ZERO POLLUTION ECOSYSTEM

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Abstract

In this Paper we present the **Zero Pollution (Z⬡P⬡) Ecosystem**, which emerged through the BSIC Hackathon to solve the problems of excessive plastics pollution. We will show data that prove the urgency to attack the problem and then how we propose a viable solution, through a decentralized platform, using the Ethereum Blockchain.

Problem Statement

After generations of neglect of the environment, we are witnessing an environmental chaos never seen before. Leaving the political sphere aside, we need to assume: **we are the problem!**

We could spend long pages talking about all the problems we cause, but here we will talk specifically about **PLASTICS POLLUTION**, which has reached almost inestimable levels in the whole world.

According to information from the Our World in Data website, it is estimated that from 1950 to 2015 the world had produced about 7.8 billion tons of plastic. But that number is already around 8.3 billion.
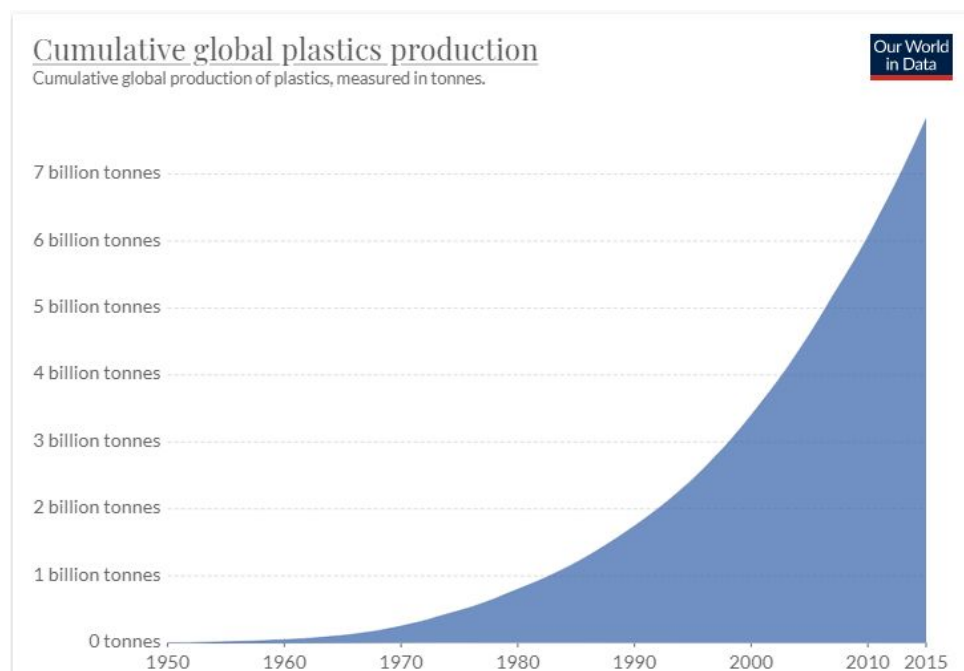
But the problem is not just unbridled production. We must also emphasize the inappropriate disposal of all this plastic. Below we can see the estimated share of global plastic waste by disposal method until 2015.
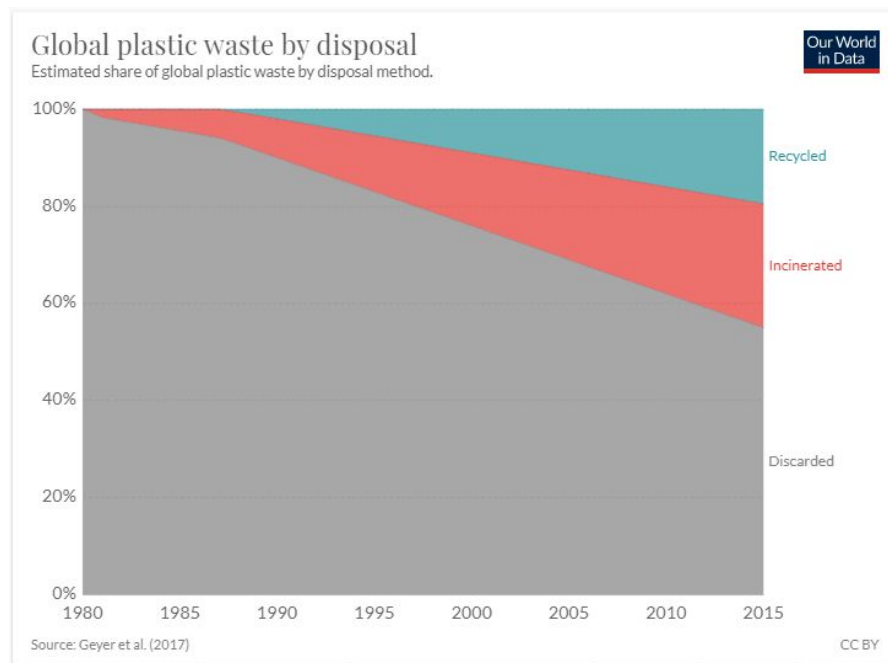
We need to find a way to increase this Recycled Index and drastically reduce Discarded.

Some other relevant information:
- ❏ **91% of the plastic used in the world is not recycled;**
- ❏ **Per capita rate of plastic waste generation by Country, measured in kilograms per person per day:**
  - ❏ *USA 0.34kg*
  - ❏ *Germany 0.48kg*
  - ❏ *Poland 0.1kg*
  - ❏ *Denmark 0.05kg*
- ❏ **Total waste of Plastic by Country in 2010 (tonnes):**
  - ❏ *USA 37mi*
  - ❏ *China 59mi*
  - ❏ *Brazil 11mi*

We can conclude that an average US citizen produces 124kg of plastic waste per year. A german citizen, about 175kg.

Plastic Waste Sources

The sources of the "Discarded" index (plastic waste) can be lack of education (citizen's behavior), high population density, irregular disposal of large producers, lack of investment (infrastructure), and many others. In the image we can see the sources of pollution (not only plastic) in the oceans.

SOURCES OF MARINE LITTER

1 SEWAGE RELATED DEBRIS
2 LITTER DROPPED IN TOWNS AND CITIES
3 POORLY MANAGED BINS AND LANDFILL SITES NEAR THE COAST
4 LOST FISHING EQUIPMENT
5 SHIPPING MATERIALS LOST OVERBOARD
6 POORLY MANAGED INDUSTRIES
7 LITTER DROPPED AT THE BEACH

From https://www.sas.org.uk

**Environmental Impact**

We are tired of seeing striking images of how plastic affects marine life. It is estimated that by 2050, there will be more plastic in the oceans than fish - what is, currently, responsible for the deaths of 100,000 marine animals each year.

But the consequences are not just marine. Rivers, mangroves, parks, forests, soils are also impacted by plastic waste.

In the image below we can understand the size of the problem. It is not just about quantity, but the longevity of the impact.
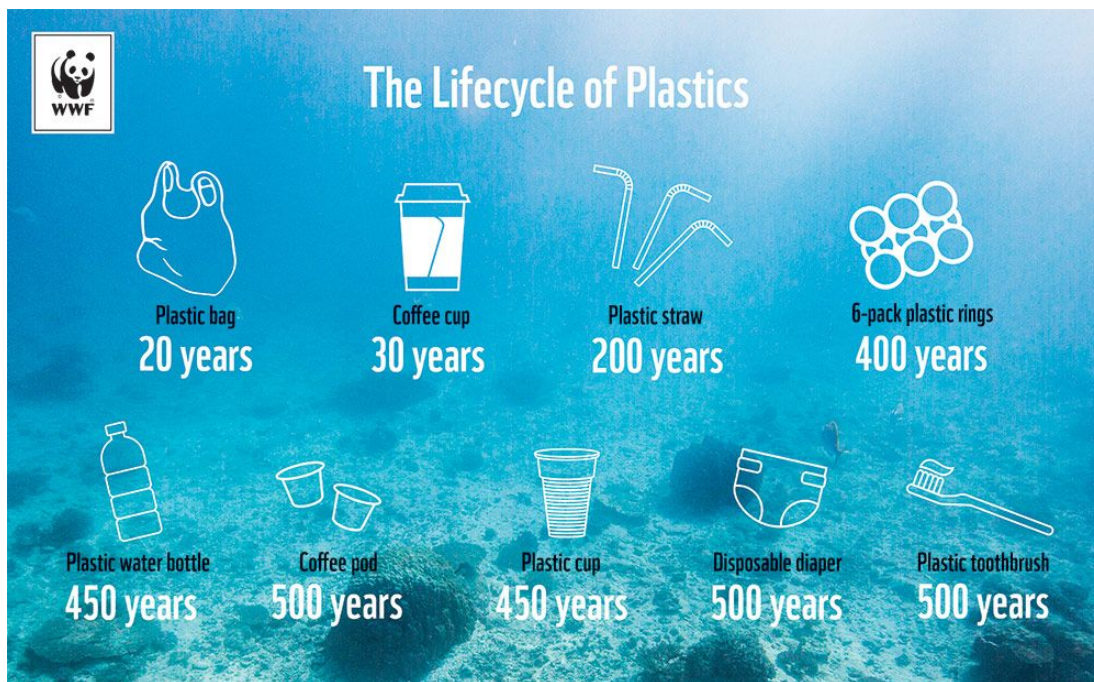
From WWF

Some research shows that biodegradable plastic is decomposed in about 6 months, what can be considered an evolution. But it is still little seen in our daily lives.

Specific Problem - Brazil

Brazil can be considered a good case to be analyzed. It is a large country, with high economic, cultural and social potential, but we can still find a lot of garbage and pollution with plastic spread all over the place - both in poorer places and in upscale neighborhoods. A lot of this is due to a lack of education and also a lack of investment in selective collection and recycling. The Government is unable to solve the problem alone. The solution should not be just to "remedy", but to tackle the root of the problem - but that is Government's responsibility.

Brazilian Plastics Pollution Data

- ❏ Brazil is the **4th largest producer of plastic waste** (11.3mi tons/year) in the world, behind the United States, China and India;
- ❏ Brazil **recycles only 1%** of the plastic waste produced (145k tons);
- ❏ Each Brazilian citizen produces more than 1 kg of plastic waste per week - 62kg per year;

Check more [here](#).

Pioneer Solutions

There are already great projects around the world with the aim of trying to solve the problem of plastic pollution - especially in the oceans.

There are also attempts at online campaigns (through "#"), for example, on Twitter and Instagram - an example in Brazil that was made by surfers to collect garbage on the beaches. But unfortunately they are sporadic situations that end up losing strength.

However, we identified some points where we can improve and be different, aiming to reach a wider range of engaged people. Even so, they are potential partners to work together!

The most impactful projects that we can mention are the following:

Bounty for Basura

Bounty for Basura is a project led by the [Bounties Network](#) platform. Their goal is to bring people together to collect garbage in the oceans and distribute bounties as income to the participants.

Plastic Bank

Plastic Bank is a Social Plastic® Ecosystem to offset plastic footprint become Plastic Neutral and establish a position as an environmental leader.

4ocean

Another potential partner and similar project is the 4ocean, focused on ocean plastic cleaning too. They act like the Bounty for Basura, doing some task forces to clean up the shores. They have already cleaned about 8,506,541 lbs of plastic!

Xô Plástico - Brazil

Xô Plástico is a local initiative from Recife - Pernambuco (Brazil) - created by the twin sisters Laís and Laisa Araújo. We did a survey with them, which you can check **here**.

If you want to know more about these projects and compare them with ZOPO, click here.

The Opportunity

Extracting the strengths of the mentioned projects, combined with a decentralized platform such as ZOPO, we identified a potential opportunity.

❏ We believe that people engaged with the environment can and should be rewarded in some way;
❏ We believe that people of any social class can participate in the Ecosystem, being an example of social inclusion;
❏ We believe that Entrepreneurs can help citizens to make the Ecosystem stroger;
❏ We believe that the best way to achieve our goal is through a Blockchain like Ethereum, fully decentralized;
❏ We believe that we can, little by little, reach a global level;
❏ We believe that the Ecosystem Token can have real value in people's lives;

ZOPO **Ecosystem** initially allied with projects like this, can become potential triggers for a **worldwide environmental revolution**.

Z◯P◯ Solution

Value Proposition

Reduce Plastic Pollution on Earth close to ZERO, through Citizen's engagement, powered by a **decentralized blockchain ecosystem** and a **friendly user DApp**.

But, how does it work?

A complete plastic (re)cycle will be created, where **Citizens** will be able to **collect** and take the plastic waste using our **Biodegradable Plastic Bag** to authorized **Checkpoints**.

The full bags will be sealed and sent to **Endpoints**, which will produce new bags and other possible plastic destinations.

Best of all, everyone will be **rewarded** by the **Checkpoints** - earning Tokens or Bounties, like products, services, and other stuff. After all, people are driven by rewards. And more: the plastic cycle can be **end-to-end tracked**!

Ecosystem Personas

Citizens - Anyone who wants to contribute to the ecosystem/environment by collecting garbage and receiving rewards.

Checkpoints - Entities that make the focal point of the ecosystem, contributing to its functioning - entrepreneurs, establishments, street points and others. This role will be rewarded too.

Endpoints - The final destination of the collected garbage - and the beginning - enterprises that are interested in the use of the plastic, reclycling industries, and others.

Volunteers * - Confirm if there will be a role to help the ecosystem - logistics and other activities.

Sponsors - People and Businesses that are interested in supporting the project by investing some Stake!

The Macro Process
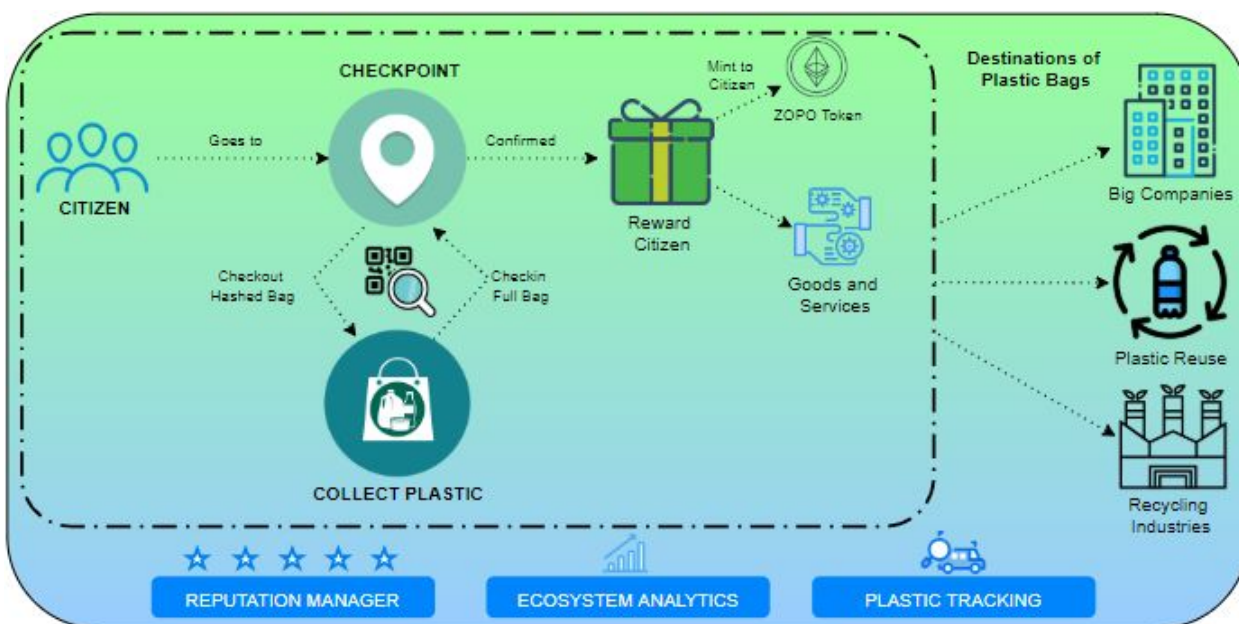
Storytelling - Use Cases

1 - Register as a Citizen

"Alice usually runs in the park and always find plastic garbage thrown next to a river. She heard about a platform called ZOPO, and she wants to register to help collect the plastic trash."

Citizens of any social class can easily register to participate using the DApp.

For those who have a smartphone, just access the ZOPO through the MetaMask wallet provider. For those who want to be part of it but don't have a smartphone - we will develop totems for registration in Checkpoints in the future.

Soon we will create our own wallet generator and use other providers - or even DID Providers (Civic, uPort...).

2 - Register as a Checkpoint

"Bob, who owns a nearby store, also pays attention to this problem of plastic waste. He also heard about the ZOPO platform and decided to help by being a Checkpoint."

At the same time, establishments of any type of segment may register as **Checkpoints**, which will be the basis for **supporting Citizens**. They will be responsible for distributing the ZOPO bags, proposing bounties to the Citizens and destinating the **ZOPO Bags** to the Endpoints. They can connect using **MetaMask** too, and need to fill a register form.

3 - Add Reward

"But, Bob doesn't want to be just a supportive place. He wants to reward a T-shirt and 10 ZOPO Tokens for those who deliver a bag full of plastic."

Checkpoints can register rewards to attract more citizens to your establishment. You can place a product, service, discount or even ZOPO Tokens as a reward.

4 - Find Checkpoints

"Alice, already registered as a Citizen, went for a run again and found what she expected. So, she opened the DApp and checked the map available at ZOPO Dapp. She found Bob's store, which was 2 blocks away, offering a Token reward."

To facilitate finding Checkpoints, Citizens will have a feature called "Find Checkpoints" - they will be able to locate the nearest Checkpoints and the reward information through the DApp map.

5 - Check-out ZOPO Bag and Collect Plastic waste

"After finding the Checkpoint of interest, Alice moved to it. There she was able to Checkout a ZOPO Bag by scanning the QR Code and start the plastic waste collecting. She put all the plastic waste in the ZOPO Bag and returned to Checkpoint."

After the Citizen goes to a Checkpoint, he/she can **check out a ZOPO bag** and start collecting plastic waste. Citizens must scan the ZOPO Bag QR Code and confirm the association of his **Citizen Address** x **ZOPO Bag Address**. The DApp will lock the Checkout function, so the Citizen cannot take another bag.

6 - Check-in ZOPO Bag

"When she returned to Checkpoint, she Checked-in the bag. Bob verified the content and confirmed that everything was OK. So, Bob sealed the ZOPO Bag and rewarded Alice with the promised bounty - gave her a T-shirt and 10 ZOPO Tokens."

To perform the **Check In**, the Checkpoint must **scan** the **ZOPO Bag QR Code** and confirm the return of the same. After that, the Citizen will be able to Checkout another Bag if he/she wants. The Checkpoint can proceed to the Tokens minting and reward the Citizen as promised.

7 - Mint ZOPO Tokens

"As promised, Bob said he would give tokens to Alice as a reward. For that, Bob will have access to the" Mint Tokens "function, which should generate ZOPO Tokens directly to Alice's wallet"

Checkpoints that place ZOPO Tokens as a reward, must have access to Transfer and Mint functions.

Quick Description of future Features:

Register as an Endpoint - Registration of establishments that want to be a destination for ZOPO Bags.

Use ZOPO Tokens - Payments and transactions involving ZOPO Tokens.

Ecosystem Analytics - Reports, Dashboards and Queries such as Quantity of plastic collected by region, by citizen, by Checkpoint, among others. Probably using **TheGraph**!

Reputation Management - Reputation system that controls how much a citizen, checkpoint and endpoint interacted and helped the environment.

Pastic Tracking - System that will allow to see the origin of the plastic material, where it was discarded and collected, by whom, through which checkpoint it passed until it became a new Plastic product - all transactions will be registered.

Value per Persona

But, at the end of it all, what does each one gain from it?

Checkpoints - Attractive to customers, dissemination of products and services, making the brand sustainable, receiving tokens and being able to have a lot of partnerships.

Citizens - In addition to the feeling of accomplishment, Citizens will receive goods, services and Tokens that can be used in partner establishments - or even be used on 2nd Market (Trading).

Endpoints - Increase of inputs for production (Plastic Industries), Sustainable Brand Seal, Partnerships and others.

ZⵔPⵔ Bags

ZⵔPⵔ Bags are part of the **Ecosystem Core Business**. They were designed to be easy to use. Strong, light, with an adjustable handle and made of **100% biodegradable plastic**. In addition, its design has a QR Code to facilitate the Checkout and Checkin process. The initial production of the bags should be done through partnerships.

Z◇P◇
Bags
(Draft)

❏ Produced using recycled and biodegradable plastic - Ecosystem inputs.
❏ Z◇P◇ bags were thought to be practical and comfortable for those who collect plastic waste.
❏ Every produced Z◇P◇ Bag must have an Eth Address (hash) and a QR Code to be scanned.
❏ A % of the collected Plastic waste will be used to produce more Bags!
❏ Each Checkpoint must request a batch of Z◇P◇ bags. Each bag will be associated with the Checkpoint Address.
❏ When checked out by a Citizen, the Bag's hash will be associated with the Citizen's Address.
❏ Used Bags must return to the Checkpoints and go to their Destinations - Recycling Industries and other Endpoints.

Tech Side of the Ecosystem

COMING SOON!

Describe how the Ecosystem was divided and implemented: DApp, Contracts, Tools used, etc. + Architecture Diagram.

Roadmap & Scalability

Beginning of the Ecosystem

There are two essential roles for the start of the Ecosystem. The interaction between **Citizens and Checkpoints.** Therefore, we believe that we can implement a MVP through the partnership with smaller projects, already in progress, as mentioned in the examples of Pioneer Solutions (Xô Plástico).

In this step we will need the following:

- ❏ **DApp** running with a low interface detail and the following features - Register, Find Checkpoints, Add Rewards and Checkin / Checkout bag.
- ❏ **Simple Smart Contract**, but reliable. This Smart Contract should only control the simplest interactions of DApp, such as registration, checkout and check in bags, bag generation and some interaction with the Token. There are functions that can be accessed only outside of DApp.
- ❏ **Business** - Small partnerships, with possible initial sponsors, bags not yet produced as expected, few checkpoints involved, and only local citizens.

Getting Stronger

After realizing that the Ecosystem is in full operation and gaining traction in isolated projects, ZⵔPⵔ's intention is to achieve as many partnerships as possible. At this point, we intend to include the roles of Sponsors and Endpoints in the system, which will be the final / initial destination of the plastic cycle.

In this step we will need the following:

- ❏ **DApp** with evolved usability and interface - and add other features, such as Register as Endpoints, Wallet Generation, Activity History, Reputation Manager, and others.
- ❏ **Robust Smart Contracts**. There may be a change to the creation of a Proxy Smart Contracts, allowing future **updates** and **scalability**

of the "child" Smart Contracts. Add other write and call functions as the Ecoystem needs.

❏ **Business** - Simultaneous projects (anywhere) using the Ecosystem, significant increase in Partnerships and Sponsors, significant increase in Checkpoints and engaged citizens, high production and recycling of collected plastics, and others.

Global Escalation

After gaining strength and visibility, our intention is that the DApp Z⬡P⬡ becomes something global and spontaneous, just like it happened with big startups - for example, Uber, Yellow, Rappi, Airbnb and others.

In this step we will need the following:

❏ **DApp** working perfectly, with easy usability, tutorials, different languages, and as new features appear. Analytics, Plastic Tracking available.

❏ **Smart Contracts** - Maintenance and updates to the Contracts only as needed, always advising the Ecosystem, through Events. Analytics and Plastic tracking functions running.

❏ **Business** - Checkpoints, Citizens, Endpoints, Governments, all over the world entities spontaneously participating in the Ecosystem.

The Z⬡P⬡ Token

Token Purpose

Token Specification

Token Use