EmpowerChain

Digital Infrastructure for a Circular Economy

Status: Draft *Jun 6, 2022*

Table of Contents

Keywords:

Empower: Company author of this document.

EmpowerChain: Blockchain created by Empower. Digital, decentralized infrastructure for the circular economy as a publicly owned good.

Emp: Pronounced "emp", the incentive token for Empower's incentive scheme. Its leading utility functions as a currency in exchange for goods and services.

MPWR: Pronounced "empower", The native network token for EmpowerChain. It is the governance coin of the EmpowerChain Blockchain. Holders will be able to stake it and pay transaction fees with it.

Circular Economy: An economic model of production and consumption which involves sharing, leasing, reusing, repairing, refurbishing, and recycling existing materials and products as long as possible.

PCRD: Pronounced "piciardis", the abbreviation of "Plastic CReDit", are credits used for (among other things) plastic footprint offsetting.

Proof of Real Work: When obtaining a PCRD, it will contain information about plastic waste, which people made the human effort to collect. This is literal proof of actual work that has already taken place.

Abstract

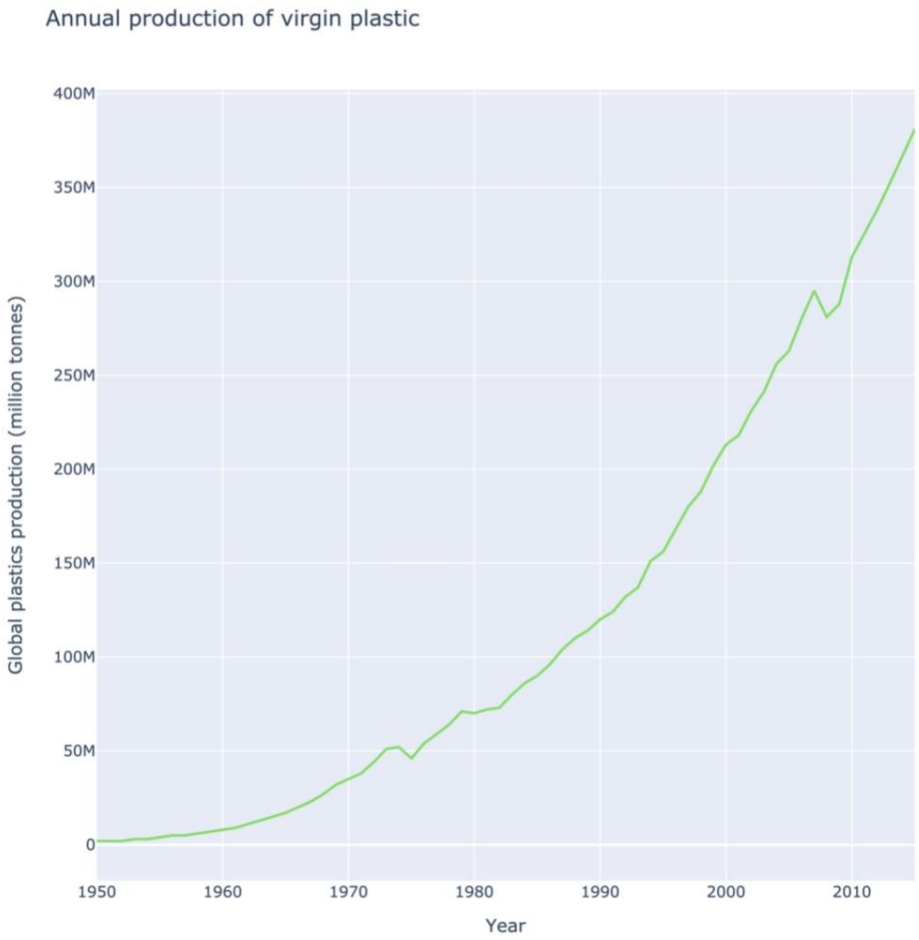
In communities across the globe, plastic has become an instrumental product in our daily lives. Plastic is a toxic and long-lived material yet abundantly used in nearly every aspect of the consumer lifestyle. Nevertheless, most of the plastic we use is in single-use products that have accelerated global waste production alarmingly; as plastics become more commonplace in households, plastic production and waste soar.

Globally, we produce roughly 448 million tonnes of non-recycled plastics that remain in our ecosystems and inevitably break down into harmful microplastics when left untreated (Parker, 2019). The accelerated rate of global waste production highlights the inefficiencies in existing markets for recycled plastic and signals fundamental inconsistencies concerning global resource management. It is increasingly prevalent that the systems we use to manage our resources must undergo a complete transformation to a circular economy.

The evolution of the use of plastic is one of the most widespread and costly problems in the global pollution crisis. As a result of the inefficiencies in traditional markets, we introduce EmpowerChain and its native $MPWR token, our tried and tested blockchain for a circular economic model that revolutionizes profitable plastic waste removal.

The Empower token is designed to simultaneously remove plastic from our ecosystem and prevent it from ever getting there in the first place. The EmpowerChain whitepaper exposes the technical rationale supporting the creation of the Empower Token, its native plastic passport, and its involvement with the Cosmos Ecosystem. Though existing plastic removal technology is essential, it is insufficient to alleviate plastic's strain on our ecosystems. The EmpowerChain is a blockchain-based ecosystem for the circular economy and is a well-suited free-market solution leveraging the Norwegian system for recycling at scale. At Empower, we believe implementing a circular economy is structurally vital to removing non-recycled plastics from the environment.

Introduction



(Source: Ritchie, 2018)

Plastic plays a large role in our daily lives. Because of its many useful traits, industries across the globe have become fully reliant on it. Plastic is affordable, durable, and tremendously versatile - making it ideal for worldwide production. Whether through revolutionary innovation in medicine with life-saving devices, strides in aerospace travel and technology, or supply chains and transportation - plastic is too great of material to sacrifice.

However, the overuse of plastic has evolved into a real issue. Plastic dependence increased from roughly 2.3 million tonnes per year in 1950 to 448 million tonnes in 2015. This sharp uptick of 200x in plastic production in less than 70 years will double by 2050 (UNEP, n.d.). Plastic, when leaked into nature, can cause major problems. Wildlife suffers, micro-and nano plastics are entering our bodies with still unknown consequences, and the problem is only accumulating because of the longevity of plastics.

Fortunately, one of the advantages of plastic production is that it can easily be recycled and reused for future consumption. However, recycling plastic comes with particular challenges. For example, materials need to be deposited and collected to be recycled. When mixed with waste or contaminated in nature, the cost of sorting and cleaning alone makes recycling infeasible. This constraint requires infrastructure and incentives that currently do not exist to be implemented at a scale large enough to address demand. It requires a structural economic transformation, often called a circular economy, that aims to recycle and regenerate natural resources. In contrast, our existing model, the linear economy, implements a use and throwaway - encouraging extractive systems for global production.

In recent years, a handful of countries in the European Union and in the United Kingdom have passed new legislation taxing the production and import of virgin plastic as a signal of support for more recyclables (European Commission, Single-use plastics, n.d.). This new legislation has resulted in over 400 extended producer responsibilities regulations, making producers more accountable for their business operations. The cost of waste and of recycling is to be incorporated into the bottom line This strategy effectively aims to mandate every plastic producer to increase the rate of recyclable content in their products. Such regulations have limited success because the traditional infrastructure in the world's economy is built for extraction, not regeneration. Global enterprises will need to redesign their products and value chains with open-source, decentralized technology and comprehensive data to initiate this transformation.

When we look for a solution to plastic waste, we need to look for one that solves the main bottlenecks:

1. Incentivized plastic removal in an equitable manner
2. Transparent data management that reveals pertinent processing information
3. A Scalable and replicable system to fit markets of all shapes and sizes

These three pieces are fundamental to working on an adequate solution. Members must remain incentivized to continue playing their role in creating and maintaining the circular economy. Data must be handled appropriately so plastic waste can be collected, transported, and processed most effectively. Ultimately, it needs to be both flexible and scalable to truly adapt to all the unique situations that exist around the world.

The solution that solves all of these things, is the digital infrastructure layer for the circular economy: EmpowerChain. It is the decentralized, equitable, and public good that enables collaboration and correct incentives.

An Idea: A Circular Economy Based on Recycling

As previously established, the current economic model permanently removes materials for single-use products with short lifecycles. This model systematically compels extractive production and unsustainable consumption. On the other hand, the Circular Economy entails sharing, leasing, reusing, repairing, refurbishing, recycling, and other activities that restore existing materials and products for as long as possible, thereby extending the product life cycle of consumer goods.

Ideally, the circular business model extends the linear model by cycling, extending, intensifying, and dematerializing material and energy loops to reduce resource inputs, waste, and emission leakage simultaneously. These implications aim to increase the amount of plastic recycled, extend the product life cycle as much as possible, and transition from a closed-loop chain to a circular supply chain.

In practice, a circular economy implies reducing waste to a minimum. When a product reaches the end of its life, its materials are kept within the economy wherever possible. These materials can then be productively used repeatedly, thereby creating added value.

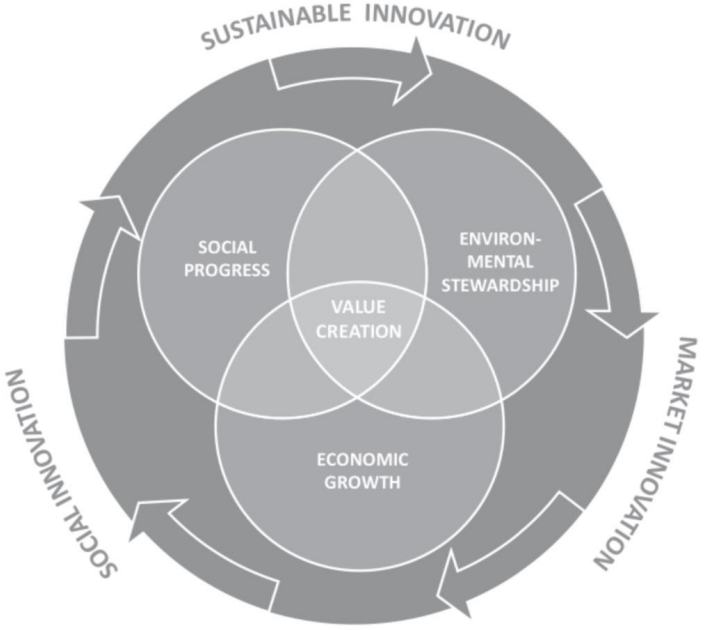
This departs from the traditional, linear economic model, based on a take-make-consume-throw-away pattern. The traditional model relies on large quantities of cheap, easily sourced materials and energy.

In March 2020, the European Commission presented the circular economy action plan to promote more sustainable product design, reduce waste, and empower consumers by creating

a right to repair (European Commission, 2020). It focuses on resource-intensive sectors, such as electronics and information consumer technology, plastics, textiles, and construction.

The added value creation of the Empower circular model is reflected in three pillars:

1) social progress
2) economic growth
3) environmental stewardship



To achieve social progress and address our first pillar, Empower aims to include informal groups to improve their welfare, particularly in developing nations.

Economic growth means that Empower's sustainable business model can consistently bring value to the plastic industry and create value for recycling stakeholders.

The third and most ambitious pillar is committed to environmental governance, e.g. reducing the flow of more plastics into the environment and encouraging innovations in ecological stewardship.

These intersectional concepts are inseparable and at the core of the Empower circular business model.

Empower: the Beginning

Empower was founded in 2018 on the idea that we can solve the plastic waste problem by giving plastic waste a fungible value.

Based on the same philosophy as the Norwegian bottle deposit system, Empower has been helping collect plastic waste, in order to make it available for recycling and reuse, and at the same time rewarding the people involved. Its goal is to stop the leakage of plastic into the environment and incentivize the collection of leaked waste in a cost-efficient manner.

After a year of pilots in more than 15 countries, we learned that the problem required a more systematic approach. We started building digital infrastructure: a platform for tracking plastic waste. The platform, combined with different incentive schemes, has been used all over the world to increase the value of collected materials.

Empower does not take ownership of collected materials or data, but helps the local collectors get funding for cleanups and match them with potential buyers of materials. Our methodology creates local waste collection infrastructure and entrepreneurs, ownership, and sustainable jobs within the waste management industry.

Empower has been the **fastest growing collection network globally,** by empowering local collection and segregation at sources anywhere. We are creating the foundation for a global decentralized waste collection system with users in over 60 countries and with between 5 and 15 new registered organizations per week.

Empower: A Case of Success

With four years in the market applying the proposed methodology, Empower has been helping collect plastic waste, recycle and reincorporate it for reuse, while rewarding the people collecting plastic waste. The sustained effort to accomplish our vision led to notable **achievements**:

- Empower has reached 15,000 tons collected and registered on the platform.

- In February 2022, we had for the first time users on all continents, adding South America and (namely Brazil) to the list, truly creating a global ecosystem and foundation for scaling up and building a broad and impactful community of changemakers.
- 140 organizations registered materials to the Empower platform via around 500 facilities
- More than 50 organizations that each have registered more than 50 tons of plastic waste
- Plastic collection was registered from more than 40 countries
- The collected and registered plastic grew in volume by more than 3000% from 2020 to 2021

Empower obtained wide recognition in fighting the global waste problem, as the following **awards** show

- Refi DAO NFT Hackathon under the category "NFTs that help restore ecosystems", 2022
- Sustainability Champion of the Year, FinTech AbuDhabi 2021
- Top 5 blockchain-based Circular Economy companies in the World, StartUs Insights 2021
- Leading 25 Global Best Practices Solution to the UN Sustainable Development Goals showcased at EXPO2020 Dubai in 2021-22
- Selected as a Top 5 Global Company utilizing blockchain technology to create a circular economy and highlighted as a Global Best Practice program the solution to the Sustainable Development Goals at EXPO2020 Dubai
- Top 50 sustainability companies to watch, CleanTech Group 2021
- Selected for SAP.iO program 2021/22
- World Economic Forum TopLink Innovator
- Member of UN-Habitat Waste Wise Cities
- Founding Member of Kenya Plastic Pact
- EY Amplifier startup 2022

- IPCIC / Incubation Network solution to plastic waste in Indonesia 2021
- Google Startup SDG partner program
- European Social Impact Competition - Impact Prize Winner 2020
- Xynteo Exchange Impact Award Winner 2018

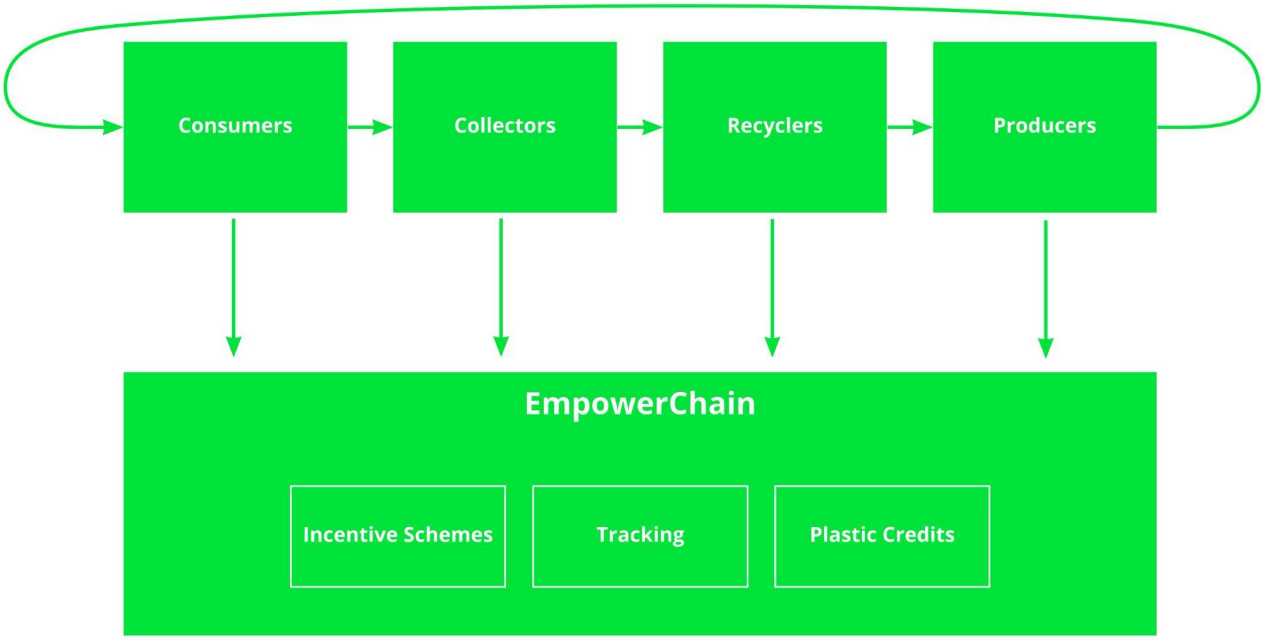
Estimations for the future:

- Estimated collection capacity in the beginning of 2022: more than 300,000 tons across all continents
- Growing collection capacity to more than 1 million tons by the end of 2022
- Aiming for the EmpowerChain to connect more than 100 million people in 100 countries directly with DeFi and the Cosmos Ecosystem by 2025

The Solution: EmpowerChain and the Empower Circular Economy

Empower has proven that we can tackle this large and complex problem in a human way, with suitable tools and systems in place. But for the solution to scale to a global level, it needs to be decentralized so that anyone can participate. In particular, the most crucial stakeholders need to be owners and beneficiaries of the value-creation: the people who use and collect the waste.

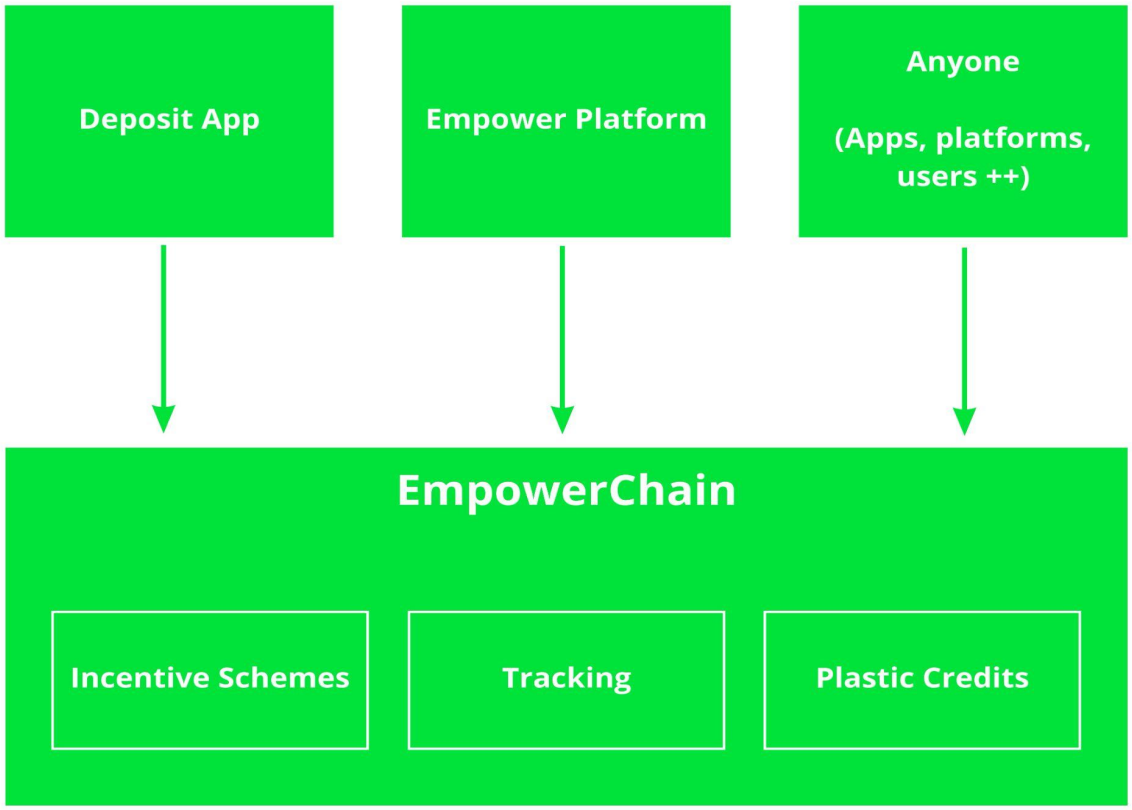
The Empower Platform, currently in place, provides many of the initial tools needed but lacks a decentralized solution. Enter the EmpowerChain.



A circular supply chain needs different tools. EmpowerChain aims to provide them.

We envision an ecosystem where anyone, anywhere in the world, can set up the necessary tooling to start collecting, tracking, recycling, and reusing waste. The network will allow the different actors to collaborate and distribute incentives and upside fairly.

The EmpowerChain is a fully decentralized, open-source, and public blockchain that aims to provide appropriate incentives to enable the collection and segregation of plastics at the source, anywhere in the world. The EmpowerChain network accomplishes this through on-chain applications (or "modules") for deposit schemes, plastic credits, and tracking.



The EmpowerChain will be a public good that can be used by anyone

Our goal is to create infrastructure available for anyone, not just for the Empower organization. We aim to create a public good, a network owned and governed by the ecosystem of waste management and the Cosmos community. Anyone ought to be able to build tools and systems on top of the EmpowerChain to help bring about the circular economy. As such, the EmpowerChain will be open, permissionless, and governed by the stakers in the system. For more details on this, see the Tokenomics section.

Blockchain & the Cosmos Ecosystem

There are several reasons why this project fits naturally with blockchain technology. Our blockchain is backed by an open-source code, available to the community in any part of the world, generating neutrality and not giving an advantage to any agent involved in the network. It is not owned by any single entity, giving us the possibility to truly decentralize and democratize a public good.

Furthermore, open-source technologies require transparency, so that everyone can read the software's established rules governing the token. In addition, it is only possible to change the blockchain if most of the stakeholders agree. This allows network improvements and other code enhancements to be developed by anyone, not only the original core team,. This in turn leaves the door open to a possible quick organic development growth without forcing the community to do it.

Also, staying in the line of the coding, the Cosmos ecosystem has substantially grown with regards to interchain operability (Map of Zones, n.d.), updated code (Cosmos, n.d.), and tools developed. This gives functionalities that can be implemented faster in the new blockchain since they have already been tested in other projects.

Finally, since there is an essential need to streamline transactions for paying the waste pickers worldwide, we need a technology that supports peer-to-peer operations in the easiest and most efficient possible way. Cosmos Ecosystem helps solve this problem with intrinsic low transaction fees, unlike other networks (YCharts, Ethereum Average Gas Price, Bitcoin Average Transaction Fee, 2022).

We chose the Cosmos ecosystem as the appropriate software to work with for several reasons:

- **Cosmos SDK.** The framework to get involved in this ecosystem is one of the best frameworks for building application-specific blockchains. $MPWR will require modular applications for its proper development.
- **Scalability.** At first, the $MPWR blockchain will require another on-app token: $EMP. This is just the beginning, and we expect the project to grow with time, so we need technology that will be able to work in the long term.

- **Interoperability.** There is a vast interconnection between most of the blockchains developed in the Cosmos Network through several Dapps (osmosis, junoswap, etc.). This interconnection allows us to work better with the rest of the community, making it easier to reach prospective investors. The users of EmpowerChain would get access to services such as
    - Decentralized finance
    - Insurance
    - Marketplaces
    - The general crypto ecosystem through bridges to Ethereum, Bitcoin, Solana, etc.
- **Proof of stake method.** Blockchains developed in Cosmos are proof of stake. This method is less energy-expensive and doesn't require as much computing power, implying it is more environmentally friendly than Proof of Work (Kaplan, 2021).
- **Smart Contracts.** Cosmos SDK has a module explicitly dedicated to smart contracts: CosmWasm (CosmWasm, n.d.). This will help develop Dapps to incentivize the users who want to get involved in the recycling process.

EmpowerChain: Digital Infrastructure for a Circular Economy

There are many different needs in a complex supply chain, especially one transitioning towards a circular economy. This is why there is no single solution. You need a set of different solutions that all can work together. EmpowerChain unveils a class of applications that incentivizes the parties correctly and allows them to collaborate. EmpowerChain is a tailored blockchain network, built to support the circular economy and to ensure equal opportunities for the stakeholders of a global decentralized waste management ecosystem.

Blockchain technology has the ideal mechanics to build this upon because it allows for a trustless and lock-in-free platform where ownership can be shared. It also provides for the never-before-seen distribution of incentives.

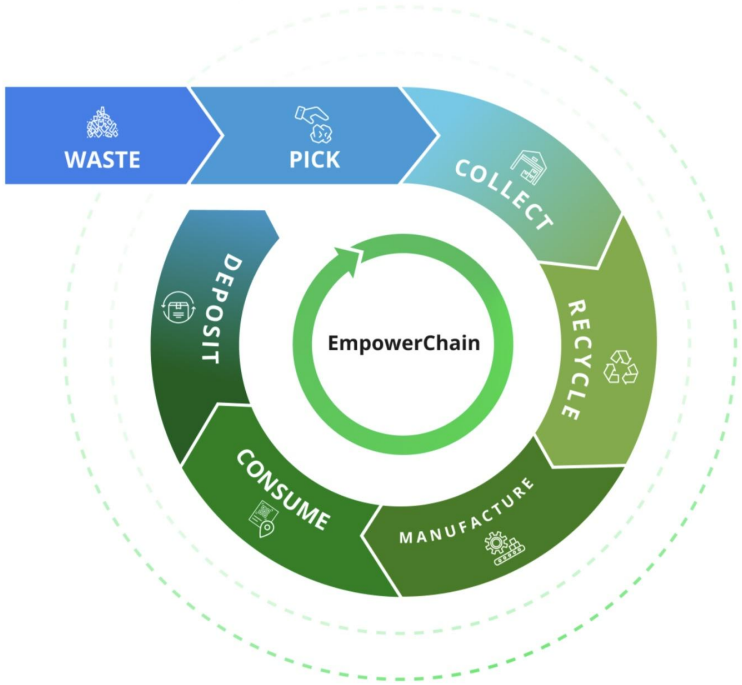
Different stages in a supply chain require various tools and incentives for a circular economy. There need to be direct incentives for consumers or waste pickers to deliver their waste in the collection stages. Producers and manufacturers need data for storytelling and compliance with upcoming regulations (e.g. the EU tax on virgin plastics). Impact investors also need data and access to clean and direct channels for investing (e.g. plastic credit offset).

EmpowerChain is the underlying infrastructure that unlocks the potential of the circular economy. Through incentive schemes, plastic credits, immutable tracking data, and more, it empowers a group of stakeholders to make the shift to a circular economy.

EmpowerChain helps us move forward and abandon the linear and wasteful lifecycle we use for our plastic products:

A linear economy

We want to abandon the linear process in favor of a sustainable process where all the involved agents receive a benefit for belonging to the cycle. Our vision is one where EmpowerChain can be at the core, transforming plastic of single-use into a material with value that fuels the circular economy.



A circular economy, with EmpowerChain at the core

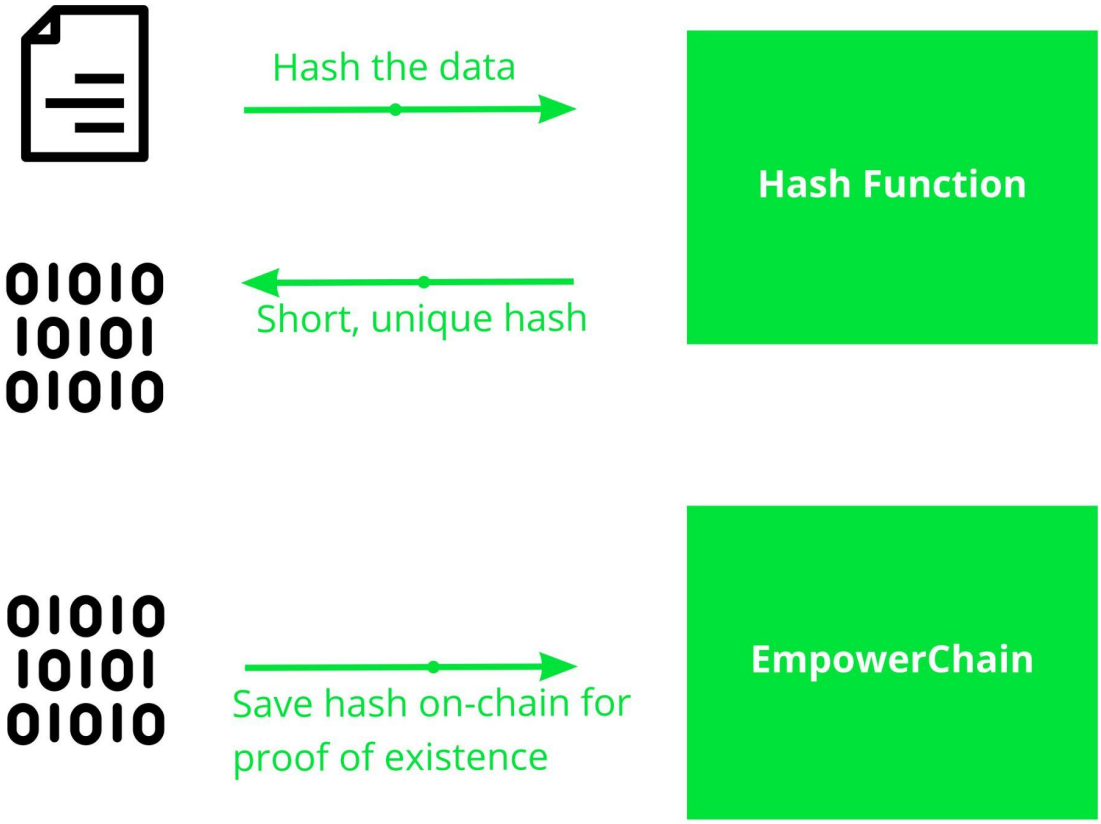
The Applications

Below we describe the initial mechanism, or modules, that we are building on EmpowerChain. Each covers a different essential and complementary part of the circular economy.

Tracking: Proof of existence

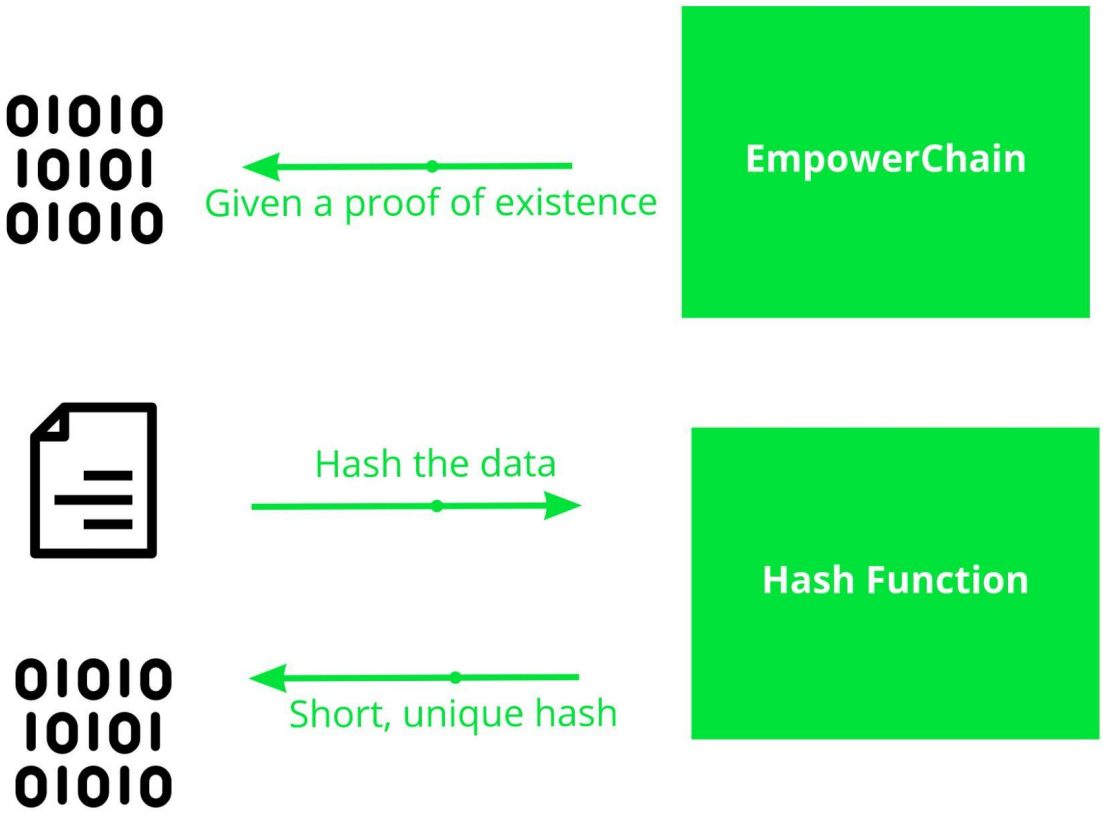
The traceability aspects of the circular economy are crucial. Reliable data is the cornerstone of traceability. . There will be a lot more work to make tracking data more visible and have trustless mechanisms for verification, but the initial step is to make data immutable.

Proof of existence is a combination of a well-known cryptographic technique called “hashing” and the immutability of a blockchain. When you hash a piece of data (such as a tracking data point), you get a string back that you can use to prove later that the same part of data corresponds to the hash. This is commonly used in, for instance, authentication schemes to prove that you know a password without the receiver storing the password themselves.



The process of creating a Proof of Existence

By uploading a hash of a tracking data point on the EmpowerChain, anyone you later share that data with can go to the blockchain and verify that this piece of data existed at a particular time and has not been modified afterward.



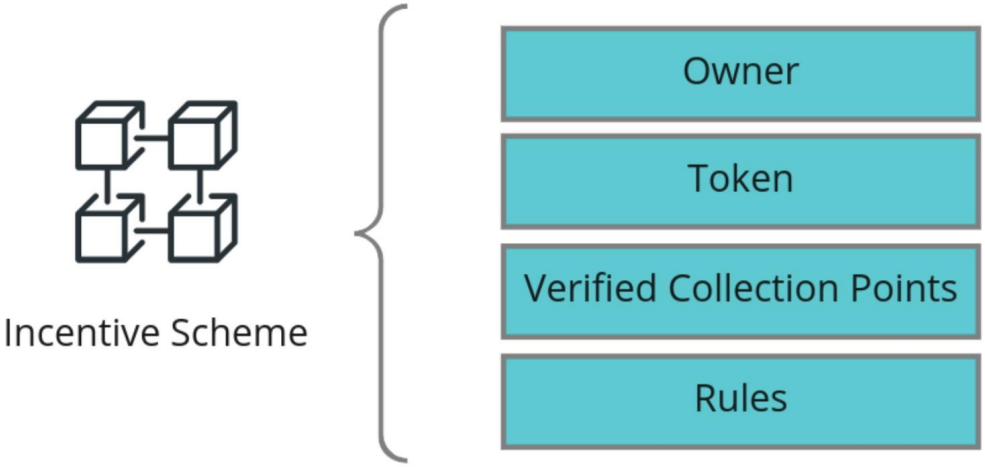
Using a Proof of Existence for verification

This is only the starting point to traceability and verification of tracking data on-chain. We will also have a privacy-enabled marketplace to buy and sell data in the future.

Collection incentive schemes

The EmpowerChain will enable bespoke deposit systems for anyone interested in collecting materials or products through incentives. Some examples include

- Extended Producer Responsibility (PRO) organizations that need to get back products, packaging, etc., after being used.
- Organizations that need materials can set up a deposit system to incentivize collection and aggregation at the source to get clean waste streams. Meaning that post-consumer goods get captured before they get contaminated by mixed waste or nature.
- Producers who want to get their products back after end-of-life for recycling, consumer engagement, etc.
- Sponsored volunteer deposit systems for cleanups, like the Empower Deposit system, where anyone can donate to clean up anywhere.

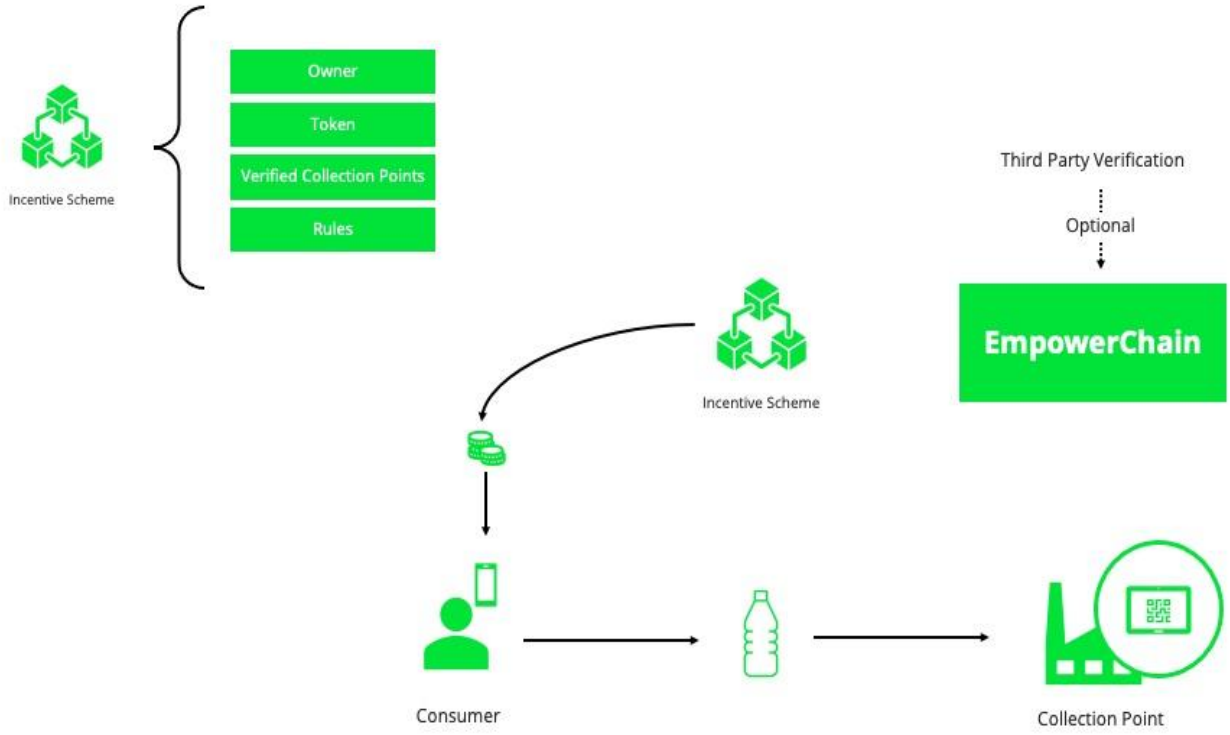


The components of an Incentive Scheme

A deposit system is a set of rules, actors, and incentives that can be configured to work in the environment and setting it will be deployed. Examples of configuration settings include which organizations are allowed to accept deposits, what type of materials or products can be deposited, what incentives are to be paid out, when incentives are to be paid out (e.g. after multiple steps of tracking) etc.

The deposit systems create incentives for those holding plastic waste to avoid mixing and contaminating materials. With efficient incentives and accessible collection, we can segregate millions of tons of plastic at the source, keeping more than 200 billion dollars in the economy, fueling sustainable jobs, and waste collection.

Incentives can both be monetary or gamification-based. They can be paid out in cash, vouchers, credits, or tokens. The goal is to cater to various incentive schemes and ensure that it is helpful for people all around the world.



An incentive scheme process

Empower Deposit Coins (EMPs)

The first collection incentive scheme to be deployed on the EmpowerChain is the EMP deposit scheme by Empower.

With the collection of plastic, people will be able to acquire proof of actual work. This is the idea behind an Empower Coin (EMP). This token is the way waste pickers and people doing segregation at source can earn directly from people who want to offset their plastic footprint without going through intermediaries for cashing in. This creates the genuine possibility to support waste collectors that have a real measurable impact, both environmental and social.

The EMP token will be the native currency inside the Deposit App, with the function to be used in exchange for other goods, services, and tokens. This token will have inherent value as a tool to crowdsource a global plastic waste cleanup, provide granular data on waste collection and create a decentralized waste collection network.

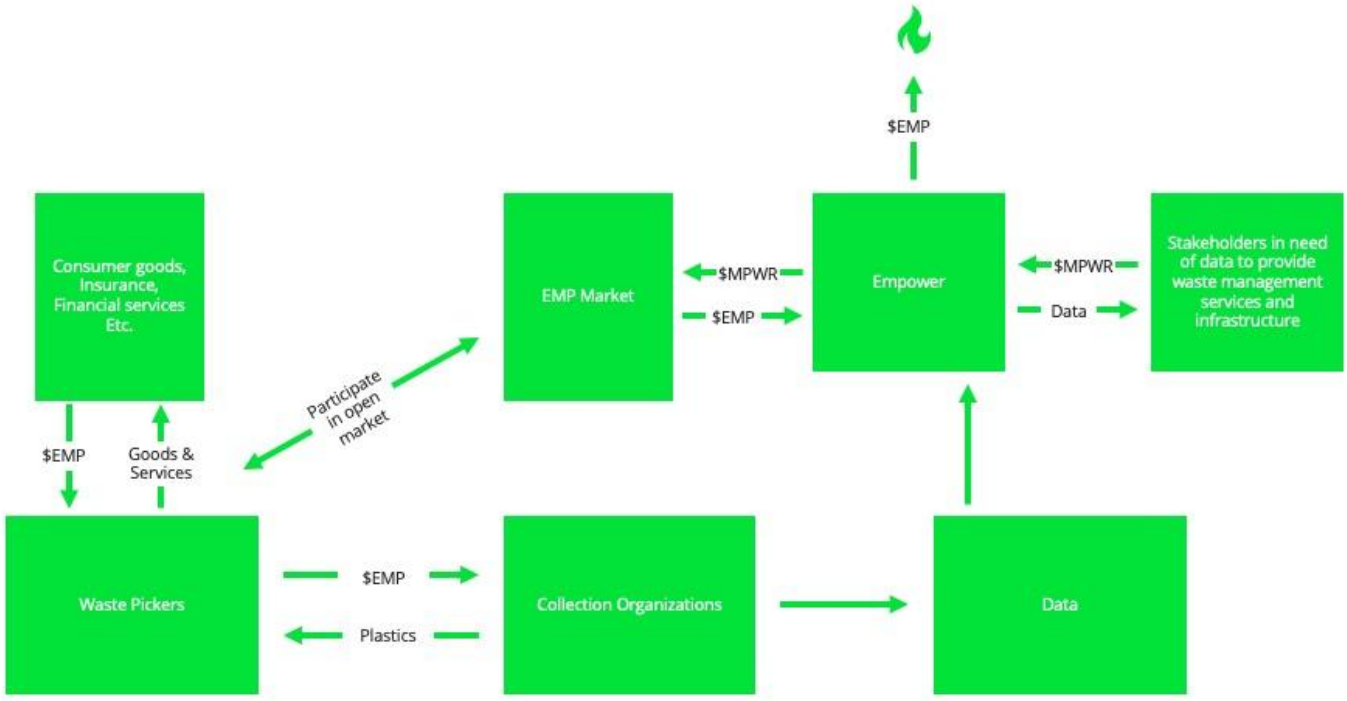
With the EMP deposit scheme, we want to empower anyone to set up a collection point, start collecting plastic waste, and incentivize the crowdsourcing of waste collection and segregation at the source supplying the collection points. Notice that Empower does not set up a collection point itself, but collection points have to be verified by Empower to become part of the network. Anyone anywhere can set up a collection point and go through the verification process on the Empower Platform for free, becoming a piece also owned by the community. There are collection points in more than 40 countries worldwide, and we're aiming to reach 100 in 2023.

EMP Tokenomics

Empower tokens will be used like any coin: in decentralized exchanges, stores, and other Dapps that accept it, permitting a wide variety of usages in the future. By burning EMPs, businesses can earn plastic credits, a cost-efficient product that will offset their plastic footprint, involving them in the fight against plastic overuse and supporting a global plastic waste cleanup movement.

The monetization of collection data will also support the value of EMPs. Using EMPs as a waste collection incentive provides granular data on waste collection location, regularity, volumes,

types, and other data that today are almost impossible to get hold of. This anonymized and aggregated data will be made available to stakeholders needing it to provide waste management services and infrastructure. The fees will go to buy back and burn EMP, giving the value back to the individuals contributing to the global cleanup.



How the $EMP will stay valuable with data

The tokenomics behind the EMP token have an inflationary-deflationary process relating to the amount of plastic waste reached per quarter. It will start with an inflation of 24%, and each quarter will be updated, depending on a goal of plastic waste collected by the blockchain community.

First, considering the previous year's plastic waste collected by the blockchain, we divide it by 4 to get our quarterly forecast for plastic waste production (The value that will be used during the first quarter will be the amount of accumulated plastic waste by Empower).

- If the blockchain contains the plastic waste goal of ±0.5% during the current quarter, the inflation of EMP will decrease by 2.5%. If the whole year the blockchain reaches the

destination of plastic waste collected, the fourth time the goal is reached, the inflation will reduce an additional 2% bounty, reaching a total of 12% per year if the goal is reached.

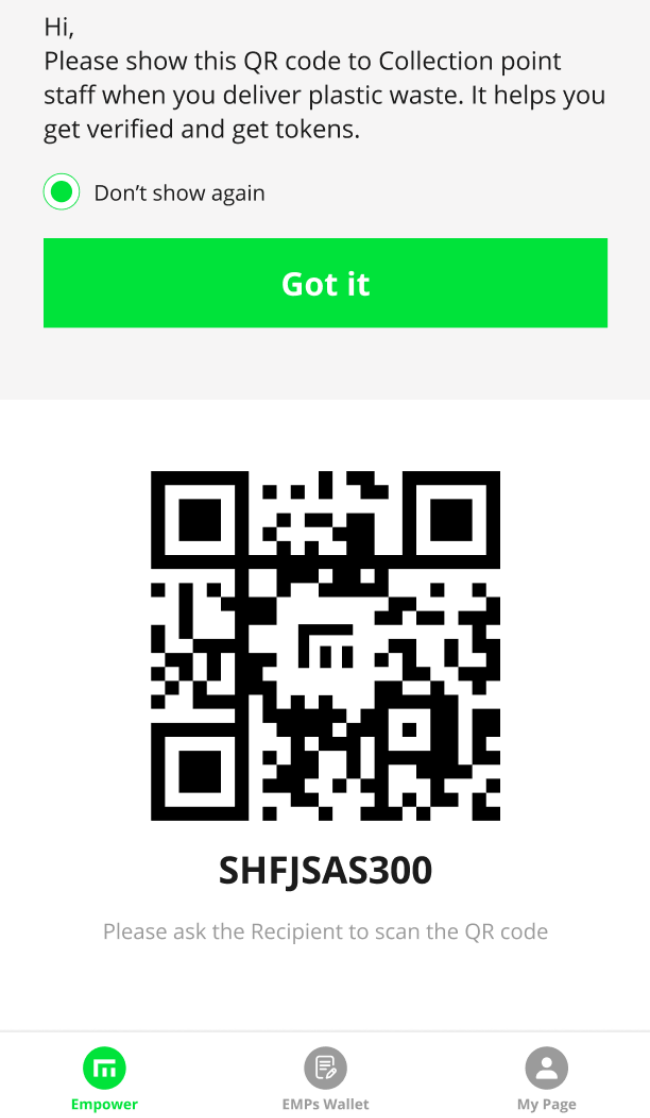
- If the collected plastic waste isn't sufficient during a quarter, inflation will increase by 3%. If the whole year the blockchain doesn't reach the goal of managing plastic waste, it would increase its inflation by 12%, being a literal counter to a year of complete deflation at the end of that year.

The inflation rate will always settle between 10 and 60%. This means that even if inflation has to decrease by more than 10%, it will not, but it can increase next quarter because of the other condition. In the same way, it can't inflate more than 60%, but it can decrease.

Deposit Application

The first contact of collectors and consumers with the EmpowerChain blockchain will be with the Deposit App. An all-in-one app that will work as a digital wallet where the users will be able to manage their assets and NFTs belonging to the EmpowerChain blockchain, with the possibility of becoming a stakeholder.

Besides the wallet functionality, users will be able to recycle their plastic waste through this mobile app by going to a collection point and receiving collection incentives in exchange for their collected plastic.



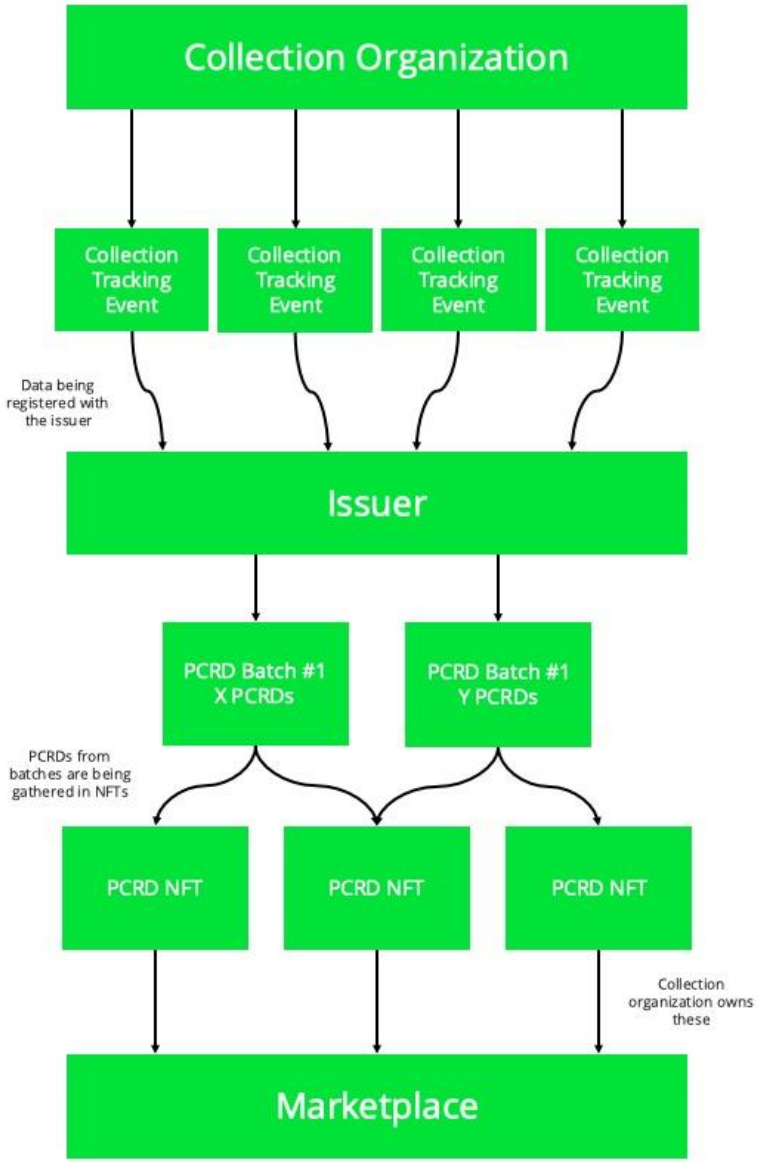
Screenshot of an earlier version of the Deposit App

Plastic Credits (PCRDs)

When waste is segregated and delivered to a collection point, we need to create incentives to ensure that the collection point and recyclers are incentivized to take care of the materials in the best possible way. This is why we also have Plastic Credits (PCRD).

PCRDs are the way collection organizations, sorting facilities, and recyclers can earn directly from people and businesses wanting to offset their plastic footprint. This creates a chain of incentives, driving proper collection and recycling, with transparency and traceability through the blockchain.

PCRDs go through multiple stages, where each stage allows for different usage of the credits. The figure below summarizes the process.



The process of PCRDs from collection to marketplace

The issuer first issues PCRDs in batches according to the batching criteria, which can, for instance, be based on one or more of the following:

- Period
- Location
- Type of material, etc.

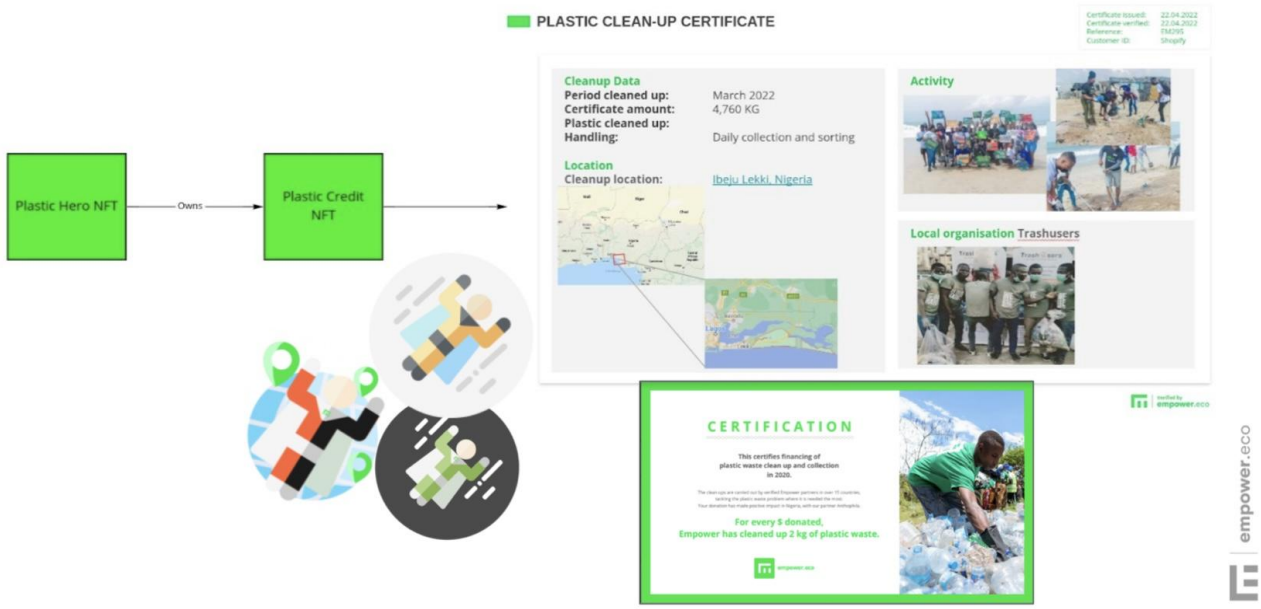
Each batch will always be based on the collection organization that owns the credits because they become the owner of the credit batches and can put them up for sale on the market.

The PCRDs are fungible within their respective batches. They can be thought of as tokens that can be traded or used for other purposes, such as creating PCRD NFTs.

PCRD NFTs are a way to lock the PCRDs in proof of ownership and eventually offset. This is what end users will purchase directly from the marketplace. Users can select the desired PCRDs from the batches and create their own PCRD NFT.

The most obvious use case for PCRD NFTs is to offset it directly and use it as a proof of offset. Individuals can do this to have a personal positive impact, companies to offset their use of plastics, or even producers to bundle their products with environmentally positive actions (e.g. buy a pair of shoes and offset X kg of plastic).

Another use case that Empower is developing is using the PCRD NFTs for gamification of impact. Empower has created a proof of concept for an NFT called Plastic Heroes (Gjermund Bjaanes (2022, April 27), where the Plastic Heroes can clean up plastic by buying and connecting PCRD NFTs. This concept won the Refi DAO NFT Hackathon under the category "NFTs that help restores ecosystems."



Plastic Heroes connected to PCRDs

Similar to incentive schemes, there can be different standards and requirements, and as such, there will be other issuers of PCRDs. In the initial version, the issuers will be the only ones able to issue the credits directly. In the future, we plan to integrate this with the Tracking module, so that PCRDs can be issued automatically upon completion of defined criteria (such as verification by third parties, etc.).

We will also allow for bridging off-chain plastic credits to EmpowerChain to take part in the marketplace in future versions. This will require proof of retirement of said credits.

By the nature of the PCRDs, there is no maximum supply since they represent the collected plastic waste sent to recycling, so while there is a supply of plastic waste, there will be a possibility of creating a new PCRD. Likewise, we will get unique data and transparency by allowing any cleanup organization or plastic collector company to use the same protocol and issue their credits as PCRDs. In doing so, our infrastructure enables everyone to see which companies contribute or not in terms of volumes, funding, impact, and others. This in turn bolsters the drive for real impact, putting resources and capital where they have the most significant effect

There will also be the opportunity to create fungible PCRDs from the batches where the collection is verified, but there is a lack of individual or valuable data. These will most likely have a lower market value than the PCRD NFTs, but will still have the potential to play an essential

role in global waste collection funding and allow more businesses and individuals to take part in the worldwide cleanup.

Future Applications

More apps will be available for EmpowerChain Blockchain in the long term, and enhancements for the Deposit App. Our intention is to gradually release each functionality and add a medium article or a document to describe them or add the missing information to this whitepaper.

One of the future applications that will be important is the on-chain buying and selling of tracking data. This needs a privacy-enabled marketplace for verifiable tracking data.

Roadmap

The roadmap is split into multiple phases that build on each other.

Phase 1: Conception

- Initial white paper
- Community building
- Airdrop announcements
- Preparing waste community (collectors and recyclers)

The first phase reveals our vision to the community about creating a public good in digital, decentralized infrastructure for waste management and empowerment.

The goal is also to prepare the community for future airdrops and incentives for the collectors and recyclers.

Phase 2: Testnets and redefining

As this is a public good, we need to ensure it aligns well with the people it aims to represent. Making sure we adjust to meet the community's needs is something that we expect will require a lot of testing and potentially redefining certain aspects of the EmpowerChain.

As part of the testing process, we will also run an incentivized testnet.

Phase 3: Mainnet launch: Plastic Credit NFTs (PCRDs)

We plan to launch EmpowerChain, with the first modules being Proof of Existence and the Plastic Credit NFTs (PCRDs).

We are starting with the Plastic Credits, even though "chronologically" they are the second step in a supply chain because, without them, there is a lack of incentives for collection schemes to work at scale.

Phase 4: Collection incentives schemes & deposit app

After the mainnet launch, the work starts to get the collection incentive schemes developed and tested, together with the deposit app. During phase 4, we will begin rolling out the collection incentive schemes with different levels of functionality to get it out and battle-tested as quickly as possible. Empower is working with organizations worldwide and with tens of millions of potential users in the already established networks. The aim is to bring incentives and a portal to decentralized finance to at least 100 million people by 2025.

Later Phases

We will be sharing more updates to the roadmap of previous phases. After the release of the initial modules, the current plan is to focus on traceability and adding value to collection incentives and PCRDs through access to products, services, and liquidity.

Governance

In Proof-of-Stake blockchains such as EmpowerChain, there is a concept of blockchain-based ecosystem governance. When you own and stake tokens, you also gain access to propose and vote on on-chain governance proposals. These proposals can be almost anything, from text-based signaling proposals for off-chain discussions to code changes and parameter adjustments (e.g. inflation rate, rewards, etc.).

The MPWR token is EmpowerChain's network token and, as such, will be used for governance as well. This is one of the critical ways EmpowerChain will be a public good, owned and controlled by the community and users.

A note on on-chain governance and our vision

While the initial applications on the EmpowerChain is our main focus, we also have ideas and a vision for the future regarding on-chain governance.

Governance is a key to any Proof of Stake chain. Lately, there have been several examples of community-splitting governance, and we also aim to improve this part of decentralized solutions.

The surprising thing with many existing chains is that they combine the newest technologies and software with out-of-date codes of law. The earliest known code of law dates back to 2400 BC, and since then, there have been thousands of years of trying and failing, developing best practices and best solutions for governance and voting. Even after all this time, it is still not perfect, but we believe that combining the best practices of the code of law with the best-decentralized technologies can bring us a new and significant step forward. We are part of bringing society and humankind forward.

So, to our surprise, we see many chains applying a code of law that was outdated thousand of years ago. It is in many ways like choosing to store your keys as rock carvings and looking away from thousands of years of technology development. If we want to move forward, we need to combine the best of technology with the best of governance. EmpowerChain aims to bring in the best practices we have from democracies, organizations, and enterprises worldwide and combine that with the decentralized and immutable nature of the blockchain. Code of law on the

blockchain can disrupt the world, just as it has already proven to be the next generation of currency and financial infrastructure.

EmpowerChain aims to combine these strengths to elevate their utility, bring decentralization, equal opportunities, trust, and transparency, and make the world better.

Tokenomics

EmpowerChain will have multiple tokens:

- MPWR is the native token for governance, network fees, and cost for on-chain services.
- Tokens related to incentives, such as incentive schemes (e.g., EMPs) and Plastic Credits. The incentive-related tokens will have their tokenomics and were previously covered in detail. For details on the EMP token, see the EMP section.

MPWR Tokenomics

Symbol: $MPWR (sounds like "empower")

Type: Native network token

Network: Sovereign dapp chain: EmpowerChain.

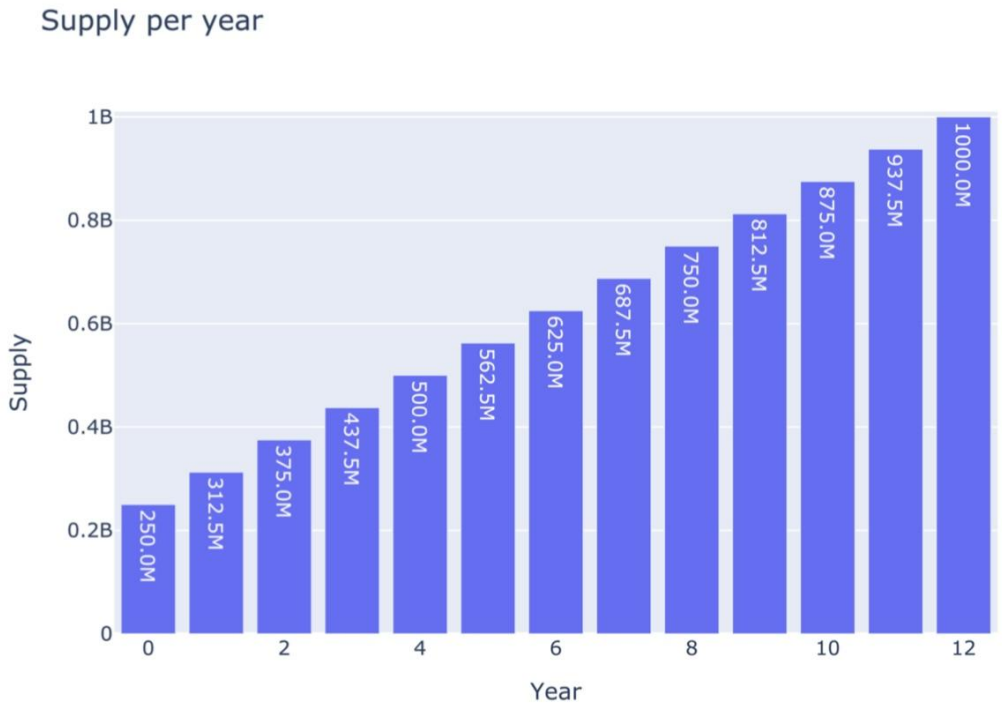
Total (Fully Vested) Supply: 1,000,000,000

Initial Circulating Supply: 200,000,000

The EmpowerChain will have one native network token called $MPWR, used for security (validation and staking), governance, community pools, and network fees. It will also be used as the base token for different services such as buying plastic credits, providing liquidity to deposit

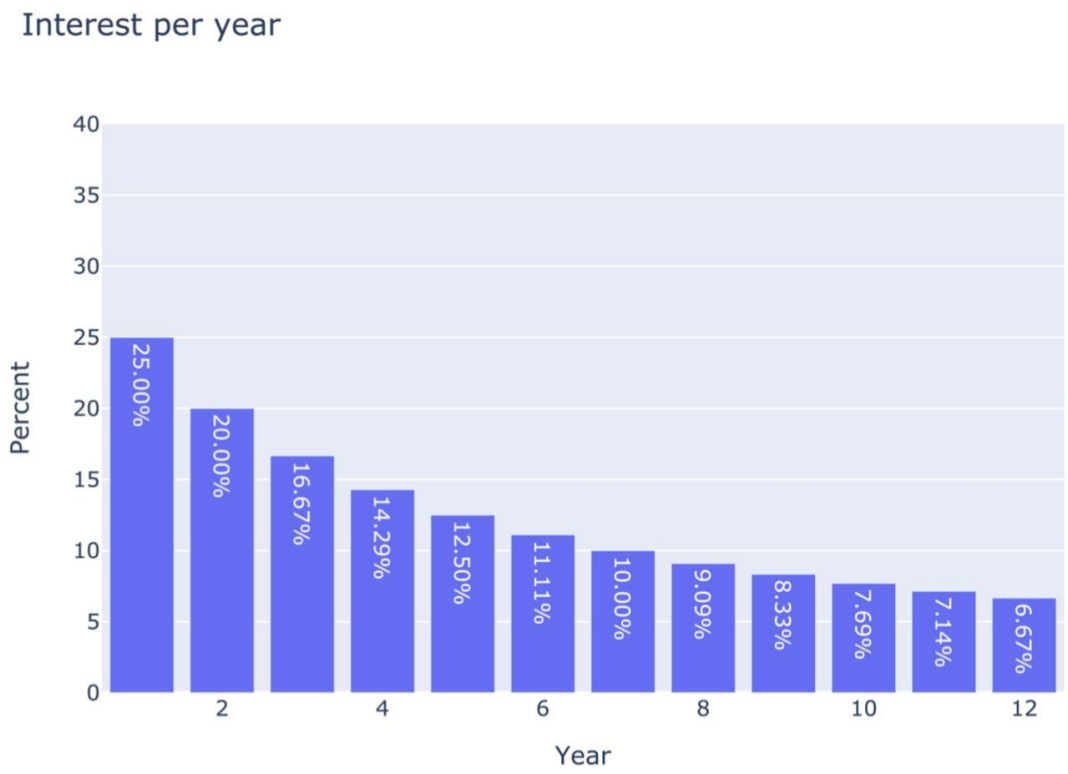
tokens, and more coming in the future. The goal is to make the $MPWR token valuable and have high utility so that it is a viable incentive for the actors in the value chain.

The initial supply will start with 200 million, getting to a final amount of 1 billion $MPWR. 750 million will be released through inflation during the first 12 years, to drive adoption. After reaching the 1 billion, the reward for staking MPWR will be generated through network fees from EMPs, generated by other deposit tokens, PCRD NFTs, credits, and tracking plastic waste registers.



Supply of $MPWR over the first 12 years

Since the release of the rest of the tokens will be linear, the interest rate will decrease every year, having an expected interest rate as shown in the graph below.



Interest per year for the first twelve years

The $MPWR token has the same goal as Empower: to help society survive and ultimately thrive by sharing the upside of making the world a better place.

One of the fundamental pillars of the circular economy is waste collectors. In support of their preceding work as active agents already involved in the recycling process, 25% of the token distribution will be allocated to them, restating their key role in this new model.

Since the EmpowerChain will be developed using the Cosmos SDK framework, to make the Cosmos ecosystem members get involved with the EmpowerChain when released, we will allocate another 24% of the token distribution airdrop for the Cosmos ecosystem. The airdrop will include several networks in the Cosmos ecosystem. The amounts required and the dates for the snapshot will be private and publicly released after the snapshot, to avoid as much as possible any chance of gambling the airdrop.

There will be a 21% for Empower in a general split into several important parts:

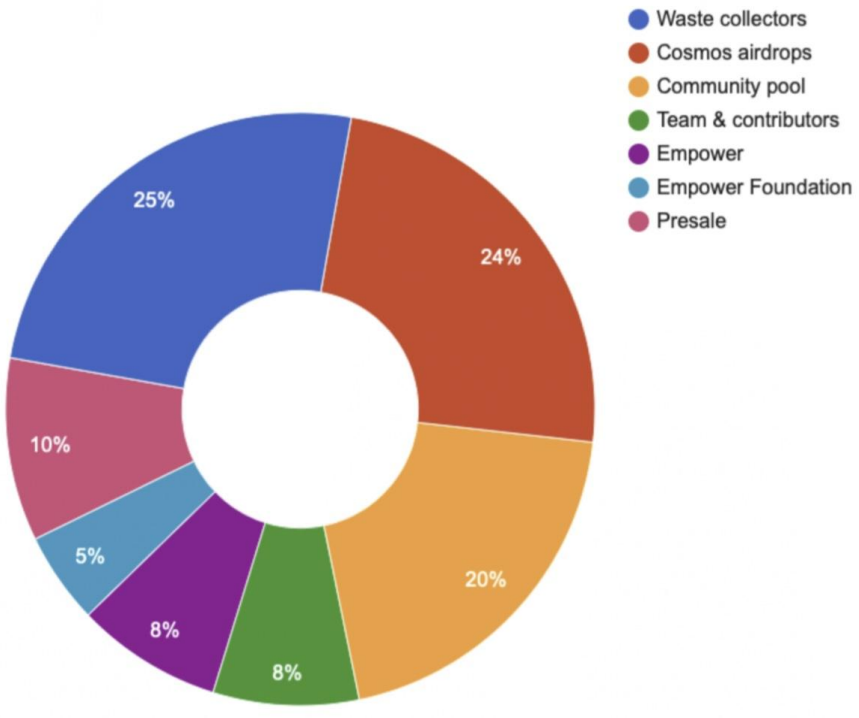
- 8% for the team and the network's contributors, locked up and vesting over 3-5 years with the opportunity to stake it.
- 8% for Empower itself as an entity, to ensure long-term governance and alignment with circularity and sustainability principles, and to ensure Empower keeps driving its development in line with the community and building its apps and solutions on the EmpowerChain. Empower will have a ten-year vesting period, with the option to stake it.
- 5% that will be destined to the Empower Foundation, with a permanent lock-up staked, and whose rewards and earnings will go 100% to funding cleanups and waste management initiatives. The foundation will provide proof and valuable data about these processes, building trust with the communities.

There will be a presale of up to 10% of the total amount of $MPWR tokens to the public. There will be a restricted number of entities who can participate in the presale, but anyone will be able to sign up and get on the list. Participants will be selected on a first-come, first-served basis, which will allow the listed investors to buy the $MPWR token at the presale price. The presale will be locked up and vested, with the schedule depending on the price. There will be a limited presale of $MPWR, to avoid dangerous holders that could put at risk the whole blockchain. In the event the presale is not sold out, the remaining $MPWR tokens will be distributed to the community pool.

The final 20% will be destined to the community pool to fuel community engagement and decentralized decision making, marketing and co-development, strategic fund initiatives, dex liquidity, and potentially others as governance sees fit.

Token Distribution

- **Waste collectors:** 25%
  - ➙ Earned by collecting and recycling plastic waste and vested over five years
  - ➙ Goal: Engage and empower the waste collection community globally, in 100+ countries
- **Cosmos airdrops:** 24%
  - ➙ Stakers of selected chains in the Cosmos ecosystem
  - ➙ Community support and spread of ownership
  - ➙ Goal: incentivize Cosmos community, aligned interests, and positive initiatives
- **Community pool:** 20%
  - ➙ Marketing, co-development & funding strategic initiatives
  - ➙ Dex liquidity
  - ➙ Goal: Fuel community engagement and decentralized decision making
- **Team & contributors:** 8%
  - ➙ Lock-up and vesting over 3-5 years
- **Empower:** 8%
  - ➙ Lock-up and vesting over 5 years
  - ➙ Goal: Ensure long-term governance and alignment with circularity and sustainability principles.
- **Empower Foundation:** 5%
  - ➙ Permanent lock-up, all earnings/rewards go 100% to fund cleanups & waste management initiatives
- **Presale:** Up to 10% (any remaining tokens will go to the community pool)
  - ➙ Locked-up and vested, with the schedule depending on the pre-sale price.



The $MPWR token distribution

Empower and the EmpowerChain

It is helpful to distinguish between the company Empower and the blockchain EmpowerChain.

The company Empower is the entity that has worked since 2018 on finding the optimal ways to solve the plastic waste problem and has created a SaaS platform to solve the circular economy problem.

EmpowerChain is conceptualized by Empower but is designed as an open public good. Think of Empower and the Empower SaaS Platform as the first users of applications on the EmpowerChain. Empower is committed to continuing to develop the EmpowerChain, as we believe it is going to be crucial to have a common decentralized infrastructure for the Circular Economy. Empower will bring a global community of entrepreneurs and developers to EmpowerChain. They will use and develop it as a core infrastructure for the circular economy, where Empower is just one of many applications giving it value.

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