Altered Carbon: A platform for the discovery, acquisition and consumption of Voluntary Emissions Reductions

Introduction

Altered Carbon (AC) enables the discovery of Voluntary Emissions Reductions by ordinary people so that they can acquire these credits either for capital appreciation or to offset their personal activities.

The value proposition of Altered Carbon is that it will provide:

- transparency in a presently opaque market where the relative worth of carbon credit generating project categories is unknown
- lower the fees for trading carbon credits range from between 3-8% enabling more value to be passed on to the projects combating climate change.
- a mechanism for driving revenues from carbon trading toward financing a sustainable future

We believe that solving these problems is critical to realising the benefits proposed by the creation of the nascent carbon market.

Our mission is to bring together crypto investors and the carbon market and enable this asset class to generate yields before retirement.

Carbon Emissions Reduction

The Paris Agreement provided three options for policy makers of signatories to take at a national level in order to reduce carbon emissions:

1. Set a cap that a company cannot exceed
2. Introduce a carbon tax linked to the amount of CO2 a company produces
3. Create a carbon emissions trading scheme

The last method has resulted in the creation of carbon credits to enable the functioning of carbon markets.

Carbon Credits

Carbon Credits are certificates that represent the right to emit one ton of carbon dioxide or equivalent.

Categories of Carbon Credit

There are currently two types of Carbon Credit in existence:

- Voluntary Emissions Reduction (VER)
- Certified Emissions Reduction (CER)

While CERs are verified and regulated by an independent third party, VERs are not.

Carbon Credits are generated by Carbon Reduction Projects (CRPs). CRPs reduce carbon by performing activities across the following categories:

Category[1]	Example
Nature	Conservation, reforestation, avoidance of deforestation
Renewable	Hydro, geothermal, solar, wind
Community	More efficient energy sources, clean access to water
Waste-to-energy	biomass digesters, landfill gas.

Carbon Market Size

The Carbon market in 2020 was $272 billion growing 20% from the previous year[2], of which 90% is attributable to the European Emissions Trading System (ETS). This is set to grow dramatically with the Q2 2021 launch of the Chinese ETS which is now the world's largest trading market.

The Voluntary Emissions Reduction (VER) market is currently on track to be worth $1 billion in 2021 (Ecosystem Marketplace) and is predicted to be worth $50 billion by 2030[3].

The Problems with Buying Carbon

The acquisition of Carbon is currently possible through the use of centralised exchanges or for institutional purchases through direct investment in carbon reduction projects. The current centralised exchange model does not provide comparability between the different categories generating carbon credits. The current paradigm has created the following problems.

Firstly, due to the nascent nature of the market it is not clear that all categories of carbon reduction are equivalent in value. The authors argue that not all carbon abatement sources are equal and therefore investors and users of carbon credits should be empowered to acquire carbon credits from projects that best align with their own objectives.

Traders and brokers charge high fees, between 3-8%[4], taking a significant proportion of the value created through the hard work of the CRP.

[1] Carbon Offsets - what are they and how do they work?
[2] Global carbon market grows 20% to $272 billion in 2020: Refinitiv
[3] A blueprint for scaling voluntary carbon markets to meet the climate challenge
[4] https://arxiv.org/pdf/2107.00185.pdf

Purchasers of Carbon Credits have limited use for these credits until they are redeemed and so they are simply held for capital appreciation and offer no further utility.

Solution

We believe the problems identified will be solved through the creation of a platform that offers the following features:

Tokenization by category of Carbon

Tokenization of each category of Carbon Reduction Project (CRP) with one token representing 1 ton of CO2 or equivalent as follows:

- AC-Nature Coin
- AC-Renewable Coin
- AC-Community Coin
- AC-WTE Coin

These categories of carbon will enable the market to provide transparency on the value of each source of carbon and investors will be able to make better informed decisions.

These coins will be backed 100% by purchasing voluntary carbon credits (either directly from approved projects or through brokers or exchanges) falling within the scope of the defined portfolio, e.g. reforestation projects will create AC-Nature Coins.

All asset backed coins will adhere to the following rules:

- No more than 10% of the total carbon for the total circulating supply will be in a single project
- At least 50% of carbon sourced will be Gold Standard[5]
- 50% of the portfolio supporting a coin will not have a vintage greater than 3 years
- 20% of the portfolio will be retired within one year of the date of purchase

Automated Market Maker (AMM)

The creation of an AMM will provide an exchange platform which will allow the exchange of carbon for lower fees than an equivalent centralized exchange. Liquidity pairs listed on the exchange will enable the transparency envisaged by the tokenization explained above and staking in liquidity pools will enable investors to earn a yield (in the Altered Carbon Utility Token) on carbon credits that they are holding for capital appreciation or waiting to retire.

[5] The Gold Standard

Flow of Funds

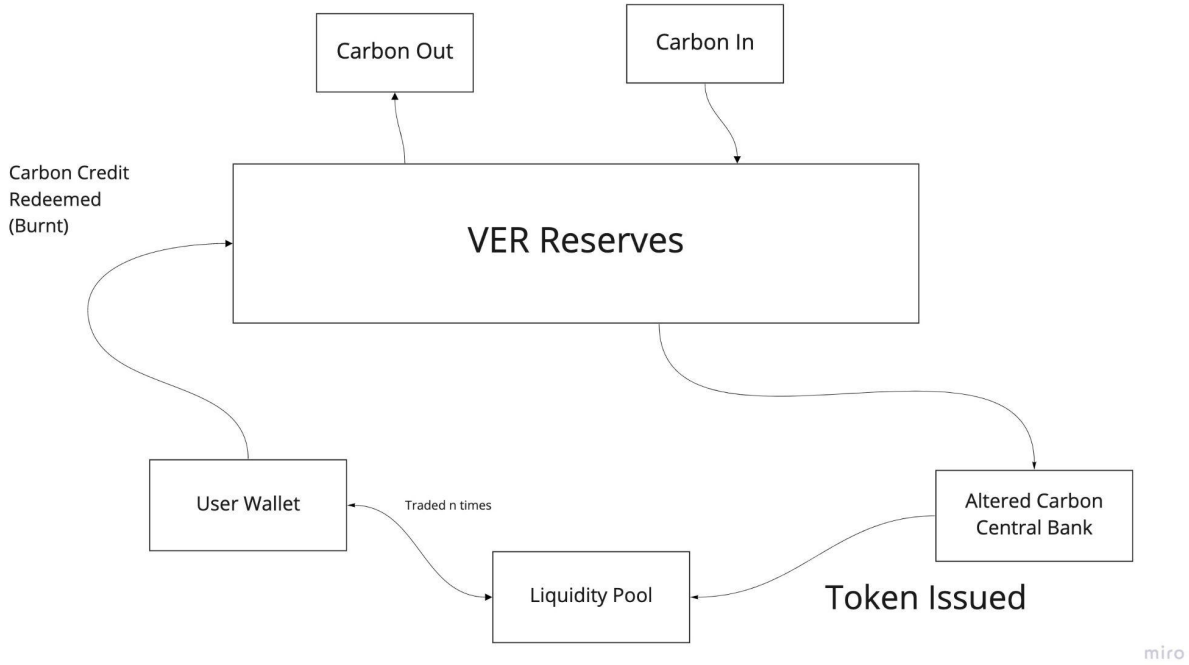

Figure 1

Carbon Acquisition

There is a roadmap of four stages envisaged for the acquisition of Carbon and bringing it onto the platform.

Seed Phase

The Altered Carbon organisation will release 20% of Altered Carbon tokens through an Initial Decentralised Offering (IDO).

The Altered Carbon organisation will seed the initial liquidity by acquiring Carbon on the open market and creating the first asset backed coin, AC-Nature Coin. This will be listed on the Altered Carbon AMM against a stablecoin for purchase by early adopters. These early adopters can stake their AC-Nature Coin for Altered Carbon utility tokens as a reward.

Germinate Phase

Using the lessons learnt in the seed phase the tokenisation offering will expand into the remaining three categories.

Grow Phase

The Altered Carbon organisation will reinvest a proportion of profits made from transactions in acquiring more carbon credits to increase the number of circulating tokens and ensure that the carbon assets which are backed on the platform lead to the growth of relevant carbon projects. This gives a decentralised solution to the problem of value equivalency among carbon projects.

Bloom Phase

The Altered Carbon platform will offer a tokenisation workflow to all Carbon Reduction Projects. These projects will be able to tokenize their projects directly on the Altered Carbon platform under one of the four categories and sell their coins directly on the market or stake these coins for rewards. We believe this is where the platform will really come into its own as it connects projects directly with buyers.

Altered Carbon Token

Altered Carbon (AC) accounts for exchange fees, enables proof of stake, pays rewards for those staking in liquidity pools and acts as a governance token for Altered Carbon DAOs.

An initial supply of 2,500,000,000 tokens will be minted to support transactions on the Altered Carbon Chain. This figure was calculated using the following assumptions:

1. A forecast of the trading volume based upon adoption and forecast growth of the VER market which is predicted to be valued at $50 billion by 2030.
2. The requirement to pay Altered Carbon tokens out to liquidity providers proportionate to their liquidity pool stake.
3. An estimated valuation of the token in relation to the USD, growing each year so that revenues make the network a viable business and the rewards attractive to liquidity providers.
4. Further tokens will be minted to ensure the price does not rise so high as to inhibit transacting and encourage excessive holding of Altered Carbon.

The initial supply will be divided as follows:

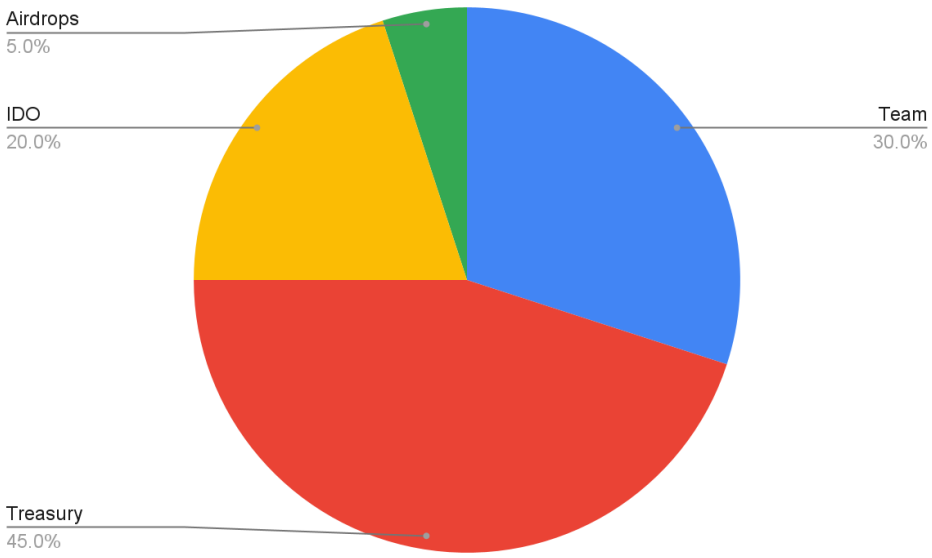

Figure 2

Automated Market Maker

What is an Automated Market Maker

An automated market maker (AMM) is a type of decentralized exchange (DEX) protocol that relies on a mathematical formula to price assets. Instead of using an order book like a traditional exchange, assets are priced according to a pricing algorithm. One of the largest AMMs, Uniswap, has grown volumes over 900x since launching in January 2020 and currently processes over $1 billion a day in transactions.[6]

Why is it beneficial to have an Automated Market Maker?

We believe an AMM provides the perfect mechanism to promote liquidity and enhance price transparency in voluntary carbon markets. An automated market maker (AMM) allows automated trading of tokenized voluntary carbon offsets with cryptocurrencies. It provides incentives for liquidity providers (LPs) by charging a transaction fee and distributing proceeds among liquidity providers thereby creating a dynamic price discovery mechanism for a variety of carbons in an efficient market.

[6] Uniswap | Home

Why do we need another Automated Market Maker?

Existing AMMs generate fees from trades made with liquidity pools with a proportion going to the exchange wallet and a proportion to liquidity providers. We believe that this model does not go far enough to achieve the social good that can be accomplished in a Web3 world.

We believe a new model is required where the fees are paid in a token that is inherently tied to a sustainable future that contributes towards social good. Therefore our AMM will pay fees in the Altered Carbon Token (AC). AC will enable users to participate in the governance of the Altered Carbon DAOs (see below) by voting on key decisions. These DAOs will act as a force for good in a new sustainable future.

Liquidity Pools/Staking

Liquidity Pools (LPs) are formed when an equal value of two tokens are placed into a pool to create a market. In exchange for providing their funds to an LP, liquidity providers earn trading fees from the trades that happen in their pool, proportional to their share of the total liquidity.

Traditional investing consists of centralized exchanges connecting buyers and sellers through a variety of order books. When placing a buy or sell order, another counterparty or market maker is necessary to effect the transaction. By contrast, when transacting in an AMM with LPs, the other side of the transaction is not a counterparty, but a contract. You do not need a buyer to execute a sell order, you only need sufficient liquidity in the pool with pricing determined by the pool's algorithm.

Holders of voluntary carbon offsets will now have a mechanism to earn a return on their carbon offsets by participating on our platform as a liquidity provider.

Pricing of tokens will be performed by the Equivalent Swap Price Model, implemented by the Starport Liquidity Module.[7]

Liquidity pools will be allowed for any token that is available on the Gravity DEX protocol meaning that Altered Carbon tokens can be earned on any liquidity pair currently part of the Cosmos ecosystem. With the slated arrival of the Gravity Bridge this will expand the available market volume to include all Ethereum based tokens and other EVM compatible chains.[8]

[7] liquidity/LiquidityModuleLightPaper_EN.pdf at develop · tendermint/liquidity · GitHub
[8] Gravity DEX - Ecosystem - Cosmos: The Internet of Blockchains

Fee Structure

A 0.3% fee will be charged on all trades made on the Altered Carbon decentralised exchange. The fee will be distributed as follows:

- 0.1% to liquidity providers
- 0.2% to Altered Carbon Exchange Wallet

This 0.3% fee represents a significant discount on the current average market rate of 5% charged by brokers of carbon credits.

Furthermore, 10% of the revenue generated from the *grow* phase onwards will be invested in the Altered Carbon Green Investment fund which the community can further earn returns from.

Altered Carbon Investment Fund

The Altered Carbon Investment Fund will be run as a Decentralised Autonomous Organisation (DAO). The governance token for this DAO will be Altered Carbon (AC) which doubles as a utility token for the AMM and other network activities. Holders of AC will be able to stake AC and vote on investment prospects in proportion to their stake in the fund.

The Altered Carbon holding entity that operates the chain will further invest 10% of revenue generated from the AMM from the grow phase onwards.

All transactions made by the fund must adhere to the following principles that will be enshrined in the DAO Charter:

- The mission of the DAO is to accelerate the green revolution by efficiently passing capital to those transitioning us to a net zero future.
- Investments proposed by the DAO must be Carbon Reducing

Altered Carbon Social Benefit Fund

A second DAO will be established focused on ensuring that those most adversely impacted by climate change are compensated and prepared to adapt to a 1.5C future. Socially conscious holders of AC will be able to stake their tokens to participate in the governance of the fund and donate their tokens.

The Altered Carbon holding entity that operates the chain will further invest a percentage of revenue generated from the AMM from the grow phase onwards.

Our fund will also support individuals and families in developing nations directly impacted by climate change. We believe retail investors will support the idea of providing funding at a

community level and will want to participate directly in helping individuals improve the quality of their lives. Example of efforts funding will support include:

- Micro loans for women
- Education for children (especially girls)
- Support for improving subsistence farming
- Enhancing access to clean water

We will highlight these activities within our platform to build a sense of shared community where investors will experience first hand how their platform participation is positively changing lives.

Onboarding for Projects

We want Altered Carbon to become the de facto place that Carbon Reducing Projects (CRPs) come to monetise their carbon offsets. Eventually cutting out the intermediaries so that they can readily access a large market of retail investors.

In order to realise this dream we will be democratizing access to our blockchain by developing onboarding tools that will allow CRPs to undergo due diligence and tokenize their offsets without needing to have sophisticated blockchain knowledge in their own teams. These tools will evolve Altered Carbon into a platform on top of which all CRPs can access customers and customers can access an ever growing source of carbon credits with confidence in the veracity of the source.

Other Carbon Tokens

We acknowledge that many wonderful and exciting Carbon based tokens are currently being developed on blockchain technologies. We firmly believe that climate change is a global emergency that can only be solved by being **competitively collaborative**.

This means that we believe as many people as possible should be exploring different avenues for solving the climate crisis and that the marketplace of ideas will optimise for the best solutions.

But it also means that we should be as inclusive as possible, meaning that our platform will be non-discriminatory in relation to the trading of any token on our AMM, this includes other carbon based tokens that are listed.

Our difference is that our AMM supports social good and enhances transparency through the categorisation of the sources of carbon.

Technology

The below is a high level overview of the stack that will be adopted for Altered Carbon MVP.

Blockchain

The blockchain for Altered Carbon is being implemented using the Cosmos SDK and scaffolded with Starport. Cosmos was selected because of its:

- interchain compatibility,
- speed of deployment and;
- support of application specific blockchains, which we believe to be superior for implementing Altered Carbon compared to the smart contract paradigm implemented by other existing blockchain technologies.

The Cosmos SDK provides an advanced Proof of Stake mechanism, full details of which can be reviewed here.

Initial validators will be incentivised to establish nodes in exchange for enhanced rewards.

This blockchain will enable the development of the Automated Market Maker and Altered Carbon Green Fund.

A React Web Application is being built which will be used to interact with the blockchain by users allowing:

- Exchange Tokens with Liquidity Pools
- Stake Tokens in Liquidity Pools
- Vote on Green Fund Investments using Tokens
- Stake Altered Carbon Tokens
- Vote on Green Fund Investments using Staked Altered Carbon Coins

Team

Rich Hurley, Chief Executive Officer

Richard is an entrepreneur and the former co-founder/CEO of Atreides.ai, a funded Artificial Intelligence company that is currently undergoing acquisition. Prior to founding Atreides.ai, Richard worked as a management consultant at Deloitte LLP (UK) focusing on the extractives industries. Whilst at Deloitte Richard worked across the UK, Africa and United States implementing technology solutions at large extractives businesses and was one of the core Deloitte team who helped establish VAKT, an oil trading settlement platform enabled by blockchain.

He holds a Masters in Software Engineering from the University of Oxford, is a Chartered Accountant and holds an LLB from the City Law School, University of London.

Josh Harrison, Chief Technology Officer
Josh co-founded Atreides.ai as the CTO and led the development and productionisation of enterprise SaaS AI applications. He has experience of all areas of the software engineering lifecycle, best practices and technological and performance trade offs. He comes from a strong software engineering background, having previously worked on APIs and data science pipelines for healthcare and cyber risk modelling based startups in London and San Francisco.

He is currently studying for an MSc in Software Engineering at the University of Oxford, and has previously published and presented an peer reviewed academic journal on cloud forensics.

Randy Wilson, Chief Financial Officer
Randy is a former SaaS startup CEO and partner within a global consulting firm's digital risk practice. Throughout his career, he has been responsible for serving leading energy, industrial and financial services companies through the execution of focused initiatives to identify and resolve complex issues in the areas of working capital/liquidity management, trading/hedging strategy, risk management, treasury, IT, accounting, valuation and credit. He has global commodity market experience having worked and lived in Houston, London, Geneva and Singapore.

Randy was also his firm's energy and resources blockchain leader. In this capacity, he acted as the strategy advisor to one of the largest non-financial services blockchain consortia providing guidance on defining new markets, developing the entity's revenue model, engaging with broader market participants, performance measurement, and on-boarding and integration strategy.

Randy has an MBA from Oregon State University and a Bachelor of Science from the University of British Columbia.