same city in relation to the inhabitants.

For example, if there is already a grocery store that serves 100 citizens, a citizen will have to be discouraged to build another one as the one present is already sufficient to cover the needs. If the citizen still wishes to create another one. There will be no possibility of terraforming the cities. They will be automatically

generated in a causal way when they are founded and the development, as already mentioned, will take place according to the available slots and what citizens want to build on them.

The roads and connections will therefore be generated automatically. The space for the citizen to change the environment will only be through interaction with the tools provided. The running time of the game is in real time with no possibility of slowing down or speeding up, the game time is UTC.

## ZONES

Residential, commercial, industrial and administrative

Every citizen to be part of the city must have a house, so buy at least one residential slot and a housing license, these do not produce or guarantee any yield.

Citizens will be able to purchase commercial or industrial spaces in which to establish their business. The purchase of a commercial or industrial space allows, through a building permit, the possibility of creating a reference building (shops, gyms, various industries). To start producing yield, the building will need to have a commercial license that may have an indefinite or variable duration depending on costs and use cases (to be defined).

Citizens will only be able to borrow administrative buildings (disposal, police, schools, means of transport, and so on) that we will identify as necessary for the proper functioning of the city:

Example:

- Each city requires a waste disposal plant to function;
- Without a functioning system (or in the absence of any other building defined as mandatory) the city cannot produce complete yield for its inhabitants;
- The incentive for citizens is to immediately equip the city with a functioning plant (and all other mandatory buildings) so that the city can start producing yield;
- With the purchase of the temporary concession, the citizen ensures a share (to be defined so that it is sustainable) of the yield produced by the plant itself, as well as rendering a service to the community;
- The administrative buildings cover a specific need as the number of inhabitants, if the city grows it will therefore be necessary to have more functioning plants and the mayor will have to make sure that its citizens take on a license;

## RESOURCES / BUILDINGS REQUIRED FOR EVERY CITY

- **Citizens:** here it is quite clear
- **Sustainability:** this resource will make it clear whether or not the city is balanced with respect to its needs, as seen above the lack of mandatory buildings leads to a city imbalance, the city imbalance will lead to a cut in the yield generated by the city according to the degree of sustainability. It will be possible to identify bonuses / malus as a function of badly governed cities (for example multiplier <1 for yield) or well governed (multiplier > 1 for yield paid by badly governed cities)
- **Money:** this is the number of Winnow Coin (WWC) tokens
- **Water:** all cities must have an aqueduct or a system that guarantees water supply.

- **Electricity:** all cities must have an aqueduct or a system that guarantees energy supply.
- **Waste:** all cities must have an active waste disposal and recycling system
- **Transportation:** All cities will need to have a functioning transportation system
- **Health:** all cities will have to have a health system
- **Police:** all cities will have to have a police force
- **Fire brigade:** All cities must have a fire brigade
- **Extractive raw materials:** all cities will have a certain amount of mineral resources to be defined and necessary for the development of the industrial / commercial sector, they will be the keystone for yield management

## **NATURAL RESOURCES - TRANSFORMATION OF FINISHED PRODUCTS**

One way to ensure the presence of long-term yield is to provide areas where there are natural resources to be extracted through mines. These natural resources will have to be acquired by the owners from the factories to transform them into finished products to be given to the owners of commercial activities, who will have to use them in order to create yields from their sales. There is therefore a cascade relationship for the generation of yield that starts from natural resources.

Diagram: Citizen acquires temporary mining license and earns yield from the sole sale of the raw material, does not own the business and cannot claim it (low risk investment 0.5x) -> Citizen buys land and creates factory to sell finished product to commercial activity, owns land + factory and can sell it (higher risk investment depending on the number of inhabitants and other factories of the same kind, 1.5x multiplier which can decrease based on competition) -> Citizen buys land and creates shop selling the finished product, owns land + shop and can sell it (higher risk investment depending on the number of inhabitants and other factories of the same kind, 1.5x multiplier which may decrease based on competition).

## **VALUE OF THE LAND**

It is necessary to find a bonus / malus link for the value of residential land purchased by citizens so that land in the city with high sustainability and high yield is enhanced. This land must be able to be sold by citizens to other citizens interested in being part of that city in that high yield area. Part of the sales will necessarily have to go to the DAO treasury to level the yield in the poorest cities and balance the system.

## **MAYORS**

The office of statutory mayor is temporary. To become mayor and guarantee a permanent share of the total yield produced by the city, each mayor will have to vest their WinNow tokens for at least 12 months. There will be a minimum fee to participate. The mayors will have a broad power in the development of the city and must be put in a position to be able to intervene if the dynamics defined for the proper functioning of the city are not respected by their citizens.

## **YIELD**

The yield will be offered in the form of APR% to be presented in each city and will be a function of the TVL (Total Value Locked) in the city and directly linked to the cost of land purchase, building permits, commercial licenses, exchange of resources and so on. The APR% will tend to be higher in new cities with few buildings as the incentive is to encourage citizens to purchase licenses at a lower cost and create the right conditions for them to advise other people to join their city.

The aim of the game is therefore to create a highly cooperative environment in which citizens, in order to enjoy the yield produced by the city and the popularity of the Wonniw metaverse, are pushed to take an active part in the metaverse itself, bringing

more and more players to the platform to ensure sustainable yields in the long period.

#### **DAO TOKENS AND SHOPPING TOKENS**

The Wonniw metaverse will have two types of tokens, one is the Winnow (WNNW) token which is a DAO token and will be useful for all aspects related to voting and the "political" interaction of the game, such as mandatory staking to become Mayor. The other is Wonniw Coin (WWC) which will instead be the exchange currency for the purchase of licenses within the game and the means of payment for the yield.

#### **INTERACTION BETWEEN VARIOUS CITIES**

later in the development, a further level of interaction will have to be envisaged and the introduction of the figure of the elected governor of an entire region who will be responsible for the proper functioning of the cities under his supervision.