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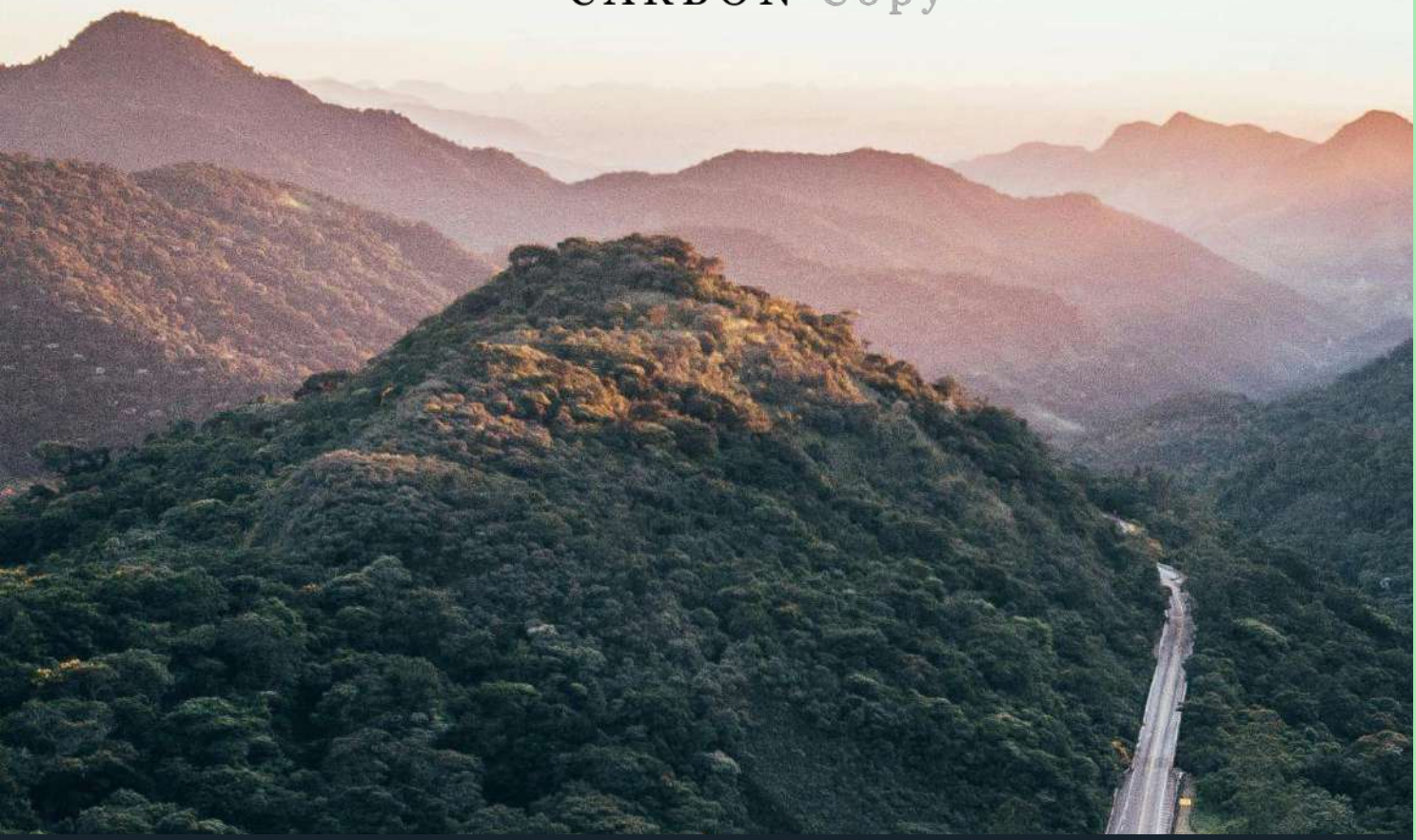

The State of ReFi

A Closer Look at Web3 Regenerative Finance

In coordination with:

ReFi DAO

Q1 2024

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Preface

The climate is in crisis and the income inequality gap continues to widen. While inextricably linked, addressing these two systemic issues will define the remainder of this century and beyond. Potential solutions abound at all levels, from the United Nations to local communities and everything in between. Solutions to which smart, passionate, and motivated people around the world are dedicating their time and money.

One approach that has developed a following is regenerative economics, a concept popularised by John Fullerton and based on Herman Daly's work on ecological economics. The basic premise is that if we want to address our systemic issues, we need to move away from our current, extractive system and towards a system that balances the need for economic growth with the need to regenerate the environment. A frequently cited example is transitioning from monoculture farming to agroforestry.

ReFi is grounded in this concept. It is a new pathway for solving old problems; one that reimagines how we value the environment and the people within it. But, critically, ReFi is not a panacea, nor necessarily feasible as an alternative to our current financial system. It is however a core piece of the much larger, collaborative effort that is required at all levels to address systemic issues such as climate change and income inequality.

With that in mind, we would like to highlight three things that will help provide context for this report.

The first is that in using the term "ReFi", we explicitly mean the Web3 implementation of regenerative finance. ReFi is often used as an abbreviation of regenerative finance, but we think it important to note that regenerative finance is not exclusive to Web3. It is a field within the larger regenerative economics movement. More details can be found in Appendix #1.

The second is the open question of whether our current financial system can sufficiently address our systemic issues. Proponents of regenerative finance argue that it cannot, that solutions such as ESG investing, green bonds, and development finance will not be able to keep up with the damage caused by our extractive financial system. Others suggest that the only way to solve our systemic issues is to leverage our current financial system to reward good actors and penalise bad ones. And while the answer to the above question remains inconclusive for now, we have drawn an explicit distinction between the two systems. This is not to position one as better than the other, but rather to clearly illustrate ReFi's aspiration to move towards a more regenerative system.

The third is that ReFi has become a catch-all term for solutions using Web3 technologies for ecological and social impact, not just solutions that align with regenerative economic theory. As such, it has carved out an interesting position relative to the two systems. Its presence in both allows it to act as a bridge. More specifically, a conduit enabling the transition to the regenerative system at the core of ReFi's existence.

Why We've Written This Report

The idea for this report began after visiting a crypto event in the summer of 2023 and realising that few attendees had any idea what ReFi was. It struck us as odd that people within the industry would be so unaware, but it pointed to an even larger question: why did it seem like ReFi was being considered as insignificant?

Further research uncovered two simple truths. The first was that there were too many definitions of ReFi floating about. There was no shared definition or narrative that people could coalesce around. What this ultimately created was a state of confusion, especially for those outside of ReFi. The second was that ReFi's (and blockchain's) inextricable link to carbon credits meant that its reputation had taken a hit after the scandal involving Verra, South Pole, and REDD (Reducing Emissions from Deforestation and Forest Degradation) carbon credit calculations.

However, the idea for a report really gained steam when we started talking to people adjacent to ReFi. Those that had heard of it confessed that they had difficulty understanding its relevance. Was it not just climate impact using blockchain? Was there any commercial viability? We then learned that even ReFi projects themselves lamented the challenge of explaining their value proposition. These things needed to change if ReFi wanted to get to the next level.

We therefore aim to achieve four goals with this report:

1. Fill the ReFi awareness gap
2. Give ReFi projects a document to reference in their collateral
3. Offer a potential narrative that can help ReFi people speak to non-ReFi people
4. Build the foundation for a larger, more in-depth quantitative research report

It is important to note that we do not intend to speak on behalf of the ReFi space. Rather, we aim to provide an objective overview based on our observations and research over the past year. We hope this will spark discussions both inside and outside the space about ReFi's role in solving the major systemic problems facing us today.

With that, we present The State of ReFi report, a closer look at Web3 regenerative finance.

Executive Summary

Today's ReFi space is best described as Web3-powered social and ecological impact. It is about taking the Web3 solutions available to it—blockchain, cryptocurrency, smart contracts, and decentralised autonomous organisations (DAOs), along with other modern technologies, and using them to build solutions that address our systemic issues, namely climate change and income inequality. Solutions include public goods funding, digital monitoring, reporting, and verification (dMRV), and universal basic income.

With a hyperlocal impact focus and decentralised ethos, ReFi works by facilitating the flow of funding and incentives, providing data-driven tools to derive financial value from regenerative impact, and supporting the issues of new currencies and investment instruments backed by tokenised ecological assets. Based on our count, there are at the very least 500 active ReFi solutions in existence today.

Despite the prevailing bear market conditions, ReFi activity remained strong throughout 2023. Tokenised ecological assets such as carbon credits were brought on-chain. Venture funding for Web3 startups declined considerably. Alternative funding mechanisms such as retroactive and quadratic funding emerged to fill some of the funding gap. Network societies became the coordination mechanism of choice for collective action. Blockchain infrastructure made a concerted effort to decarbonise. An ideological divide opened up between the "regens" and the pragmatists. ReFi integrated successfully with decentralised physical infrastructure solutions. The number of organisations and individuals conducting data-driven research on the ReFi space increased but a gap remains.

ReFi's potential can be quantified using market analysis of four areas where it stands to have impact: the voluntary carbon market (VCM), microfinance, climate change adaptation finance, and retail impact investing. The VCM is set to grow to between US$10 and $40 billion by 2030. A higher carbon price based on removal offsets could push the market size to US$1 trillion. Microfinance is a US$200 billion global market that could grow to US$300 billion by 2030. The adaptation finance gap is estimated to be between US$215-387 billion and continues to widen in the face of government inaction. Estimates suggest that retail investors have upwards of US$3.4 trillion in capital available for impact investing.

In terms of specific opportunities, there is one in particular that help ReFi establish itself: producing trusted on-chain ecological credits that can compete with off-chain credits produced by the gatekeepers of the voluntary carbon market. Most of the infrastructure already exists to make this a reality. The last step is solving the impact verification piece.

ReFi is faced with a number of challenges, however. Its connection to crypto and the voluntary carbon market tarnishes its public reputation. Regenerative economists have expressed concern over ReFi's potential to over-financialise the global commons. The lack of commercialisation prospects of many ReFi solutions make venture funding difficult to secure. Regulation remains uncertain at best in most jurisdictions and future attempts to pass regulation may harm the ReFi movement. Demonstrating impact continues to plague ReFi solutions due to lack of shared metrics and data sources. The usability of ReFi solutions has traditionally made things difficult for end-users.

There are some strong examples of impactful ReFi solutions. EthicHub has facilitated US$3.5 million in financing to more than 500 projects, with a default rate around 1%, where 100% of lenders received their principal plus interest. The Glo Foundation takes the interest generated from its reserve of Glo Dollar collateral and donates it to basic income programs that lift people out of extreme poverty. Regen Network has issued more than 2 million new on-chain credits from over 15 million hectares of land in 2023, of which 588,448 credits were retired.

As we move forward in 2024, we expect to see a significant increase in the number of ecological credits issued on-chain, traction for new ecological accounting frameworks, more robust climate data oracles, and improved tooling for collective action. There are some big questions to answer, however the focus should remain squarely on metrics and data for demonstrable impact verification. This is what matters at the end of the day, regardless of which approach to impact is taken.

Defining ReFi

Establishing a definition of ReFi that is truly representative inside the space *and* meaningful outside it has proven to be difficult. Ask ten people and you will get ten different definitions.

> ***"ReFi", is an emerging global cultural movement and field of finance that seeks to create economic systems, practices, and strategies that support regenerative and restorative outcomes in ecological and social systems.***
> ReFi Rabbit Hole Working Group

> ***Regenerative Finance (ReFi) is a movement focusing on the power of blockchain and web3 to address climate change, support conservation and biodiversity, and creating a more equitable and sustainable financial system.***
> Crypto Altruism

> ***Regenerative finance (ReFi) is an alternative financial system that focuses on promoting and restoring sustainability and resilience along with monetary gains.***
> Investopedia

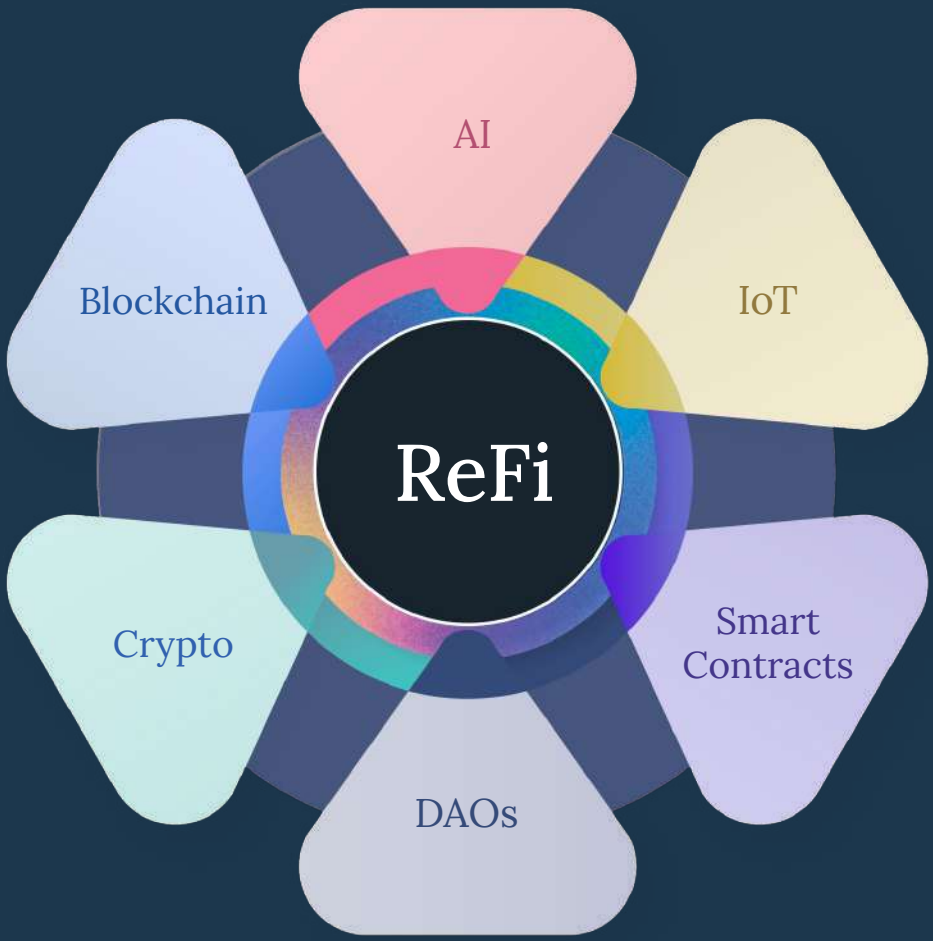
At the same time, that the top results of a Google search for "ReFi definition" are related to "refinancing" does little to provide clarity.

These two things have sowed confusion, but they have also motivated people from across ReFi to come up with their own definitions. This further complicates matters. In trying to define it, they often arrive at something two technical for people outside of ReFi or too abstract for people in it. We have endeavoured to strike a balance between the two.

What is ReFi?

The seeds of ReFi can be traced back to the launch of Bitcoin in 2009, when, for the first time, infrastructure for a decentralised, alternative financial system was publicly realised. Ethereum's launch in 2015, which introduced the concept of smart contracts and tokenisation, provided the tools to build services on top of this infrastructure. It was then only a matter of time before this same infrastructure and tools were leveraged for ecological and social impact.

In its most basic form, ReFi represents a belief that our current economic and financial system needs to change if we are going to address our systemic issues, and that this new system needs to be decentralised, equitable, and regenerative, not centralised, unjust, and extractive.



At a more practical level, ReFi can be described as **Web3-powered ecological and social impact.** In other words, taking the available Web3 solutions—blockchain, cryptocurrency, smart contracts, and decentralised autonomous organisations (DAOs)—and combining them with other modern technologies to build solutions that address our systemic issues.

Some examples include:

- Digital measurement, reporting, and verification (dMRV) of ecological credits
- Low-interest micro-lending platforms
- Circular economy projects
- Ecological credit marketplaces
- Climate data oracles
- Universal basic income schemes
- Social impact verification
- Public goods funding mechanisms (quadratic, retroactive, et al)

These solutions are the beginnings of the alternative financial system that underpins ReFi's existence. And while not always fully regenerative in scope, ReFi solutions are bound together by the need for fundamental change.

Key Characteristics

Digging deeper, ReFi has some notable characteristics that build upon our definition:

- Prioritises a **systems thinking approach** to ecological and social impact by appreciating nature's and society's interconnectedness.
- Espouses a **culture of proactivity** over reactivity.
- Values **coordination** and **collaboration** over competition.
- Provides a **bridge to a regenerative system**.
- Integrates **modern technologies** such as artificial intelligence (AI), Internet of Things (IoT), and mobile payment services.

What ReFi Aims to Achieve

At a more granular level, ReFi aims to:

- **Bridge the financing gap for climate change** mitigation, adaptation, and loss and damage (currently estimated in the trillions of dollars).
- **Fund public goods**
- **Address income inequality** and economic injustice.
- **Provide a decentralised alternative** to the opaque, inefficient voluntary carbon market and MRV process.
- **Issue new currencies** backed by the value of ecological assets.
- **Reform the way land is valued** based on its ecological value.
- **Aggregate funds for lending** to small-scale regenerative projects that larger institutions typically ignore.
- **Provide regenerative investment instruments** that balance regeneration and return.
- **Incentivise healthy habits** such as diet, exercise, mindfulness, and "inner regeneration".

How ReFi Adds Value

One of the most frequently asked questions, and one people in the space have had trouble articulating an answer to, is how ReFi adds value to the fight against climate change and income inequality. The ubiquitous blockchain attributes—transparency and immutability—are often touted but are rarely valuable in isolation. (The "garbage in, garbage out" metaphor comes to mind.)

Instead, we think it more helpful to look at other aspects that make ReFi solutions viable, as it may turn out that Web3 is not the long-term technological and/or philosophical foundation:

- **Hyperlocal focus.** A core tenet of most ReFi projects is real-world grassroots impact. Instead of building solutions that can scale globally, what we have seen in ReFi is a tendency towards solving local problems first. This philosophy aligns closely with the idea that financing is most effective when distributed directly to individuals or communities. It also allows ReFi solutions to battle-test their ideas at a small scale before deciding whether to expand.
- **Agility.** Web3 technologies have reached a level of maturity where they are fairly easy to integrate into real-world services. ReFi solutions are able to get up and running quickly, begin testing, and then rapidly adapt to changing dynamics on the ground.
- **Decentralised ethos**. As the evolution of AI demonstrates to mainstream audiences the need for decentralised governance, the idea that the Global Commons could be governed in any other way is becoming increasingly infeasible. ReFi has decentralisation built in by design, meaning that the solutions that come out of the space are inclusive in nature and developed in the open source.
- **New incentive frameworks**. Incentives are perhaps the most critical aspect of human and organisational behaviour. In our current system, incentives are aligned towards profit, which means a vast majority of the effort and capital go towards making profit at the expense of everything else. ReFi aims to fund and instil new incentive frameworks that give people the luxury to prefer regeneration over exploitation. In other words, where impact equals profit.

How ReFI Works

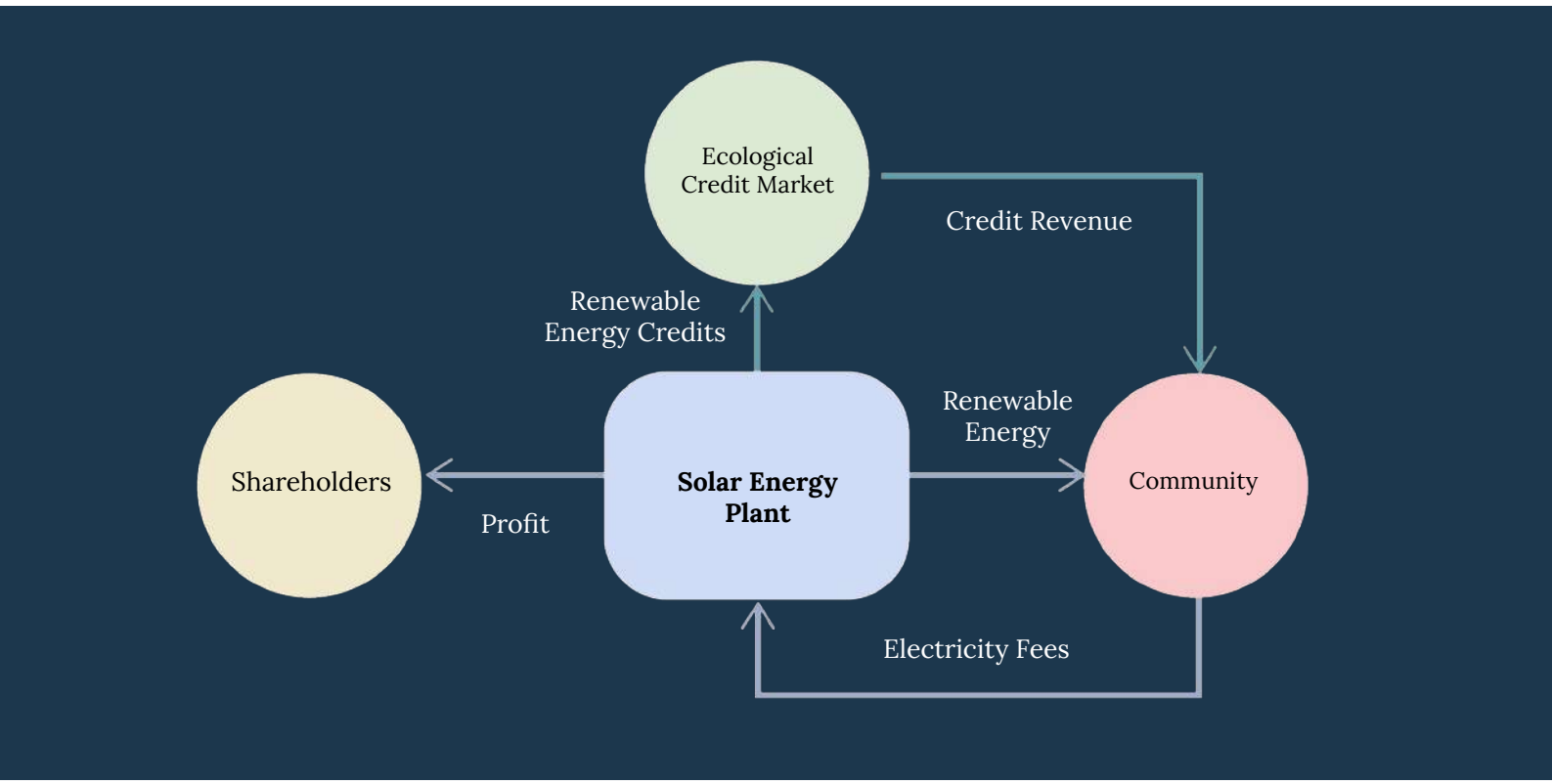
At its core, ReFi works in three primary ways:

1) Facilitates the **flow of funding** and incentives from source to end user via decentralised services and treasury governance mechanisms
2) Provides end users with **data-driven tools** to derive financial value from regenerative practices
3) Supports the issuance of **new currencies and investment instruments** backed by tokenised ecological assets

A key point is that ReFi solutions often integrate existing technologies, such as AI, mobile payment networks, and sensors, to maximise usability. These technologies are not always decentralised, but they are necessary for adoption. Consider the case of rural farmers in Kenya as an example. Mobile money is the most commonly accepted digital payment medium in the country. A ReFi solution that involves sending money to these farmers should leverage mobile money, not expect to onboard the farmers to cryptocurrency payments..

A ReFi Model in Action

A good example of a ReFi system built on regenerative principles is a solar power plant that uses the income from the sale of renewable energy credits to improve the surrounding community instead of pocketing it as profit above and beyond the profit already made from operating the plant.



ReFi and Web3

Web3 is both an enabler and a limiting factor for ReFi. It is the infrastructure that underpins much of what ReFi holds dear but it has so far struggled to deliver at scale in the real world. A big reason for that is because it requires more participation, more steps, and more awareness, which rarely align with actual on-the-ground needs. Important progress is being made on this front, however, such as the ability to secure a wallet with credentials from Google, Facebook, and others instead of having to rely on private keys.

The reality is that the decentralisation, transparency, and democratisation desired by ReFi is an end. It is the result of a long, iterative process in which these elements are introduced according to need, not foisted upon end-users. There is also the industry's obsession with native utility tokens as the primary means to facilitate economic activity in a solution's own ecosystem. While cheap to mint and distribute as rewards, these tokens are far too volatile and, regardless of their tokenomics, lose their value during bear market cycles. This is not a sustainable model. Stablecoins, by contrast, are a much more appropriate medium of ReFi-driven economic activity.

It remains unclear if Web3 technologies such as blockchain, cryptocurrency, and DAOs are the long-term answer. They are the best option for the moment, but many ReFi solutions who have had success in the past couple of years have actually decreased or eliminated their reliance on Web3 in order to meet the needs of the market. And while this may sound like a harbinger of doom, we would argue that it is a sign of maturity. It is projects recognising that Web3 is not a solution in itself, but rather tools to be applied when they are the best fit for a particular need.

The ReFi Landscape

Based on our count, there are at the very least 500 active ReFi solutions in existence today. A few different methodologies have been used to build a taxonomy, the most popular of which is impact area (nature, carbon, energy, health, et al.). Our research suggests that because ReFi solutions often bridge multiple impact areas, a more practical methodology would be more useful. As such, we have decided to classify solutions based on their primary role in the space.

Ecological Currencies

Impact Verification

Microfinance

Oracles and Data

Project Financing

Investment Instruments

Investors

UBI

Recycling and Waste

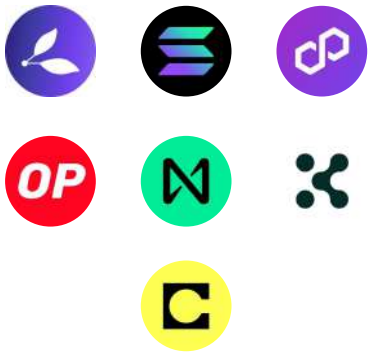
Network Societies

Fundraising

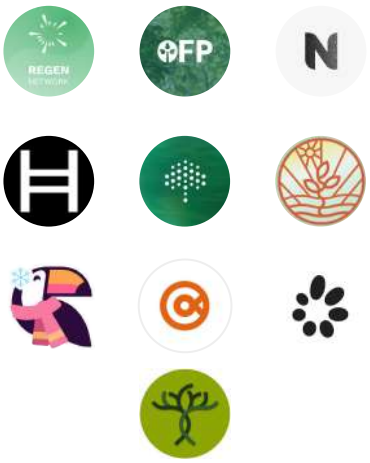
Content

Regenerative Economies

Distributed Ledgers



Ecological Credits and dMRV



Impact DePIN

Impact NFTs

Ecological Accounting

Reforestation

Insurance

Industry Trends

The past year has seen a number of trends in ReFi and related trends in the wider blockchain/crypto industry.

Tokenised Ecological Assets

ReFi's proverbial low-hanging fruit is the tokenisation of ecological assets. Initially, this meant bridging off-chain carbon credits on-chain so they could be tracked and traded in a more transparent manner. Retirement remained difficult, however, because there was no way to communicate on-chain retirement to the off-chain source registry. This increased the risk of double counting until two-way bridges were implemented that allowed ReFi solutions to communicate directly with off-chain registries.

We estimate the volume of tokenised carbon credits traded since the beginning of 2021 at nearly US$5 billion at time of writing. While this is a fraction of the off-chain voluntary carbon market trading volume, it has given rise to innovation around blockchain-based registries, marketplaces, and project pre-financing.

What we are seeing now in ReFi is the introduction of carbon and other nature credits natively issued on-chain without an off-chain counterpart. This is the culmination of advancements in dMRV, where satellite and other sensor data can be used to measure and verify impact.

Ecological Accounting

One of the negative outcomes of our singular focus on carbon is that we tend to judge impact based solely on tCO_2. Other factors, such as biodiversity, soil quality, and community development, are treated with lesser importance despite being core components of a healthy ecosystem. This affects agriculture in particular, where a focus on carbon allows for monoculture farming and other soil degrading activities.

The response to this issue has been the development of more comprehensive approaches that are based on interconnectedness of nature. One is the Ecological Benefits Framework (EBF). Developed by The Lexicon and referred to as "a digital handshake for the planet", it provides a common language for evaluating impact holistically based on 6 connected ecological benefits: air, water, soil, biodiversity, equity, and carbon. This allows everyone, regardless of their chosen path, to communicate their ecological impact in a standardised way. It is worth noting that some experts question whether the EBF goes far enough with respect to social impact. With only 1 of the 6 benefits, equity, there is concern that community development will not get the same attention as the other 5 benefits.

Declining Web3 Venture Funding

Venture funding for Web3 startups, according to Crunchbase, has seen a steady decline since the record-breaking days of 2021 and early 2022. A result of general bear market conditions, the conviction of Sam Bankman-Fried, and rapid advancement of generative AI, Q4 saw only US$1.1 billion in 221 deals.

"Funding to VC-Backed Web3 Startups By Quarter", Source: Crunchbase

The decline has been bad news for ReFi, which has traditionally had a difficult time raising venture funding in the first place. Available data indicates that only 22 venture funding deals have been closed by ReFi startups. Of these, carbon credit infrastructure startups such as Toucan Protocol, Flowcarbon, Thallo, and Senken make up the majority. To add insult to injury, a recent article by the *Financial Times* indicates that VCs are sitting on more than US$300 billion in undeployed capital.

Alternative Fundraising Mechanisms

During bear markets and periods of declining venture funding, fundraising becomes a major hurdle for early-stage ReFi solutions. This is an even bigger challenge for people working on public goods. The industry response has been to build and test alternative fundraising mechanisms that provide a lifeline during downturns and an incentive to build things that benefit the public good.

Quadratic funding (QF) has emerged as a popular alternative mechanism. In short, it is a way to allocate funds from a larger pool based on community voting. In other words, instead of the donor deciding where the funds go, the community decides. The project with the highest number of votes, not donation value, receives the largest proportion from the matching pool. Gitcoin Grants is the most established QF platform, having already distributed more than US$56 million via 170 quadratic funding pools since 2019. The recently formed Climate Coordination Network now offers a quarterly Climate Solutions Round through the platform.

Another approach is retroactive public goods funding (RetroPGF), employed by blockchain network Optimism, in which selected voters allocate funds based on a project's past impact, not its potential for future impact. In total, some US$80 million has been distributed through 3 rounds since Q4 2022.

Network Societies and CoordiNations

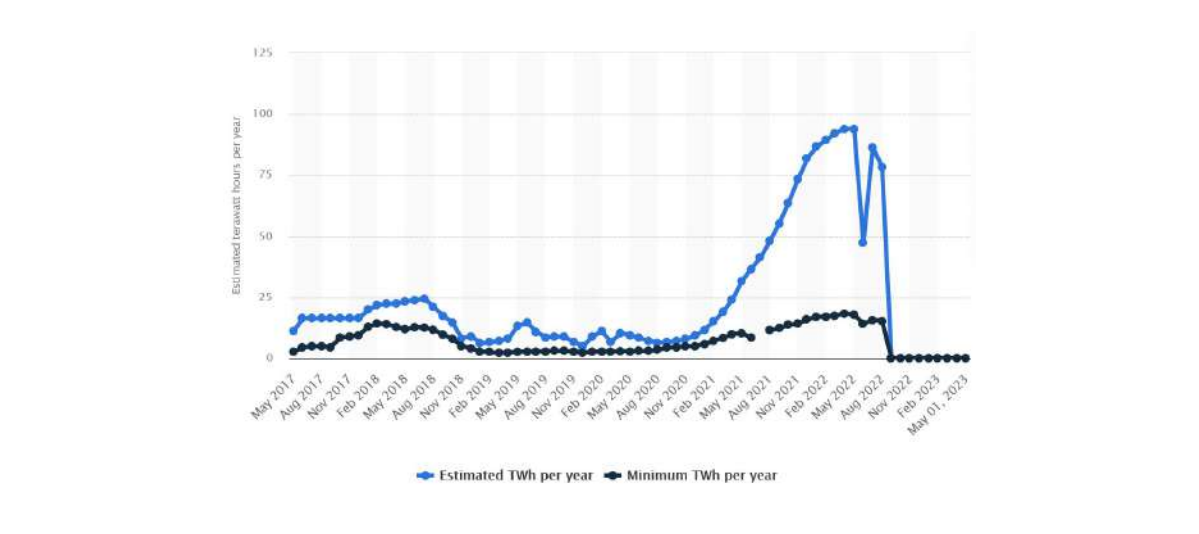
Network societies and “coordiNations” are a much lighter version of the “network state” concept coined by Balaji Srinivasan, which he describes as a “highly aligned online community with a capacity for collective action that crowdfunds territory around the world and eventually gains diplomatic recognition from existing states.” Built on top of Web3 technologies, network societies and coordiNations are an answer to the problem of scaling coordination and impact at a global level, without the desire for sovereign land and diplomatic recognition.

In practice, ReFi has seen the birth and expansion of a number of different network societies, of which ReFi DAO and Green Pill Network are the largest. Through fostering local “nodes”, or startup communities, they are providing a platform and playbook for global collective action. ReFi DAO, which has 28 nodes and counting, has written extensively about its own experience with the network society concept, while Green Pill, with 23 nodes, has articulated its own approach to coordiNations in two books.

For new network societies, the challenge has always been implementation. They require more than just a WhatsApp group or a Discord channel. They need governance, collaboration, coordination, fiscal management, an economy, and sustainability. They also need to espouse the very philosophy they claim to uphold. ReFi DAO’s answer to this is a journey towards “exit-to-community,” where “the organisation is co-owned and co-governed by the community that fuels it in a way that promotes inclusivity, dynamism, and enhances collective capacity.”

Blockchain Infrastructure Decarbonisation

Proponents of Web3’s potential for ecological impact have historically been contradicted by the fact that the underlying blockchain infrastructure required disproportionate amounts of electricity to confirm transactions. Bitcoin, for example, is infamous for consuming more electricity in a year than some medium-sized countries due to its reliance on a Proof of Work (PoW) consensus mechanism. The Ethereum network was in a similar position prior to the switch to a Proof of Stake (PoS) consensus algorithm in 2022. After the switch, electricity consumption decreased from nearly 100 TWh to a few hundred GWh.



"Ethereum energy consumption worldwide from May 2017 to May 1, 2023", Source: Statista

Ethereum's change has done little to alter the narrative, however. This has galvanised efforts on at least a couple of fronts to push for the decarbonisation of blockchain infrastructure. The first are private-sector initiatives aimed at holding the industry accountable. The Crypto Climate Accord (CCA), an initiative led by Rocky Mountain Institute (RMI), the Alliance for Innovative Regulation, Energy Web, and the World Economic Forum, aims to "accelerate the development of digital #ProofOfGreen solutions and set a new standard for other industries to follow." Another is the Crypto Climate Impact Accounting Framework created by the Crypto Carbon Ratings Institute (CCRI) and South Pole, which is "a first step to understanding how to account for emissions across the cryptocurrency value chain."

The second is a movement towards carbon-neutral blockchain infrastructure, particularly by those networks that are impact driven. Solana, for example, has real-time energy consumption tracking and offsets its annual emissions by purchasing tokenised offsets from selected ReFi solutions. Celo, in turn, refers to itself as a carbon-negative blockchain by combining its use of a PoS consensus mechanism with purchasing of carbon offsets.

Ideological Dichotomy

The ReFi space can roughly be divided into two camps: the pragmatists and the ideologues (also called "regens"). The pragmatists believe that we need to include the stakeholders in our current financial system if we are going to make progress towards addressing our big systemic challenges. They see commercialisation as a necessity and have no issues building business models that appeal to institutional investors.

The ideologues baulk at this idea, believing instead that the stakeholders of our current system are the root cause of the problem and should not be pandered to. They prefer on-the-ground impact over everything else and often shun the strings that accompany institutional capital. They prefer alternative funding mechanisms and organic growth, but can lack the professionalism and polish when describing their solutions to non-regen audiences. At the same time, there is a sense that more funding would allow them to make more impact.

The open question is whether the pragmatists will drive ReFi growth in such a way that benefits the ideologues. For example, can an ecological credit solution aimed at corporations and governments, such as Hedera Guardian, pave the way for native on-chain solutions like Regen Network and Open Forest Protocol?

Integration with Decentralised Physical Infrastructure Networks (DePINs)

A relatively recent trend taking shape is how DePINs and ReFi are working together to reward ecologically friendly behaviour. The *State of DePIN 2023* report released by Messari describes the DePIN ecosystem as "[using] crypto-incentives to efficiently coordinate the buildout and operation of critical infrastructure." Such infrastructure includes sub-sectors such as computing power, AI, wireless communications, sensors, and renewable energy. An additional benefit of DePIN is it supports the idea of community-owned infrastructure in places where local governments are not providing services such as clean water and stable electricity.

An example that fits the ReFi context is Switch. In an effort to give Nigerians access to clean, consistent electricity, it developed the M3tering Protocol to financially incentivise owners of solar panels to become electricity providers in its decentralised network. Consumers, upon purchase of a proprietary smart metre, then prepay for this electricity and consumption is tracked at a granular level.

New Research

As the ReFi space has grown, so too has the number of people and organisations researching and writing about it. Some examples include:

- Asset Layer: The Market Objects of Protocols - Ecofrontiers
- Blockchain for Scaling Climate Action - World Economic Forum
- DAOs for Impact - World Economic Forum
- RWA x ReFi - Thomas Morgan, CCIM
- Blockchains & Sustainable Development - BlockchainforGood
- ReFi Local Nodes Roundup 2023 - ReFi DAO

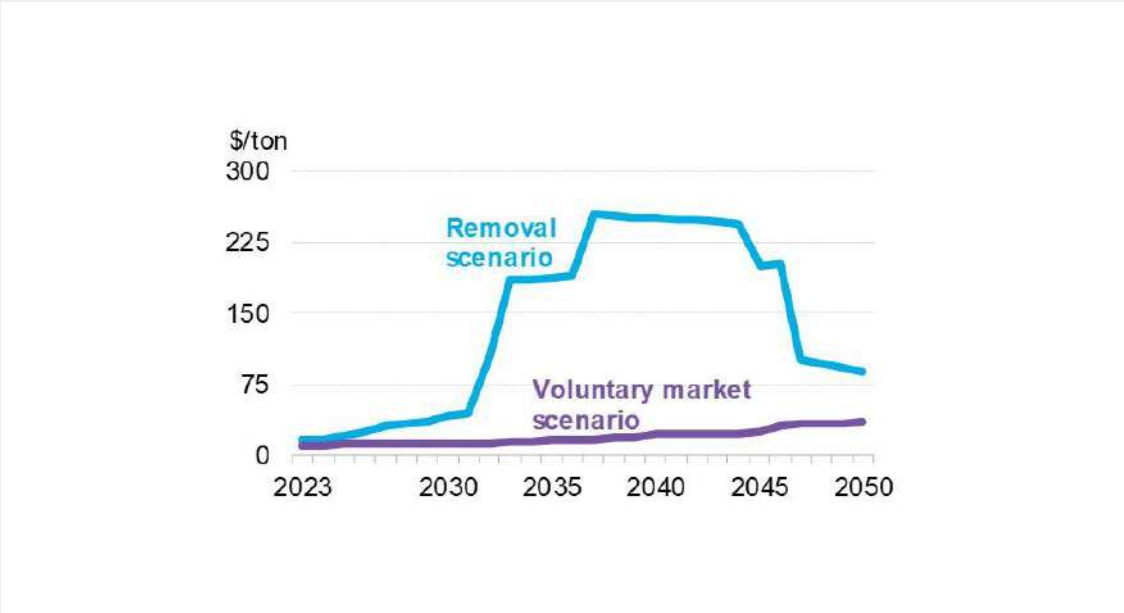
But there remains a gap in research and knowledge. A lack of reliable data sources and verified impact reporting has meant that much of the research work being done is based on what is theoretically possible, not what is actually being achieved. There is also the concerning phenomenon of the hype- and hope-based reporting that afflicts the wider crypto industry, resulting in inflated expectations and greenwashing narratives These are two things that need to change as we move forward in 2024 and beyond.

Market Potential

To better evaluate ReFi's potential, we will look at it in the context of the four areas in which ReFi stands to have the biggest impact.

Voluntary Carbon Market

According to a 2023 report by Boston Consulting Group, the voluntary carbon market is expected to grow from US$2 billion in 2021 to between US$10 and US$40 billion in 2030. As part of the report, a survey of sustainability leaders found that "a reputable monitoring, reporting, and verification (MRV) framework is a top criterion for purchasing credits."



Source: BloombergNEF

Another key variable impacting the size of the carbon market is the carbon price. Research by BloombergNEF posited two pricing scenarios. The voluntary market scenario assumes no change to the current way of doing things: companies can purchase any type of offset they want, avoidance or removal. In this scenario, the carbon price and, therefore, the overall market size, will remain relatively flat. The removal scenario, which assumes companies can only purchase removal credits, will push the carbon price higher and increase the overall size of the market. BloombergNEF suggests that it could reach US$1 trillion by 2037 in this scenario.

ReFi solutions operating in the voluntary carbon market aim to provide the reputable on-chain dMRV framework requested by companies, while simultaneously supporting carbon removal projects through pre-financing. If this comes to fruition, ReFi stands to be a major player in the voluntary carbon market.

Microfinance

The global microfinance market is pegged at around US$200 billion, with the expectation that it will grow north of US$300 billion by 2030.

One of the key success factors for microfinance, according to Standard Chartered, is lowering the cost of loans. Interest rates in Sub-Saharan Africa, for instance, can run between 5-132%, according to World Bank data. This is an area where ReFi can make an impact. With low overhead, availability to anyone with an internet connection, and integration with mobile payment networks, ReFi solutions can keep borrowing costs lower than financial institutions, decrease discrimination, and increase access.

Adaptation Finance Gap

If we consider climate change adaptation in developing countries alone—the area in which ReFi stands to offer the most benefit—the financing gap is estimated to be US$215-387 billion this decade, according to a Q4 2023 report by the United Nations Environment Programme (UNEP). The report also points out that adaptation finance actually decreased in 2021 and was well below pledges made at COP26 in Glasgow, Scotland. This is a worrying trend, especially in the face of rising loss and damage costs.

Part of the solution, the report says, is "increasing and tailoring finance to small and medium enterprises". ReFi has a role to play in this. By virtue of its hyperlocal impact and access to global liquidity pools, it can provide the level of tailoring needed to confront climate change adaptation on the ground.

Retail Impact Investing

A 2023 Standard Chartered report on sustainable banking estimated that US$3.4 trillion in retail capital is available for climate investing. This is an impressive figure, particularly in the context of the climate finance gap. What is so far missing are the instruments that provide retail investors with a direct connection to real-world impact, also referred to as impact-generating investments, instead of the more commonly available impact-aligned investments found in most sustainability portfolios.

ReFi solutions are actively working on these types of investments. Whether through equity crowdfunding for climate startups, ecological asset index funds, or green regenerative bonds, they aim to offer retail investors investment products with independently verified impact.

Opportunities

At a more granular level, there are four big opportunities we think ReFi can capitalise on this year.

Trusted On-Chain Ecological Credits

Today's voluntary carbon market (VCM) was not built on a foundation of trust. It lacks regulatory oversight, is gatekept by private enterprises who benefit from inflated credit calculations, and has seen its share of scandals. Blockchain has been offered up as the saviour, but the proposed solutions often miss the point: issuing credits on-chain does not solve the problem by itself. At a much higher level, what is needed is a system that can ensure that an issued credit is equal to its commensurate impact.

If there was ever an opportunity for ReFi to establish itself, this is it. The good news is that much of the infrastructure to issue, evaluate, price, sell, and retire ecological credits completely on-chain has been built. If ReFi can enable the decentralised calculation and verification of impact, it can introduce on-chain ecological credits—from carbon and cookstoves to biodiversity and renewable energy—that are verifiably trustworthy, accessible by anyone, and come without the high fees.

While this is no small feat, the implications are significant. Hundreds of millions of people will be incentivised to switch to nature-positive activities, assuming demand for ecological credits continues to rise as projected. For example, small-holder farmers will earn more by switching to agroforestry methods such as syntropic farming than they would from trying to maximise yield through monoculture farming.

Tokenised Real-World Assets (RWAs)

RWA tokenisation effectively means taking assets that exist in the real world and representing them as tokens on-chain. We saw it first with USD stablecoins such as USDT and USDC, but are now seeing it with less liquid assets, including bonds, treasury bills, real estate, and works of art. The advantages to tokenisation are threefold: 1) It decreases the cost of transferring the asset, 2) It enables liquid secondary markets, 3) It enables fractionalisation of larger assets into smaller pieces.

Heading into 2024, RWA tokenisation finds itself on many of the industry prediction lists for this year. It is no surprise why. With ~US$120 billion already tokenised, according to a Q4 report by 21.co, the market value is expected to grow to somewhere between US$3.5-10 trillion by 2030.

As far as ReFi is concerned, there is a clear opportunity to ride this wave of interest. Much of ReFi's output takes the form of tokenised RWAs, specifically ecological credits, shares in renewable energy infrastructure, and green debt instruments. Currencies backed by ecological assets can also be included in this list. Wider understanding and acceptance of tokenised RWAs, therefore, will only serve to benefit ReFi.

One of those benefits is the support services, including analysts, marketplaces, and ratings agencies, that will build systems to independently verify the quality and provenance of on-chain assets. Having this level of accountability built in should satisfy buyer and investor demand for asset quality and transparency, while simultaneously holding ReFi solutions to a higher standard. It would also mean these assets could be used as collateral in decentralised finance (DeFi) services.

Micro-Lending

A frequently cited concern in the world of development finance, despite clear proof that funds are most effective when deployed at the grassroots level, is that institutional lenders are not interested in this type of small-scale investment. Looking at agriculture specifically, smallholder farmers find it difficult to secure the funding that would allow them to bridge the period between planting and harvest. Getting access to this financing would allow farmers to create a flywheel effect in which they use the harvest revenue to pay for future plantings and make loan repayments.

Even if the capital was available, a major issue is that it needs to be distributed across vast geographies in tiny tranches of several thousands of dollars. This creates a disconnect between the sources of financing and farmers on the ground. Predatory lenders often step in to fill the void, offering terms that are more likely to bankrupt farmers than help them.

ReFi is well-positioned to provide a solution to this problem. On the lending side, it can aggregate global pools of liquidity and then cheaply distribute micro-loans through existing digital payment infrastructure. On the borrowing side, it can offer much lower interest rates and the ability to build a credit profile over time. Combined with other ReFi solutions, such as unlocking the ecological value of land through nature credits, ReFi-powered micro-financing has the potential to add tangible value to development finance.

Horizontal Scaling

For ReFi to achieve maximum impact, it cannot have a handful of companies trying to reach every corner of the globe. The consolidation that we have witnessed in other industries, namely tech and consumer goods, will be counterproductive to ecological and social impact. Overheads will increase, for one, but more importantly, ReFi will lose its advantages of hyperlocalisation and decentralisation..

Horizontal scaling offers an interesting opportunity. As we see with open-source software, anyone can use it to deploy their own solutions that target their respective markets. The same can be done for ReFi. Open-source solutions can and should be cloned. A micro-lending solution that is successful in northern Nigeria, for one, can be customised and deployed in southern Laos. The best part is that the different iterations all share the same underlying infrastructure, so can still take advantage of things like global liquidity pools, greater security, and economies of scale.

Network societies are proving to be an effective way of enabling horizontal scaling. The question is how to do so while ensuring fair compensation for the creators of the original solution. For example, if a creator develops a solution that spawns a hundred solutions, how can we make sure that a fair part of that value finds its way back to the creator?

Challenges

ReFi is not short on challenges that prevent mainstream adoption and the ability to scale.

Public Reputation

ReFi's connection to blockchain, cryptocurrency, and the voluntary carbon market impacts its reputation. We already know that the wider crypto industry does not have a strong mainstream reputation. Perceived connections to ape pictures, scams, hacks, and undeserved hype outweigh real-world impact. This makes it difficult to get people to implicitly trust solutions such as Web3-powered universal basic income schemes, on-chain nature credits, and micro-lending platforms. At the same time, ReFi is often talked about in the context of the voluntary carbon market and is therefore linked to scandals experienced by Verra and South Pole. This ultimately elevates ReFi's burden of performance and trust.

Another potential reputational risk is a wider cryptocurrency bull market. As we have seen in past bull cycles, the frequency of scams and fraud increase dramatically. Rising token prices and sentiment, therefore, may actually harm the ReFi movement more than it helps it because it will attract fraudulent projects looking to capitalise on the impact trend. This does not mean legitimate projects will not benefit, but rather that association with scam projects will muddy the landscape and make it difficult for people to understand what is real and what is not.

Over-Financialisation

There is concern among regenerative economics people that if ReFi solutions do not adhere to regenerative principles, then they risk doing more harm than good. This is due to the belief that the current financial system has a tendency to "over-financialise". We have seen this play out before with opaque mortgage-backed derivatives playing a prominent role in the 2008 financial crisis.

More specifically, the concern is tied to the potential pitfalls of financialising and collateralising the global commons, or the earth's shared natural resources (outer space, deep oceans, atmosphere, et al.). In other words, what would happen if the air we breathe was a commodity exposed to the financial wizardry that characterises our financial system?

There is evidence to indicate the potential for negative impact. A 2018 paper by Osborne & Shapiro-Garza looked at the commodification of ecosystem services in Mexico's forests. It found that "prioritisation of exchange value over use value of land, reducing both livelihood security and biocultural diversity; engendered internal conflicts between carbon producers and local authorities, undermining traditional governance structures and practices; and negatively affected women's access to fuel wood".

While indeed a valid concern, our view is that strict adherence to regenerative principles is perhaps less important at this early stage of ReFi's progression. As momentum builds, however, every ReFi project should aim to be regenerative in its ambitions. The key will be to have the tools and processes in place to make this transition smooth and beneficial.

Commercialisation

A common question put to ReFi solutions when talking to venture capital and private equity firms is:

“That’s great, but how do you plan to commercialise?”

For some, the question hits at the underlying “anti-commercialisation” philosophy of ReFi. We have spoken to founders who refused venture funding on account of being asked to follow a commercialisation strategy that deprioritised local impact. This raises an important question: In lieu of venture funding, are there enough alternative sources of funding out there that will allow them to scale their impact?

Regenerative cryptoeconomic systems may have an answer. By earmarking a portion of the transaction fees generated by network usage, distributed ledgers can allocate hundreds of millions via alternative funding mechanisms. Both Optimism and Celo are using this approach.

For other ReFi solutions, they see venture funding as one of the few means to build and scale their ideas. The question they need to answer is: How to construct their business model in such a way that it meets the criteria required by venture capital firms—namely sound unit economics, monthly recurring revenue, and path to profitability—all while achieving their desired level of impact?

Regulation

Any industry dealing in tokenised real-world assets and tokenised investment instruments has to take regulation into account. The wider crypto industry has often pursued an avoidant, sometimes combative, approach to regulation, while regulators have tended to prefer caution over progress. ReFi has yet to bump up against regulators in any meaningful way, but as solutions progress, and begin engaging citizens of the United States with investment instruments, it is only a matter of time.

The first question this raises is: How will regulators view on-chain ecological assets and universal basic income (UBI) schemes? Some believe that these things will inevitably become licenced activities as a means to prevent scams, meaning increased bureaucracy and higher barriers to entry. Others point to DeFi as proof that there is a long way to go before regulators will even entertain the notion of ReFi regulation.

A second question: Is regulation a necessary component of a thriving ReFi sector? LIkely yes, especially where investment instruments are concerned. There is a strong sense that the only way to bring significant private capital into the space is through regulation. That said, if ReFi can succeed in building its own self-regulation mechanisms for ecological credit markets and micro-lending platforms, government regulation may not be all that important as a factor for success.

Measuring Impact

It is currently difficult to quantify ReFi's impact. In fact, we can go as far as to say that ReFi does not have a shared set of metrics by which to measure its performance. At time of writing, there are no known services tracking real-time blockchain-based metrics such as on-chain ecological assets, total value locked (TVL) in micro-lending protocols, and lending/borrowing totals. This is something that has to change if ReFi is going to be taken more seriously. We only need to look to other sectors of the industry for examples. DeFi has its own service called DeFi Llama, crypto has CoinMarketCap and CoinGecko, while Dune Analytics and Nansen track broader blockchain metrics.

At the same time, there are off-chain metrics that need to be measured as well. The Ecological Benefits Framework is a great starting point, but there needs to be a fraud-resistant process for collecting and verifying this information. This could take the form of a standardised impact report template with a built-in decentralised verification layer that incentivises randomly selected experts to verify impact claims.

Usability

Usability has plagued the wider blockchain and crypto industry since its inception. Wallets, private keys, transaction signatures, and block times have played a role in this, but so too have clunky interfaces built in such a contrarian way that makes you think they are biting off the nose to spite the face. The stark reality is that ReFi will be at its best when it plays by the usability rules, from infrastructure to user interfaces, established during the Web2 era.

The other point worth raising is the end-user desire for decentralisation. The march to convenience has so influenced the human experience that any move to the contrary feels like making life more difficult. Take centralised fintech (Wise, Revolut, Robinhood, et al.) as the perfect example. They have set the usability standard for transfers, payments, and investments, respectively.

Would a decentralised Wise be as successful? At this point in time, it is unlikely, even if it offered a higher degree of data security and control, lower fees, and more robust fraud protection. Why? Because decentralised solutions require more effort and time. They ask the user to be responsible for their own funds and actions. And while some people want this, the majority does not. It was why banks were created in the first place. The solution, although easier said than done, lies in making decentralisation feel convenient. Things are happening on this front in the wider industry, such as abstract wallets and integration between Web2 credentials and Web3 wallets, but there is still a ways to go.

ReFi At Work

To get a better sense of how ReFi's work on the ground, here are 3 examples of ReFi solutions that are making an impact:

EthicHub

EthicHub connects small farmers with the low-interest financing needed to work their land and sell their crops to direct markets. Investors, in turn, can earn up to 9% by investing directly in projects, purchasing bonds, and staking $ETHIX tokens on behalf of unbanked farmers.

How It Works: EthicHub uses a peer-to-peer crowdlending platform to facilitate loans to projects and secures the loans with staked $ETHIX and bonds.

Impact: EthicHub has facilitated US$3.5 million in financing to more than 500 projects, with a default rate around 1%, where 100% of lenders received their principal plus interest.

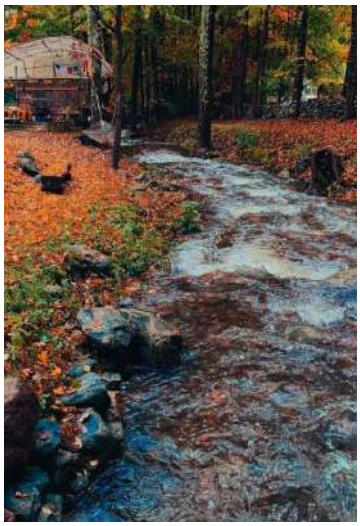
Glo

Developed by the Glo Foundation and issued by Brale, Glo Dollar (USDGLO) is a US-regulated stablecoin backed 1:1 by a reserve of cash and US Treasuries. What differentiates it from other USD stablecoines such as USDC and USDT is that it is designed to generate basic income for those living in extreme poverty.

How It Works: The Glo Foundation donates the interest generated from its reserve to basic income programs that lift people out of extreme poverty, such as GiveDirectly.

Impact: There are 2.4 million USDGLO in circulation today, up from 122,000 in June 2023. The company estimates that for every $20,000 of USDGLO adoption, 1 person will be lifted out of extreme poverty.

Source: GiveDirectly

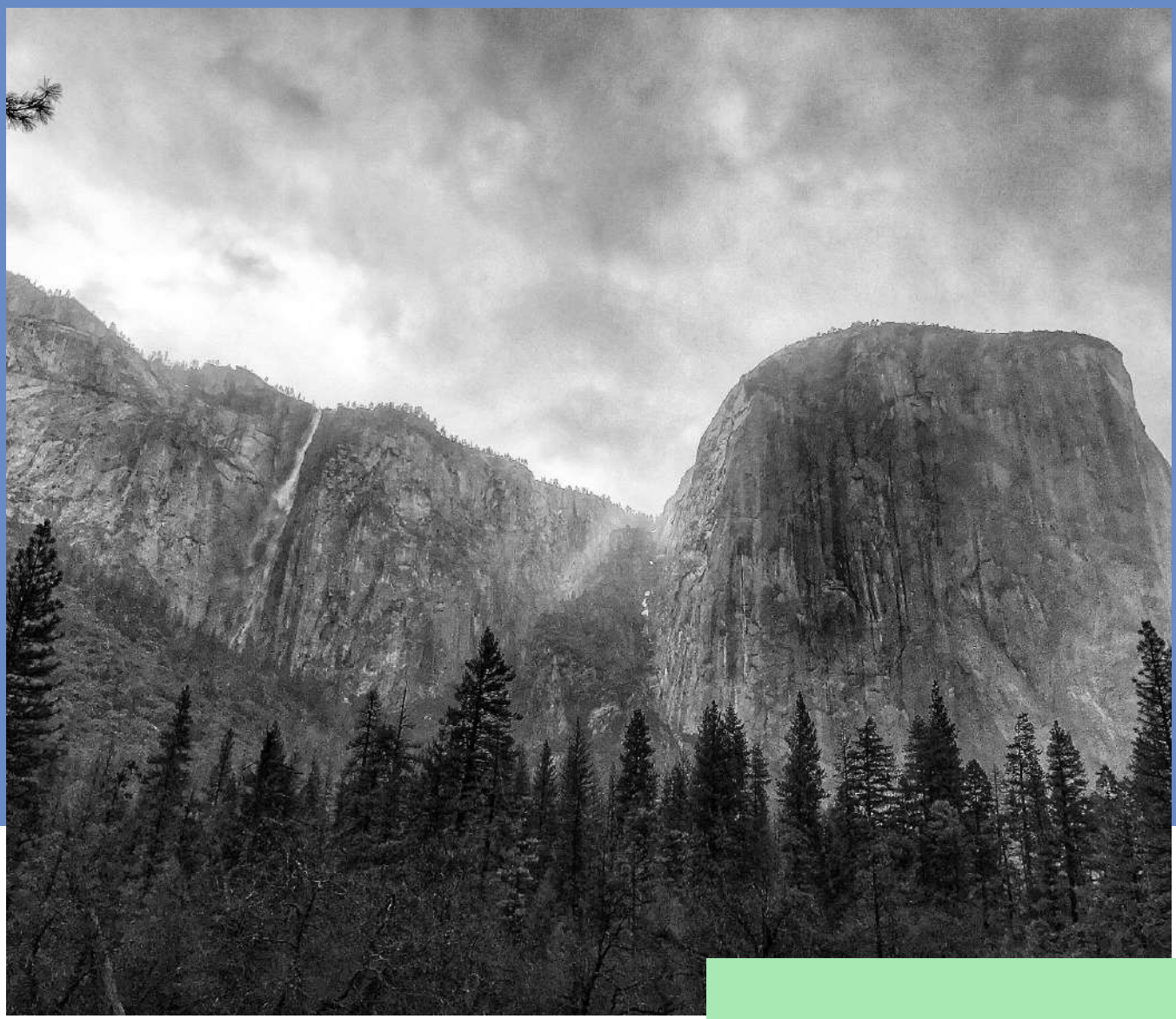


REGEN NETWORK

Regen Network is a platform to originate and invest in high-integrity carbon and biodiversity credits from ecological regeneration projects. It mobilises capital to move on-the-ground ecological regeneration projects forward.

How It Works: Regen Network provides the open-source methodologies, dMRV tools, and marketplace infrastructure to project developers so that they can verify, issue, and sell their ecological credits to corporations looking to meet climate commitments.

Impact: More than 2 million new credits were issued from over 15 million hectares of land in 2023, of which 588,448 credits were retired.



Looking Forward

It would be cliche to suggest that 2024 is going to be a big year for ReFi, but we do believe that it is an important year for the space's awareness and credibility.

What to Watch For

- Significant Increase in ecological credits verified, issued, sold, and retired natively on-chain.
- Traction for the Ecological Benefits Framework and other ecological accounting methodologies.
- More robust decentralised ecological data oracles covering wider geographies and more variables.
- Integration with decentralised science (DeSci) and DePIN solutions.
- New network societies and expansion of existing ones.
- Improved tooling for decentralised governance and collective action.
- Implementation of the ERC-404 token standard enabling the fractionalisation of NFTs.

The Big Questions

ReFi does have some big questions to answer in 2024, however:

How can ReFi define and demonstrate its impact to the outside world?

This question has the most tangible solution. A diverse group of people in the space need to get together and define the metrics by which to measure whether ReFi is achieving its mission. DeFi is lucky in that its activity is exclusively on-chain, so the metrics were easy to define (total value locked, transaction volume, default rate, et al.). ReFi activity exists both on- and off-chain, which means defining and demonstrating success will be more challenging. But the importance of this task should not be underestimated.

Can alternative funding mechanisms such as quadratic and retroactive funding keep ReFi going in lieu of venture capital?

There is a strong connection between the level of activity in an industry or sector and the amount of funding available to it. So far, ReFi has gotten by without much in the way of external funding. It has done this by staying small, agile, and relying on alternative funding mechanisms like quadratic and retroactive funding. What remains to be seen is whether the current level of funding through these mechanisms is enough to not only sustain ReFi but to attract new builders as well.

Will ecological-asset-backed currencies and assets fall victim to volatility?

A major milestone in the transition to a more regenerative economy is ReFi's ability to create currencies and other assets backed by on-chain ecological assets as opposed to off-chain fiat or paper assets. Whether stablecoins, index fund tokens, or stores of value, a key element they must all share to be taken seriously is low volatility, especially when juxtaposed to the wider crypto industry. If there is a sense that these new assets are in fact volatile or backed by suspect ecological assets, it will only increase the harm to ReFi's public perception.

Will the market trust ecological credits verified and issued natively on-chain?

While we will likely see an increase in native on-chain ecological credits, there is no guarantee that buyers will be lining up to purchase them. The burden of quality is high for ReFi, but if it can provide the verifiably impactful credits companies are looking for, it will change the dynamics of the voluntary carbon market. The resulting influx of capital will help scale impact and incentivise new projects. It will also go a long way in helping ReFi's credibility and awareness.

A Final Word

It is safe to say that ReFi has proven itself as a viable solution in the fight against climate change and income inequality. And while impact remains relatively small and localised, there are real people on the ground benefitting from this new approach to finance. We also cannot help but remark on the ingenuity and passion of the people in the space. It is refreshing to see blockchain and cryptocurrency demonstrate their utility outside of the investment realm.

There is, however, a long way to go before ReFi becomes anything close to what it aspires to be. For this year, we think the ReFi space should focus on three areas in particular:

- **Impact verification and promotion**. This is the big ticket item. Trusted impact verification systems will open a number of doors, including differentiation in how ecological assets are valued, which means greater incentives to maximise impact. They will also allow solutions that consistently demonstrate impact, and ensure that people know about it, to garner more attention. Crucially, this also means being highly sensitive to the negative impact of greenwashing. Now is not the time to be overstating or fabricating impact.

- **Integration with existing technologies and services**. ReFi's best use cases all leverage a variety of different technologies and services—some decentralised, some not—to maximise impact. This is not something that should stop because ReFi solutions need to be usable and accessible to grow. Insistence to the contrary will only serve to slow the pace of adoption. Meet the people where they are, do not expect them to come to you.

- **Coordination**. Lone wolves are not solving our systemic issues. Neither, we would argue, is collaboration—a word thrown around much too freely in ReFi these days. Coordination is what is needed to get ReFi where it wants to go, to remedy the perceived coordination failures that got us here in the first place. This does not just mean coordination within ReFi but with stakeholders *outside* as well.

We will end with a word from Neduc, a community based in a northern Brazilian favela and beneficiary of ReFi solutions such as GoodDollar and impactMarket:

> ***In 2022 we started the [impactmarket] microcredit program and a group of artisans stood out for their daring proposal to turn waste (plastic bottles) into fashion. Today their ecobags are sold in stores around the city and have even reached Portugal e Spain and Web3 is amazing.***

Finally, we would like to extend our sincerest appreciation and thanks to the people whose knowing or unknowing contributions made this report possible. In no particular order: Monty Bryant, Dulesh Fernando, Shihan Fang, Kate Bennett, Laura Walker, John Ellison, Thomas Prince, Evan Hudson, Kennedy Ng'ang'a, Jason Peter Stevens, Beverley Postma, Gregory Landua, Susanne Zapelão, Thomas Morgan, Sebastian Persch, and all the other thinkers, regens, and climate warriors who are fighting the good fight and talking about it.

If you have any comments, concerns, or suggestions about anything you have read in this report, do not hesitate to reach out to us at hello@carboncopy.news.

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Appendix #1: ReFi Influences

The following is taken from the ReFi Rabbit Hole Working Group, members of which include Monty Merlin of ReFi DAO and Sev Nightingale from Sunflower EcoTech.

The underpinnings of ReFi can be traced back to the early 20th century with innovative ideas around monetary policy and economic theory. In 1916, economist Silvio Gesell proposed the concept of "Freigeld," a currency designed to encourage economic activity through a negative interest rate, which discouraged hoarding and aimed to improve the economic status of those in poverty.

In the subsequent century, various scholars and economists further shaped the theoretical basis of ReFi. John Fullerton argued that money, beyond its practical utility, was a reflection of a society's spiritual and cultural values. This line of thought was echoed and elaborated upon by Charles Eisenstein in his thesis, "Sacred Economics". Eisenstein postulated that money served not just as a medium of exchange or store of value, but also symbolised societal values and moral systems, reinforcing the idea that economic systems are inherently tied to social and ethical structures.

The feasibility of communal and sustainable economic systems was exemplified by Elinor Ostrom's research on common-pool resources. Contradicting traditional wisdom, Ostrom demonstrated that communities could sustainably and equitably manage shared resources through cooperation and trust, a paradigm shift that earned her the Nobel Prize in Economics in 2009.

The holistic approach of ReFi aligns with Kate Raworth's "Doughnut Model," which defines a range of economic activity that is both sustainable for the planet and sufficient to meet basic human needs. This model establishes both a lower limit for social foundations and an upper limit for ecological ceilings.

In 2011, Gregory Landua & Ethan Roland published "The 8 Forms of Capital" which expands the traditional idea of capital, incorporating Social, Material, Financial, Living, Intellectual, Experiential, Spiritual, and Cultural Capital. This comprehensive framework redefines wealth, factoring in various resources beyond financial, and facilitates a more holistic view of societal interactions.

More recently, the practical implementation of ReFi has been seen since 2018 in initiatives like Gitcoin Rounds, showcasing how these economic theories can be put into practice.

Collectively, these key events and developments have laid the philosophical and practical foundation for Regenerative Finance, setting the stage for a new economic model that aligns financial practices with the restoration and enhancement of social and natural capital.

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A network society to regenerate the earth.

About ReFi DAO

Our mission is focused on developing strategic services and public goods for the Regenerative Finance (ReFi) ecosystem including movement-wide sense-making, education, opportunity development, fundraising support, onboarding and empowerment through a blend of online platforms, multimedia, and community coordination.

Central to our work is incubating and supporting the development of ReFi Local Nodes across all major regions in the world. These local communities are pivotal in championing ReFi solutions on the ground and enacting a cosmo-local network for the regenerative economy.

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