DEVELOPING A BLOCKCHAIN BASED ECOSYSTEM FOR CARBON CREDITS

SONIC CAPITAL

This document explores key economic and technological requirements along with unique opportunities and economic models to highlight how participants in an ecosystem of a distributed ledger solution can issue smart contracts and assign a value to improving the health of our environmental and social ecosystems.

Protocols and frameworks show how data quality and transparency can be assured and improved through an open data platform with decentralized governance.

Inspired by the evolving technologies, teams and models at Regen.network, joinseeds.com, Energyweb, Hypha.earth, Nori and Allinfra, we provide an overview of market forces with economic value and introduce the concept of a "planetary token".

1. Introduction

Blockchain and crypto driven innovation have not yet established a coherent relationship with the biosphere and the natural elements of our planet.

One of the highest potential uses of blockchain-enabled decentralized governance, crypto-economics, and distributed computing is to bring forth a game-changing paradigm shift in the relationship between financial systems, our social foundation and the ecological ceiling.
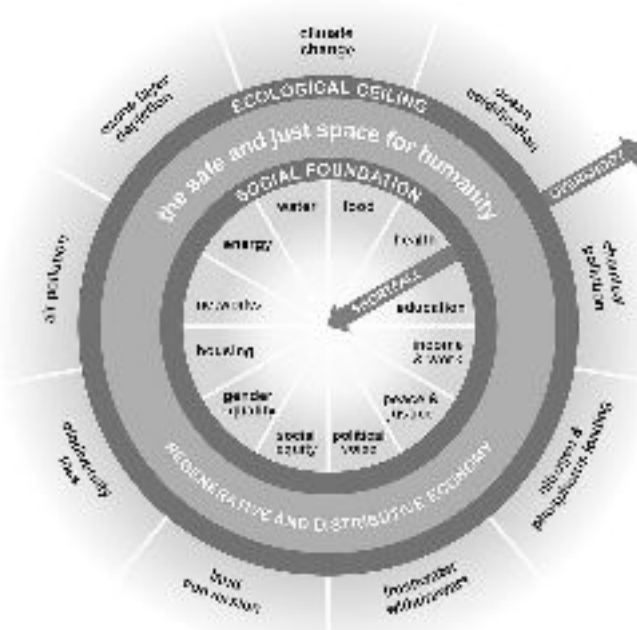
We outline how a tokenized distributed ledger, running decentralized protocols for the verification of ecological outcomes and smart contracting capacity, can enable numerous industries from carbon markets to consumer product companies and the insurance sector to tie their decision-making back to an accurate, shared understanding of their impact on natural systems.

Blockchain provides the technological foundation needed to both transparently track ecological data and incentivize shifts in land use toward more regenerative practices. It is a technology for encouraging collaboration amongst diverse stakeholders globally and distributing the value of the planet's resources more equitably, while providing a whole new commercial path, attracting and compensating talent in a self-sustaining ecosystem.

The real world application of blockchain is to create a global social and ecological accounting system. Unlocking the ability to reward improvements in ecosystem health is imperative to creating a coordinated response to attract talent, solidify a self-sustaining social foundation and stay within the ecological ceiling.

By classifying this new asset as a "planetary token" and treating the token as a commodity, in-line with how carbon credits are viewed today, it becomes possible to make the evolution and development of this core infrastructure attractive to developers, funders and consumers alike.

2. System Architecture

The core attribute is the ability to use smart contracting capacity to reward ecological regeneration based on verifiable ecological data.

2.1 Protocols

Ecological, social and energy protocol frameworks break down into three core frameworks:
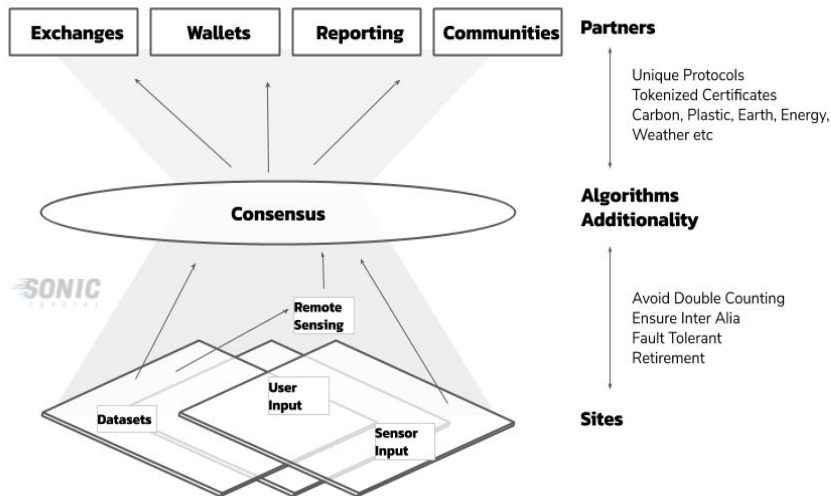
• **State Protocols** (SPs) define the algorithms and conditions necessary to verify a certain state or change of state on a piece of land.

• **Ecological/Social/Energy Contracts** (ECs)create the ability to fund and reward desired change in ecological, social and energy state.

• **Supply Protocols** (SPs) tie the ecological state into supply chains in trusted ways.

2.2 Network Components

A decentralized ledger is a domain-specific, public blockchain built on top of a consensus engine.

2.3 Data

Attestation on the blockchain, used to unlock smart contracted rewards for improvements in ecosystem health, is only as good as the data used.

● Data **sources** verifying claims of ecological state

● Shared data **schemas** for a coherently functioning ecosystem

● Data **integrity and timestamping** to ensure trustworthiness in user collected data

● Data **storage** software will require implementation of necessary protocols in order to make data accessible for computation, as users may want to keep data private and hosted on servers they control

● Data **quality protocols** provide a structured way to assess and filter the quality of input data

● Data **marketplace** allowing user contracts to specify the conditions needed to grant access to their data

2.4 Supporting Functionality

- **Token issuance** will allow organizations to tokenize their own living capital assets, minted when ecological and social contracts are fulfilled, bringing value to the health of our ecological and social state.

- **Identity, organization, key management and arbitration** will be addressed, leveraging efforts from existing projects such as Civic, Sovrin, Aragon or Moloch DAO.
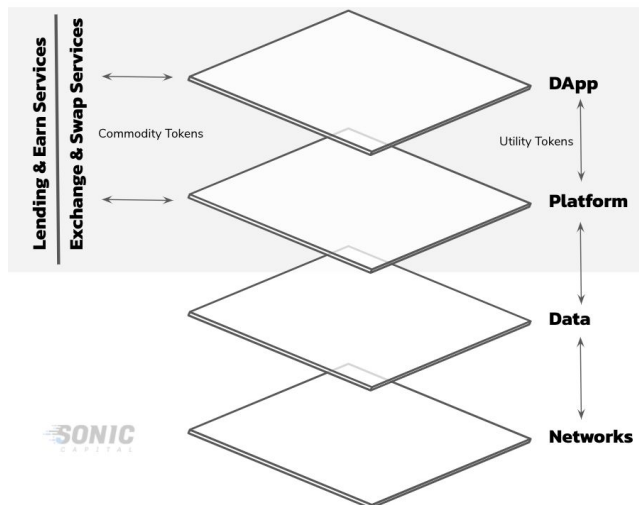
2.5 End-User Applications

A number of frontend apps will be needed for the ecosystem to flourish. Some may be existing applications while others will be created from scratch.

2.6 Exchanges & Defi

Both centralized and decentralized exchanges allow users to establish a price and trade tokens related to this living capital asset class. At 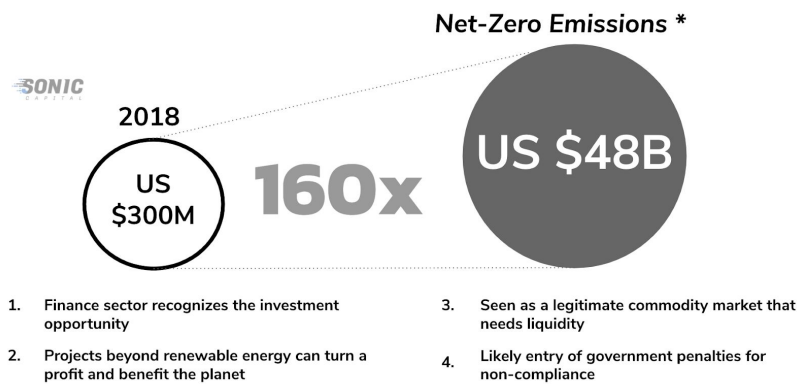the same time, investors can utilize various DeFi protocols that generate yield in exchange for providing liquidity, as well as create a market for lending, borrowing and futures products.

3. Market

3.1 Carbon market

Carbon markets currently exist as a way to help reduce the emissions of carbon and other greenhouse gases. 195 countries have committed to curbing carbon emissions via the Paris Climate Agreement. There are two types of carbon markets:

USD 50B: VOLUNTARY CARBON CREDITS

Net-Zero Emissions *

2018

US $300M

160x

US $48B

1. Finance sector recognizes the investment opportunity
2. Projects beyond renewable energy can turn a profit and benefit the planet
3. Seen as a legitimate commodity market that needs liquidity
4. Likely entry of government penalties for non-compliance

*According to the taskforce sponsored by the IIF (Institute of International Finance)

1. Voluntary Carbon Markets

These are primarily utilized by corporations aiming to offset carbon emissions. The voluntary market is estimated to be $191 million in volume in 2016 across REDD+, wind, landfill methane, large hydropower, and community-focused energy efficiency.

2. Compliance Carbon Markets

These are cap-and-trade markets with a volume of $57 billion in 2015. Compliance Carbon Markets are much more heavily regulated. Here, entities exchange emission allowances to meet predetermined regulatory targets with high penalties for non-compliance. The current carbon market system engages as many as 13 different third-party certifying standards to validate and verify project claims—most commonly the Verified Carbon Standard.

3.2 Energy market

With the distributed energy resources (DER) market, the electricity industry is entering a similar deregulation as was experienced in the telecommunications industry during the 90's. Four major bills have been passed in the US, EU, UK and AUS that are likely to bring about a whole new energy market with challenger providers and renewable energy certificates.

3.3 Predictive markets

This market will reward regenerative ecological activity and improve social outcomes by incentivizing the supply of accurate ecological and social data for the development of futures, insurance and other risk mitigation products. In 2017, weather and climate disasters caused $306.2 billion dollars in damage.

3.4 Supply certification

Goods and services focused on health, the environment, social justice, personal development and sustainable living has an estimated market size of $290 billion.

● Requires open source technological development aimed at ecological and agricultural applications in blockchain, remote sensing, IoT, machine learning, and fintech.

4. Conclusion

The Blockchain ecosystem provides three major upgrades to these markets:

1. **Automation** will reduce verification overhead by using technology as part of the certification process, providing access to a significant population segment previously not able to participate. Overhead accounts for 40-60% of the sales price for traditionally managed carbon credits.

2. With a decentralized and self-governed blockchain that is able to verify carbon in an open and transparent way, all verified outcomes will be recorded in a **public ledger**.

3. The ability to tokenize the information and data layer of this ecological ledger is key for functionality, but the larger disruptive potential of this new economic paradigm that is being ushered in by blockchain is the **tokenization** of specific living ecological capital assets.