

# The Commodification of Sequestered Plastic



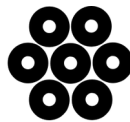
Brikcoins & Authenticated Ecobrick Sequestered Plastic

## **White Paper**

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**ecobricks.org**  
Global Ecobrick Alliance



# The Global Ecobrick Alliance

The GoBrik platform and its development are managed by the Global Ecobrick Alliance (GEA). The GEA is a not-for-profit 'Earth Enterprise'(EE). As an EE we are guided by our regenerative principles, publicly accessible Intention Map<sup>1</sup>, and association of GEA Trainers. As an EE the GEA is structured to have no profit motive and a mission and vision focused on serving the Earth. In this way, the GEA is moving forward as an impartial third party catalyzing individual, community, company and national plastic transition.

***“We envision a Transition from plastic in our Homes,  
Communities and Companies to an ever greener  
harmony with Earth’s cycles.”***

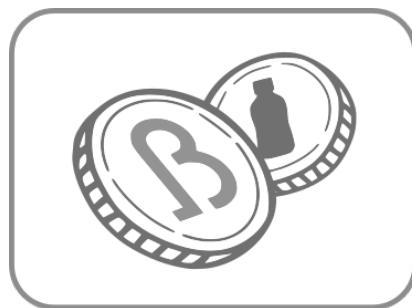
- Global Ecobrick Alliance Vision





## The GoBrik Platform

In order to fulfill the mission of the GEA, the GoBrik app was developed to serve the ecobrick movement. GoBrik is a social action platform providing ecobrickers and their communities around the world with the tools to log, track, exchange and manage their ecobricking. GoBrik is one of the main ongoing projects of the [Global Ecobrick Alliance \(GEA\) Earth Enterprise](#). Launched in 2017, GoBrik now connects over 40,000 users and 5,000 communities from 120 countries through their [ecobricking](#). The core of the platform is our community of planet passionate ecobrickers. Through their hard work, our ecobrick authentication system is generating our [brikcoin manual blockchain](#). A beta, proof-of-concept platform has been operational since August 2018 and as of April 2020, has secured and authenticated 17,276.45 Kg of plastic and generated 17,276.45<sup>2</sup>. The platform is maintained and developed by the GEA under the principles of a not-for-profit Earth Enterprise to maintain focus and impartiality.<sup>3</sup> The GEA oversees the maintenance of Ecobricks.org, GoBrik.com and the Brikcoin technology.



brikcoin manual blockchain



authenticated  sequestration





**“Urgent, ambitious action is  
necessary to stop the climate impacts of plastic.”**

- 2019 Report: *Plastic & Climate The Hidden Costs of a Plastic Planet*





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# Executive Summary

Plastic pollution is one of the crises of our times. The plastic that we consume today will endure for centuries, either the detriment or enhancement of local and global ecologies. Over the last fifty years, it is estimated that only 9% of plastics have been captured by the industrial recycling system, resulting in the majority of plastics reaching the biosphere<sup>4</sup>. Once loose, plastic degrades into micro-plastics, CO<sub>2</sub>, greenhouse gases and toxins which can disrupt ecological cycles<sup>5</sup>. Participation in the petro-capital economy increases the generation of plastic and its flow into the biosphere.<sup>6</sup> Carbon credits and the advent of cryptocurrencies provide a direction for transitional solutions.

Through local re-purposing, plastic presents its path for transitioning from petro-capital participation to and moving to regenerative living<sup>7</sup>. The enduring properties and universal availability of non-recyclable plastic make it ideal for the making of reusable building blocks, known as *ecobricks*. Ecobricking generates ecological value by meeting the criteria of plastic sequestration<sup>8</sup>. Ecobricking compacts plastic to *terminally reduction of its surface area* which secures the plastic's hydrocarbons from the main forms of potential degradation. In so doing used plastic is transformed into useful building blocks for making furniture, gardens and structures that keep plastic local and out of global industry. The process of ecobricking thus not only puts plastic on a safe millennial road, it also raises ecological consciousness and accelerates plastic *transition*<sup>9</sup>. Finally, using block chain technology and peer review, ecobricked plastic can be independently validated and confirmed to have met standards and criteria and is *sequestered*<sup>10</sup>. The ecological value of *authenticated ecobricked sequestered plastic* (AES plastic) enables the generation of a currency based upon it, that the Global Ecobrick Alliance (GEA) has called *Brikcoins* (BRK). Brikcoins are used on the GoBrik platform to buy and sell products, courses and currency. Brikcoins, as a representation of AES Plastic may also be redeemed for the AES Plastic Offset Credits by individuals and companies as a way to “offset” their own plastic footprints. In particular, AES Plastic may be purchased directly from the GEA using cash or Brikcoins in a process that destroys the Brikcoins to create AES Plastic credits and generate a serialized certificate. In this way AES Plastic can help individuals, households and company balance their grey impacts and move into ever increasing regenerative living.





# Introduction

We live in the age of petroleum powered economy. As economies churn capital and as petroleum is processed, the production of plastic is one of the consequences. While plastic pollution is one of the most visible scourges of our age, other looming ecological crises loom with far greater disruptive potential. Ocean acidification, climate change, the melting of polar ice, and methane release, to name a few, all pose existential threats to life on the planet and cumulatively are extinguishing species at an unprecedented rate. Although in comparison, plastic pollution may be a minor, it differs from other ecological crises in that we can actually touch it-- indeed every day as we lead our modern lives, through plastic, we are physically in touch with the petro-capital operating system at the root of all of our current malaise.

While most of our ecological crises loom overwhelmingly large and inflict helplessness, plastic is different. Our daily usage of plastic enables small yet meaningful choices to reduce our participation in the petro-capital economy and reduce our negative ecological impact. As we shall argue in this paper, plastic can in-fact have a positive and quantifiable ecological impact. In this way, plastic becomes an opportunity to upgrade our personal operating principles and transition to regenerative living. And as plastic today connects us across cultures and continents, it enables unprecedented collective action to realize the beautiful world we all know is possible.

In this paper we present the philosophical and scientific infrastructure for a manual block chain currency known as Brikcoins to empower plastic and petro-captial transition.







# Context

## The Petroleum Age & Plastic

The widespread adoption of fossil fuels as a source of energy has defined the 20<sup>th</sup> century. It has also been instrumental in the production of ultra-cheap plastics. In the refinement process, between 4-13% of crude oil cannot be distilled into high value, high energy fuels.<sup>11</sup> This by-product is however useful as a feed-stock for polymer plastics production. Since 1950 an estimated 8300 million metric tons (Mt) of virgin plastics have been produced worldwide; 9% of which have been recycled, 12% were incinerated and 79% have accumulated in landfills or the natural environment.<sup>12</sup> This production trend is set to continue and increase from 2019 on: according to the American Chemistry Council, since 2010 \$186bn dollars is being invested in 318 new projects to fuel a 40% increase in plastic production over the next decade<sup>13</sup>. If current production and waste management trends continue, roughly 12,000 Mt of plastic waste will be in landfills or in the natural environment by 2050.<sup>14</sup> In addition, by 2030, CO<sub>2</sub> emissions from the production, processing and disposal of plastic could reach 1.34 gigatons per year—equivalent to the emissions released by more than 295 new 500-megawatt coal-fired power plants.<sup>15</sup>

## Petro-Capital Economies

Post-industrial capitalism has boomed throughout the last century in direct correlation to those economies with access to petroleum resources. The availability of inexpensive petroleum-derived energy continues to enable and drive global economic growth<sup>16</sup>. These petro-powered economies issue fiat currencies as the defacto medium of exchange based on debt with interest attached. This system, inextricably connected to petroleum derived energy, drives competition and production for the growth of capital alone. The value of this capital has little correlation to the health of ecological systems and much to the consumption of petroleum-derived energy. This leads to environmental degradation and the continued use, burning and processing of fossil fuels as petro-capital economies





grow. Practically, this means the ongoing creation of plastic and carbon dioxide (CO<sub>2</sub>). A strong correlation between national and global plastic waste generation and gross national income per capita is observed<sup>17</sup>

## Industrial Incineration

Burning has been a means to deal with waste for centuries. More recently, this waste includes plastic. In modern times, industrial incineration has evolved from open burning and has been increasingly used for the controlled burning of municipal solid waste, often for energy creation. However, even in modern facilities, varying levels of CO<sub>2</sub>, toxic chemicals, ash and emission gases are formed<sup>18</sup> depending on the temperature and presence of oxygen during combustion. Despite regulation and technology to treat the toxic substances produced, industrial incineration does still release harmful emissions into the atmosphere<sup>19</sup>. Researcher estimates that plastic packaging burned in the open releases 2.9 Mt CO<sub>2</sub>e of green-house gases into air per ton of plastic packaging.<sup>20</sup> CIEL estimates that one ton of industrial incinerated plastic release a minimum of 0.9 Mt of net CO<sub>2</sub>e emissions, even after taking into account the electricity generated by the combustion process.<sup>21</sup>

Many modern incineration facilities have helped cities reduce the volume of waste and relieve the burden on land-fill sites. In many cases, these facilities generate heat for local distribution and/or electricity for the national grid<sup>11,22</sup> (at half the efficiency as conventional power stations<sup>11</sup>). Incinerators that collect municipal and business solid waste typically combine both plastic and other wastes to maximize the mass for combustion. The burning of organic substances such as paper and food waste is considered a renewable source of energy and has less of an impact on the environment. The burning of fossil-based plastic is not; therefore industrial incineration of mixed residual waste is considered only partially renewable<sup>23</sup>. Critics also observe that incinerators entrench a dependence on waste generation and note that this dependence diverts waste away from circular recycling streams<sup>24</sup>."

In cities such as Singapore and Tokyo where incineration is implemented, citizen segregation of materials has dropped to near zero<sup>25</sup>. Critics observe that incineration minimizes citizen participation and decreases public ecological consciousness. Incineration provides no incentives for reducing the





consumption or usage of plastic. Incineration is by default a linear system and does not assist the transition away from plastic or to a circular economy of cycled resources.

## Industrial Recycling

As a means to recuperate used plastics, industry and government have encouraged and legislated consumer recycling of plastic over the last fifty years. Industrial recycling commodifies plastic on its material value. Varying grades of used-plastic have different values. However, the grade of plastic is impossible to maintain with each cycle of recycling. With each cycle, the grade decreases, its value decreases and so too does the likelihood of it being recycled the next time round. Eventually, all recycled plastic is “down-cycled,” becoming of insufficient value to warrant the industrial effort and drops out of the recycling system. Industrial recycling is thus not a closed circular process-- rather it is a downward spiral. Industrial recycling inevitably results in all processed plastic escaping into the biosphere.<sup>26</sup>

## The Dangers of Plastic Degradation

When plastic enters the biosphere it releases toxins, fragments into micro-plastics and emits greenhouse gases that interfere with ecological cycles.<sup>27</sup> When plastic is burned or incinerated, toxic gases like dioxins, furans, and polychlorinated biphenyls are released into the atmosphere.<sup>28</sup>

Photo-oxidative degradation caused by exposure to ultraviolet radiation and physical abrasion fragments plastic debris into smaller and smaller particles, know as microplastics<sup>29</sup> The degradation process corresponds directly to the amount of surface area of the plastic that is exposed and to the length of time exposed to UV rays.<sup>30</sup> The majority of non-recyclable single-use plastics are sheets and films with large surface areas and are highly susceptible to photodegradation. This process also emits greenhouse gases, methane and ethylene.<sup>31</sup>



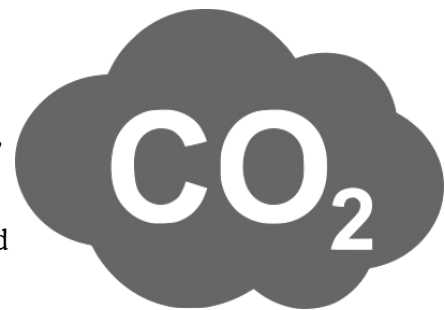


Increasing scientific documentation is demonstrating the many dangers arising from plastic degradation. Micro-plastics can have possible direct ecotoxicological impacts, accumulate in food chains and cause economic damage because of food safety concerns.<sup>32</sup> Burned and incinerated plastics have been shown to release dioxins and other chemicals that are harmful to human health.<sup>33</sup> When CO<sub>2</sub> and greenhouse gases enter the atmosphere they have been shown to disrupt global climate stability.

Meanwhile, current research show a harmful effect of micro-plastics on the health of plankton and zoo-plankton. Planktonic ecosystems power the ocean's ability to sequester CO<sub>2</sub>. The photosynthesis that power the life and growth of plankton essentially captures carbon dioxide in organic matter. The death and defecation of plankton send this CO<sub>2</sub> sinking to the bottom of the ocean where it is sequestered away from the atmosphere for centuries.<sup>34</sup> There is growing evidence that these plankton are ingesting ever greater quantities of micro-plastic debris with potentially significant impacts on their metabolism, reproductive success, and mortality rates<sup>35</sup>. Emerging scientific research indicates that this could compromise the ocean's ability to sequester CO<sub>2</sub>.<sup>36</sup>

## Carbon Credits & Trading

Carbon trading is an approach used to control and reduce greenhouse gas emissions (e.g. carbon dioxide, methane, ethane, etc.) by providing economic incentives for reductions in emissions. The underlying concept is to let the market decide and achieve emissions reductions most cost effectively, across industries and borders.



Carbon trading as a mechanism for this was implemented as part of the Kyoto Protocol, signed by 180 countries in 1997 to reduce their greenhouse gas emissions between the years 2008 to 2012.<sup>37</sup> A *carbon credit* is a term for any tradeable certificate representing the right to emit one tonne of carbon dioxide (or the equivalent amount of another greenhouse gas). Credits are issued to carbon-reducing projects under a stringent framework for authenticating the claims of CO<sub>2</sub> sequestration. The sale of





carbon credits continues as a means to offset the carbon released during transportation of goods as well as industrial and agricultural activities. Accredited activities, like forestry projects, solar arrays and other enterprises that sequester carbon receive the funds from carbon credit purchasers.

Critics observe that the globalized carbon-trading market favors large-scale, corporate sequestration initiatives. The high transaction cost for verifying and authenticating carbon sequestration projects makes the participation and generation cost prohibitive for small scale activities and negligible for large, industrial projects. Big players then buy, sell and speculate with carbon credits on the global commodity market for profit, detaching the credits from their original purpose. This dynamic enables big players to continue and profit by legitimizing their carbon-intensive activities without incentivizing a transition. Most notably, the system does not incentivize and support small and micro-scale initiatives-- which collectively have a massive potential for carbon sequestration, regeneration and transition.

Critics also observe that the carbon trading system which enables large companies to continue their carbon intensive operations, fails to address the root cause of these business operation: consumption and petro-capital growth. The system fails to provide direct feedback and cost to the consumers making the choices that require the offsets in the first place.

## The Advent of Blockchain and Cryptocurrency

The advent of blockchain and cryptocurrencies has led to a revolutionary new way to store value through the creation of an open, immutable, transactional record that transcends the need for third parties. Blockchains, such as Bitcoin, use an algorithm called *proof-of-work* to validate transactions on its network. 'Miners' do this work by committing computational resources to solve complex mathematical puzzles. When each puzzle is solved, it results in the authentication of a block of transactions. The miner is then allowed to add a new block to the Bitcoin public ledger or 'blockchain'. With each additional block the network then releases newly created Bitcoin and rewards the Miner for doing this work.<sup>38</sup>





Critics point out that the work of mining coins has no intrinsic value. It is estimated that the current work mining Bitcoin consumes 50 terawatt hours of power per year.<sup>39</sup> In practical terms, this means that Bitcoin Miners use as much electricity as Switzerland, running computers to solve math puzzles<sup>40, 41</sup>. As the calculations that are made have no practical or utilitarian value in and of themselves, miners must thus be remunerated separately (in the coin itself) for their work. Given the hardware and electrical costs in running effective 'mining rigs' the system favours those with access to capital and technology.

## The Ecobricking of Plastic

Ecobricking is a simple, low-tech means of securing plastic into a bottle to make a reusable building block. Ecobricking has emerged independently around the world in towns and cities over disparate continents during the early 2000's as a collective consciousness manifestation of human spirit in the face of pollution. Ecobricking is accessible to anyone -- all that is required is hard work, a stick, a bottle and plastic. Ecobricks can also be used by anyone. The applications of ecobricks range from simple stools using a dozen ecobricks, to gardens using hundreds, to structures using thousands. Unlike other forms of plastic management, ecobricking cannot be done by machines and requires an individual human's labour and concentration -- a process that raises ecological consciousness and, over the long-term, challenges an individual's plastic consumption.



### No Capital or Societal Barriers to Adoption

As there are no financial, technological or skill impediments to adopting ecobricking, the technology has spread virally and exponentially over the last decade. The GEA estimates that there are now 10 million active ecobrickers in the world today<sup>42</sup>. As ecobricking spreads, so too does individual and collective questioning of the mechanism of plastic production and consumption. This continues to grow as awareness spreads of plastic pollution and the failure of industrial recycling.





## The Raising of Collective Ecological Consciousness

Ecobricking is unique among plastic management technologies in its direct influence on the consumers of plastic. By enabling individuals to take personal responsibility for their plastic consumption, the manual process of ecobricking compels a direct interaction with one's consumed plastic. The meditative and communal aspect of ecobricking catalyzes the raising of ecological consciousness<sup>43</sup> Ecobrickers tend to pursue more information about waste disposal in their community, plastic, recycling and ecobricking topics. This leads to a steady decrease in the ecobricker's net plastic consumption. Ecobrickers also tend to put their ecobricks to use in ways that embody cradle-to-cradle principles, exploring regenerative technologies and organic materials (building composters, gardens and food forests). The GEA emphasizes these principles and technologies, in particular the use of ecobricks for local, organic, non-capital earth building.

**“A problem has never been solved by the same consciousness that generated it.”**

- Albert Einstein

## The Terminal Minimization of Net Surface Area

By packing plastic into a bottle, the net surface area of the plastic is reduced a thousandfold. This *terminal minimization of net surface area* means that the plastic is effectively and indefinitely kept safe from all forms of potential degradation. Furthermore, by applying cradle-to-cradle building techniques, the ecobrick can be reused over and over.<sup>44</sup> In particular, the use of ecobricks in earth constructions to build local green spaces, or earthen walls is encouraged by the GEA<sup>45</sup> as a mean to keep them safe from the main forms of potential degradation<sup>46</sup>.

## Putting Plastic on a Millennial Road

Ecobricks by design put plastic on a path out of both industrial systems and into builds that protect the plastic from all forms of degradation. When ecobricks are made and used properly, we intend to put the secured plastic on a path that will keep it safely





out of the biosphere over the next thousand years. In this way, ecobricks by design replicate the process in which the earth, over hundreds of millions of years, subsumed organic biomass, compacted its carbon deep underground and in so doing stabilized the earth's climate and gifted future ages with an energy source. In the same way, ecobrick earthen construction enables us to indefinitely secure plastic and its hydrocarbons from becoming toxins, micro-plastics or from reaching the atmosphere as CO<sub>2</sub>. This sequestration service and the actual concentrated material are likewise a gift for future ages who will be able to use (or not use) our compacted carbon as they see fit. Given that each Kg of plastic represents 95% its weight in carbon, and when incinerated results in an increase of its weight with the addition of two oxygen atoms by 3.4 times, the GEA estimates that for each 1 Kg of ecobricked plastic, 3.1Kg of CO<sub>2</sub> is sequestered.<sup>47</sup> As of June the GEA is currently revising this estimate to include the CO<sub>2</sub> footprint of keeping plastic out of industrial systems, processing, and disposals.

## Authenticated Plastic Sequestration

Plastic that has been properly packed into an ecobrick can be put to use as a building block that will not break down or contaminate the environment<sup>48</sup>. This plastic has been effectively and indefinitely sequestered. Brikcoins are generated when peers on the platform independently review (validate) an ecobrick and concur (authenticate) that the plastic has indeed been ecobricked to GEA standards. A block of Brikcoins are then generated on the GoBrik platform corresponding to the weight of the plastic and distributed to those ecobrickers who did the validation work (validators) and to the GoBrik central reserve.



## Criteria for Sequestration

In order for compacted plastic to be considered sequestered by the Global Ecobrick Alliance, we have established criteria to ensure that the process is in line with plastic transition. This means that the packed plastic is on a secured 1000 year journey, that small scale household and community







enterprises are favoured over industries of scale, and that the process of packing the plastic does not encourage further production of plastic.

- The plastic must be packed using manual, non-industrial, methods
- The process of packing must not generate capital for a for-profit enterprise.
- The plastic must be packed to a minimum density of 0.33 g/ml (to ensure an adequate terminal minimizing of net surface area)
- Ecobricked plastic must exceed GEA minimum standards.
- The enterprise must be driven by the utility value and/or ecological value of compaction
- The sequestration must be independently authenticated to ensure these criteria have been met.
- The process of authentication must not involve a for-profit enterprise.

It is possible to compact plastic using machines, industry and capital. However, ecobricks, by contrast, are accessible anyone with a stick and a bottle. As they cannot be made with machines, they enable an unprecedented empowerment and support of individuals and communities, raising their ecological consciousness at the same time. Critically, ecobricking is dissociated from fiat capital and petroleum-powered machines and economy and thus also their intrinsic biases. Given the GEA recommendations for earth building, it is also most likely that the ecobrick will end up safely and securely under earth--unlike industrial compactions of plastic (bales, pallets, boards, etc.). Brikcoins are thus based only on ecobricked sequestered plastic generated by human toil.





# Going beyond the Limits of Petro-Capital

As the negative effects of widespread plastic pollution are becoming clear, individuals and governments are realizing that removing plastic from the biosphere is essential. Even more so; ***preventing it from getting there in the first place, reducing plastic generation and transitioning from plastic altogether.***

However, to date there has been no way for individuals, government or industry to invest capital into achieving this simple goal. As we have seen, all industrial waste technologies, eventually result in releasing it loose in the biosphere-- all the while enabling the consumption and growth of petro-capital economies-- leading to yet more plastic being produced.

## Enter Brikcoins

Unlike traditional recycling, which values only the material value of plastic, Brikcoins are based on the value of securing plastic out of the biosphere. As a separate system of value, Brikcoins, and the sequestered plastic that they represent, can be purchased with petro-capital currency, thereby encouraging ecobricking and all the associated community project they represent. In this way, Brikcoins can serve as a revolutionary medium between petro-capital and our longing for achieving authentic ecological harmony, all the while favoring small scale initiatives over large scale corporations.



## What are Brikcoins?

Brikcoins are a manual blockchain, proof-of-work, complementary currency. By 'manual' we mean just that: requiring hands-on manual labour. Brikcoins are based on the ecobricked sequestration of plastic which can only be achieved through the hands-on human work of packing plastic into an ecobrick. The Brikcoin system emulates the core elements of a cryptographic blockchain, but





substitutes computation work with manual human work and cryptographic confirmation with community validation. Consequently, there are no capital or technological barriers-- aside from internet access and a stick.



By incentivizing manual work that results in value in and of itself (i.e. the creation of a useful and practical ecobrick) the Brikcoin platform removes the necessity of rewarding miners/ecobrickers with the currency itself (as Bitcoin and Ethereum platforms must) as *the work, community validation and the resulting useful ecobrick, is reward in itself*. As the work of ecobricking is non-petroleum-powered and non-capital-contingent, the barriers for participation are removed.

By removing the direct rewarding of miners/ecobrickers, we likewise remove incentive for cheating at mining/ecobricking or manipulating the system.

Furthermore, without a reward structure biased to pre-existing capital and economies-of-scale, Brikcoins favor small-scale over large-scale participation.

## How are Brikcoins Generated?

### Manual Blockchain

The first part of the generation process is the making of an ecobrick. This time-consuming, labor-intensive process packs plastic tight into a bottle. Once complete, ecobrickers log their ecobrick on the GoBrik platform. A serial number is given by the system and the ecobrickers inscribes this





permanently on the ecobrick. A photo of the ecobrick with the serial number is taken and the logging completed. The logged ecobrick is then automatically queued for review.

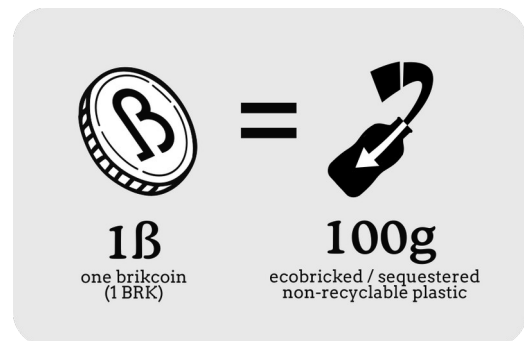
The GEA has defined standards for a properly made ecobrick. When a packed bottle meets these standards, it is considered an acceptable ecobrick. The second part of the process involves the work of the ecobricker community to ensure that each logged ecobrick does in fact meet the minimum standards of a good ecobrick. Any user on the system can review and validate ecobricks in the queue. Three independent validators review the ecobrick’s photographic data to make sure that the ecobrick is made properly, meets GEA standards and is legitimate by answering a series of questions. An algorithm calculates a validation score based on the review. The three validation scores are averaged and if the average exceeds the minimum threshold, the ecobrick is authenticated. Brikcoins are then generated and issued to the validators and the GoBrik Central Reserve based on the weight of the ecobrick.

### The Plastic Generation Standard

The amount of Brikcoins generated depends on the weight of the authenticated ecobrick multiplied by the GEA set plastic standard: **100g of AES plastic = 1β.**

This is an arbitrary preset standard on GoBrik. For example, a 0.3 kg ecobrick will generate 3 BRK, while a 0.4 kg ecobrick will generate 4 BRK. It is important to

note that the Plastic Generation Standard is different from the live actual value of a Brikcoin in AES plastic on the platform which can vary and fluctuate for numerous reasons.



### Validation Credits

It is important to note that only active ecobrickers can take part in the authentication process. This is assured by a system of validation credits. Validation credits are earned when a user’s ecobrick is authenticated. Each validation that a user makes requires one validation credit. Without validation credits (i.e. without logging good ecobricks) the ecobricker quickly depletes their validation credits.

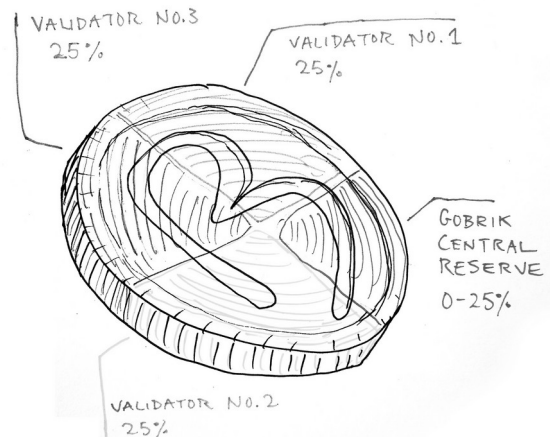




It is important to note that the maker of the ecobrick *does not receive* Brikcoins when the authentication of the ecobrick is successful. In this way the Brikcoin value of the ecobrick is decoupled from the generation of Brikcoins.

### The Distribution of Brikcoins

Upon the authentication of an ecobrick, Brikcoins are generated and each of the three validators receives 25% of the total value of the ecobrick. The final 25% is sent to the GoBrik Central Reserve. Every transaction in this process is recorded in the public 'Brikchain' ([www.gobrik.com/#brikchain](http://www.gobrik.com/#brikchain)).



### Authenticated Ecobricks are Saved on the Brikcoin Repository

Once authenticated, the ecobrick's photo and basic data is exported to a decentralized repository that stores its data for posterity separate from the GoBrik platform. Built on an easy to replicate wordpress server, we envision that such servers can be deployed and hosted as independent nodes to back up authenticated ecobricked data.<sup>49</sup>

### Only Authenticated Ecobricks can be Exchanged

GoBrik features a platform for exchanging ecobricks privately and publicly. Only ecobricks that are authenticated can be used in the GoBrik system for exchange. The authentication process gives confidence to community hubs around the world that are collecting ecobricks for projects. See [www.gobrik.com/#Hubs](http://www.gobrik.com/#Hubs)

The owner of the ecobrick can use GoBrik to exchange, barter or sell their ecobrick. Ecobrickers can exchange their ecobricks for dollars, Brikcoins, cookies or whatever else they choose. See





[www.gobrik.com/#Marketplace](http://www.gobrik.com/#Marketplace)

## Full Chain Transparency

The Brikcoin system is 100% transparent and verifiable. The balance of every ecobricker on the system is publicly available and all transactions are logged and posted. Every Brikcoin that is generated on the system is logged in a chain of block transactions. This log is human searchable and legible using our platform's BrikChain Explorer. Anyone can view, search and filter the entire chain here at any time.<sup>50</sup>

## Brikcoin: Token, Offset and Medium of Exchange

Unlike many crypto and fiat currencies, Brikcoins are grounded in real world value. Each Brikcoin is tied to the sequestration of 100g of plastic. As every BRK is directly linked to a quantity of sequestered plastic, BRK becomes a means to value the removal of the plastic from the biosphere. This gives Brikcoin value in three ways:

### 1. Sequestration

Burning or incinerating 1kg of plastic or petroleum releases approximately 3.1kg of CO<sub>2</sub>.<sup>51</sup>

Plastic that is left to photodegrade in the environment releases greenhouse gases such as ethylene and methane.<sup>52</sup> This is to the detriment of planetary ecological harmony. Ecobrick sequestration prevents these harmful effects.

### 2. Token of Stored Value

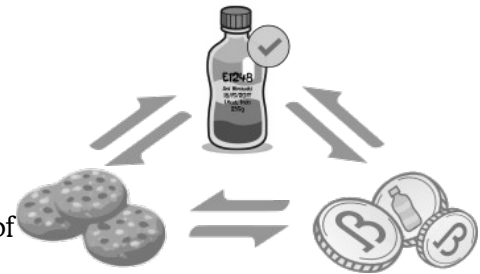
Each BRK is directly and permanently linked to a finite and scarce resource, in the same way that a banknote once referenced a gold reserve. As BRK can be exchanged between GoBrik account holders, Brikcoins become a token of stored value. Over the next decade, as plastic production plateaus and ecobricking increases, the token value will become more distinct. This will be particularly experienced in towns and cities where ecobricks are adopted and as single use plastic is banned.





### 3. Medium of Exchange

With each token representing a fixed plastic value, Brikcoins serve as an ideal means to purchase and exchange ecobricks. Given that this exchange is geographically limited by the physicality of ecobricks, we envision that BRK will become a means for the exchange of other community goods and services.



### Intrinsic Work Value Reward

Unlike traditional computational cryptocurrencies, the work in ‘mining’ Brikcoins is valuable, in and of itself. In this way, there is no need to reward the maker’s of ecobricks with Brikcoins. The entire ecobricking movement has thus flourished over the last decade without any need to reward or pay ecobrickers for the hard work of making an ecobrick. The sequestration and utilitarian value of the ecobrick is sufficient.

The GoBrik platform thus does not issue coins directly to ecobrick makers. Instead, we augment the utility value of the maker’s ecobrick by granting it ‘authenticated’ status. Only authenticated ecobricks can avail of the platform’s exchange system. Only authenticated ecobricks can be bartered and sold on the platform. Although, this exchange value is not fixed, we believe that as the system grows, the market will set a value for authenticated ecobricks, thus increasing the incentive for ecobricking, logging ecobricks and making top quality ecobricks.





# The Sale of Plastic Offset Credits

The GEA's role, as a principled Earth Enterprise, is key to maintaining and developing the GoBrik platform. Our vision of sequestering millions of tons of plastic will require a true Earth Enterprise -- a collaborative orchestration of grand proportions. As such, the GEA is developing Brikcoins as a plastic offset token to fund the work ahead without comprising our principles of fiat-currency independence. Brikcoins serve as a buffer between capital economy and fiat currency, letting us operate in both the old and new worlds.

## The Offset Concept

The concept is of offsetting is directly connected to personal responsibility, impact account and plastic transition.



## Valuing 1kg of AES Plastic

The GEA tracks and records its operational costs on our Open Books accounting system. Our final operational income statement is calculated in USD. By correlating the net results of the past year's net authenticated plastic and net generation of central reserve brikcoins we are able to determine the past year Kg/USD/BRK cost. This means that we can generate a USD cost per Kg of ecobricked authenticated plastic and a dollars cost per central reserve brikcoin.

$$\begin{array}{l}
 \text{2020 Value of 1kg credit} \\
 \text{of AES Plastic Offset} \\
 \text{($/kg)}
 \end{array}
 = \frac{\begin{array}{l}
 \text{2019 Total authenticated} \\
 \text{ecobricked plastic so far (kg)}
 \end{array}}{\begin{array}{l}
 \text{GEA Earth Enterprise} \\
 \text{2019 expenses ($) }
 \end{array}}$$







Our past year also enables us to project an estimation for how much plastic we can sequester in the new year and set our yearly goal. The net weight of this goal, we can then put up for sale as plastic offset credits. In other words, individuals that wish to balance off their personal or business plastic production can do so by purchasing our future sequestered plastic as a representation of our projected budget costs.

## Valuing 1 BRK in AES Plastic

In contrast to the Plastic Generation Standard (see p.18) which is fixed and arbitrarily set, the actual market value of 1 brikcoin in AES plastic credits fluctuates over time. It is calculated by dividing the sum of authenticated ecobricked plastic on the system (kg) minus total AES credits) by the total brikcoins (BRK) currently in GoBrik accounts on the system.

$$\text{live BRK Value (in kg of AES plastic)} = \frac{\text{total authenticated ecobricked plastic (kg)} - \text{total AES offset credits generated (kg)}}{\text{total brikcoins in circulation (\beta)}}$$

## Distinct from Carbon Offset Credits

It is important to note the fundamental difference between Brikcoin based plastic offset credits and the Carbon Credit Trading System. As discussed earlier in the paper The Carbon Credit Trading System (p12) favors large players and facilitates the buying and selling of credits. The larger the offset-er, the larger the investment, the more profit can be gained by participation. The Brikcoin system in contrast, favours small-scale, individual and community participation, while making it costly for businesses and corporations to participate. This is assured by allocating the authentication process to our community of individuals-- rather than intermediary companies with profit motive.





Significantly, unlike Carbon Credits, our system does not allow the trading of plastic offset credits-- there is no way to move them from one account to another. As only Brikcoins can be transferred, the sale of plastic offsets and their tie to BRK, will slowly float the value of the currency-- thus ensuring that it is the ecobrickers and validators, those doing the actual real world work, who are rewarded.

## No Initial Coin Offering

Most cryptocurrencies launch with an initial sale to establish their value, Brikcoins, as they are already grounded in a real-world value, do not require such a launch. Given that Brikcoins already attain the characteristics of currency, and given the goal of Brikcoins to be independent from petro-capital, we will not be launching or promoting the sale of Brikcoins for capital currency-- although the exchange of which is entirely possible and inevitably will develop. Instead, we will use the slow and steady development of the currency, our store, marketplace and the maturing of the GoBrik platform in general to organically establish the value of AES plastic in brikcoin and fiat currency.

## Terms and Conditions of AES Plastic Offset Credits and Brikcoins

Before accessing the GoBrik platform, users must consent to the *GoBrik Platform Terms of Use and Privacy Agreement*<sup>53</sup>. In addition, before acquiring Brikcoins or AES plastic offsets on GoBrik, users must consent to our *Terms and Conditions for the Purchase of Authenticated Ecobrick Plastic Offset Credits and the Holding and Exchange of Brikcoins*<sup>54</sup>. This document lays out a detailed legal infrastructure to understand the role and responsibilities of the GEA in maintaining the platform, and the terms, conditions and risks assumed by the user when participating in the brikcoin and AES plastic ecosystem.





# Longterm Vision

We envision Brikcoins as a catalyst to deep local and global plastic transition. We envision Brikcoins as a complimentary medium of exchange, ideal for supporting, encouraging and igniting the spread of regenerative ideas and technologies that assist our return to an ever greener harmony with the cycles of life.

## Acceleration of Plastic Sequestration & Transition

We envision that the GoBrik and Brikcoin platform will remove millions of tons of plastic from the biosphere. We see this as an inevitable consequence of incentivizing the valuing of plastic that will ignite a collective mobilization to sequester both freshly consumed plastic and plastics already in the biosphere. In so doing, we believe removing this potentially poisonous plastic from the biosphere will prevent untold harm to and suffering of, humans and our fellow species for the next thousand years.

Given that the ecobricking process raises ecological consciousness and reduces plastic consumption and production over time, our vision of an acceleration of personal and collective participation in the petro-capital system leading to deep plastic transition.

## Encouraging High Quality Ecobricks

One of the current bottle-necks to building with ecobricks, is sourcing them and ensuring their quality. The labor and time involved in ecobricking makes it challenging for individuals to make the requisite number of ecobricks for large constructions. The dispersal of ecobricks in a region results in logistical difficulties for one party trying to source large quantities of ecobricks from many ecobrickers. It is also challenging to know the quality of other people's ecobricks makes it difficult to confidently exchange ecobricks publicly. We envision that the Brikcoin system will solve these problems and further ignite the spread of ecobricks and ecological consciousness. We envision that the GoBrik platform will inspire high quality ecobricks, peer-to-peer exchanges and large scale constructions.





GoBrik's authentication system is designed to provide personal and direct feedback to ecobrick makers from our community of experienced ecobrickers. The systemic rejection of poorly made ecobricks, hand-in-hand with peer-review, is encouraging ever better ecobricking.

Furthermore, GoBrik's third party, independent authentication creates the atmosphere of *trust* required for public and stranger-to-stranger exchanges. Only through such a system of exchange is it possible to mobilize the requisite number of ecobricks for large scale constructions.

With the official roll out of the Online GEA's Earth and Ecobrick Building Trainer of Trainer course in May 2020<sup>55</sup>, we envision the GoBrik platform and Brikcoin system enabling and facilitating the work of community leaders in manifest ecobrick earth constructions.

## A Decentralized Token on a Centralized Platform

We envision Brikcoin as a fully decentralized, ERC-20, Ethereum based token, that integrates with the GoBrik platform run by the GEA Earth Enterprise. This decentralized app ("Dapp") would leverage the best aspects of decentralized ledger blockchain and of a centralized not-for-profit Earth Enterprise to hold the space. Currently, version 1.0 of the GoBrik platform and Brikcoins are based on our database-driven app developed on a proprietary third party platform. Our road map involves migrating to a launch of Ethereum tokens that would correspond to our first phase of database development. Our road map also involves mirroring the development of Gobrik v1.0 with our own fully coded native application (v2.0). The GoBrik app will then be a portal to the ERC-20 token and accessible through native iOS and Android versions.

In line with our vision of 'manual' crypto currency, we envision a distribution of copies of the Ecobrick database, done manually by ecobrickers around the world, to create a decentralized backup of ecobrick authentications and Brikcoin transactions.

## Community Ecobrick Hubs for Local Currency Integration

We envision that the Brikcoin system and concept will integrate with preexisting and in-development community complimentary currencies. In this way, *Community Ecobrick Hubs* can receive ecobricks,





which are then reviewed by assigned community volunteers. Each ecobrick is weighed, double checked and either rejected (returned to the maker) or authenticated (kept by the community) based on GEA standards, using the GEA system of triple validations or through community use of the GoBrik Platform.





# The Brikcoin Development Team

## **Russell Maier** – Lead developer, GEA Co-Founder

Russell Maier is a co-founders of the Global Ecobrick Alliance and has spearheaded the the spread of ecobricks in South East Asia and the UK. Russell's regenerative inventions, ideas and projects have been covered by the BBC, the Guardian, the Jarkata post, hundreds of local media outlets and recently an hour long special on CNN Indonesia. With almost two decades of web development experience, an academic background in philosophy and a decade of leading large collaborative projects, Russell is the catalyst behind the Brikcoin project. With a perspective gleaned from integrating in some of the most politically and economically challenged cultures on the planet -- from refugee camps in Gaza, rainforests in Costa Rica, to four years living with the Igorots in the mountains of the Northern Philippines, Russell brings to the Brikcoin team, his passion for solving ecological and social challenges with a low tech, regenerative approach.

## **Ani Himawati** - GEA Principal, CDD Advisor

Ani Himawati is an Indonesian anthropologist who has worked to empower communities around the country in cities, towns and remote villages. For the last fifteen years she has worked simultaneously at the grass roots and executive level in the Community Driven Development (CDD) programs with NGOs, Government and Development Aid Agencies, such as the UN and the World Bank. Ani is one of the principals of the Global Ecobrick Alliance and has assisted in GEA Training of Trainers workshops all around South East Asia. She brings her first hand experience of CDD programs to the GEA team, as well as her development work experience designing nation wide implementation programs.





## **Stephen DeMeulenaere – Token Model Advisor**

Stephen has over 25 years experience with digital currencies and 8 years experience with cryptographically secured digital currencies. Before the word 'Bitcoin' was coined, his contributions in the field of monetary design have been noted in dozens of books and magazines from "The Future of Money" by Bernard Lietaer to "The End of Money and the Future of Civilization" by Thomas Greco. Focused on the potential of how restructuring capital can solve environmental and social problems, Stephen has been a natural fit to the Brikcoin project, advising over the last two years. Previous positions include the organizer of the Blockchains for Sustainable Development for the UNCTAD World Investment Forum in Geneva, brand ambassador for the Malta AI and Blockchain summit and Asia Region Leader at Qoin - Smart City Currencies. Stephen brings his field and theoretical experience in complimentary currency design and implementation as a senior advisor to the Brikcoin team.

## **Leon Stafford – Server Configuration Designer & Manager**

Leon is a veteran WordPress developer with extensive experience optimizing servers, sites and databases for clients around the world. Leon is the lead developer of the WP2Static plugin for optimizing site performance and security. Leon couples his IT ingenuity with his passion for solving plastic. In 2017 he joined the GEA Trainer team and has since been advising on the GEA server infrastructure. With the global awakening to the perils of plastic pollution, Leon has been instrumental in configuring a short and long term solution to seamlessly serving the exponential rise in traffic to Ecobricks.org and GoBrik.com.

## **Shiloh Vermaak – Senior User Experience Manager**

A senior GEA Trainer based in Durban, South Africa, Shiloh brings her passion for solving plastic and her extensive experience with customer account management to the team. Shiloh's role is on the front lines of user interaction, managing the GEA social media accounts and interfacing with the various ecobricker movements and communities around the world. Shiloh manages the interaction between





our users, new team members and our technical team, ensuring we are constantly staying human friendly, relevant and engaging to the ecobrick movement.

## **Richard Goldsmith** – Development & Deployment

With a combined total of over four decades of experience as a relational database designer, SQL developer, data-center manager and computer engineer, Richard brings to the GoBrik team his extensive background in financial and treasury systems development. After leading Sybase database and software development teams for Morgan Stanley, Fidelity Investments, Prudential Banking and other multinational BlueChip enterprises, Richard retired from the financial industry keen to re-invest his energies and skills in endeavours that fully resonated with his values. With a deep passion for the earth as a long-time green party member and climate advocate, Richard was one of the early adopters of ecobricking in the UK as a means to supplement his already 100% renewable energy home in Surrey. Richard's passion, background and skills now merge as he assists the team establish development protocols for GoBrik and Brikcoin platforms.







# Appendix

## Earth Enterprise

As an Earth Enterprise (EE) the GEA operates under clearly defined principles.<sup>56</sup> An Earth Enterprise is built on the concept of a ‘social enterprise’-- where instead of a focus on social service, our service is to the Earth. The concept is inspired by the work of Mark Donovan developing the idea of an “Earth Corporation”<sup>57</sup> and the ‘not for profit’ (as opposed to a non-profit) concept by of the Post Growth Institute<sup>58</sup>. As an Earth Enterprise, the GEA operates on seven fundamental principles (see appendix 1) to ensure that our goals, operation our results and in line with our vision and mission as laid out in our GEA Earth Enterprise Intention Map in both the short and long-term. See the full Global Ecobrick Alliance Earth Enterprise for full context.<sup>59</sup>

### 1. **1. Regenerative Earth Service**

The methods, techniques, process and principles of our work are focused on serving the ecological health of the planet by enriching the cycles of interdependence between us and our fellow species. We ensure that our enterprise is regenerative by accounting for our ecological impacts-- both greening and graying-- and ensuring that our net impact is green.

### 2. **Leading by Example**

We ensure that the processes, methods, products and services of our enterprise are fully in line with the [principles of the ecobrick movement](#) and the other Earth Enterprise principles below. We are careful to ensure, through our trainings and organizational parameters, that every member of our team instantiates and embodies these principles in their life and work. The operation of our enterprise, of our core team embodies the principles of [collaborative mandalic manifestation](#). The GEA does this by holding the space (the core intentions and principles) of the mandalically unfolding global ecobrick movement.





3. **Open Access and Replicable**

We strive to ensure that the regenerative technologies we develop and advocate are accessible and as replicable as possible. We do this by making our technologies free, open source and ensuring that they are circular, transcaste, trans-petroleum. This involves curating and sharing a selection of our core content (our guide books, [non-personal Gobrik data](#), illustrations, etc.) and where appropriate, the source files under the Creative Commons License: Attribution (to Ecobricks.org), No Commission, Share-Alike. Likewise we strive to use only open source software, platforms and content in our enterprise and to work as much as possible work with organizations that resonate with our principles.

4. **Gender, Age & Status Transcendent**

We strive to craft methods and processes that do not restrict the involvement and participation from men and women, young and old, rich and poor and everyone in between. Furthermore we recognize and actively encourage co-creative partnerships between folks on the extremes of age, gender, and status.

5. **Financial and Impact Transparency**

We strive to make all our financials, both in [fiat currency](#) and on our [Brikcoin blockchain](#) transparent and accessible. We also disclose our net impacts in terms of [CO2 and Plastic](#) and strive that in all we do our positive impact is higher than our negative impact.

6. **Fair & Abundant Remuneration for Earth Service**

We actively cultivate the space and parameters so that our trainers, staff and principles receive fair and abundant remuneration for their service to the earth. As our enterprise expands we will ensure a wage bracket to maintain a defined ratio from the highest to the lowest paid person in the organization.

7. **Not for Profit**

No individuals or shareholders will profit from the operation of the enterprise. At the end of the year, any unspent funds will be reinvested back into the fulfillment of our mission and vision.





# Glossary

**Authentications:** The conclusion of three validations on the GoBrik platform by independent ecobrickers who have not made and do not own, the logged ecobrick being reviewed. The authentication can either be positive (“authenticated”) or negative (“rejected”). A successful authentication results in the creation of 1 BRK for each 100g of ecobricked plastic.

**Brikcoin:** A plastic offset token representing the sequestration of plastic by ecobricking. Each Brikcoin (BRK) represents the sequestration of 100g of plastic.

**The BrikChain:** A live, searchable and public repository of all transactions, blocks and authentications on the GoBrik platform connected to the creation and exchange of Brikcoin.

**Brikchain Explorer:** A page to explore all the transactions and blocks created and recorded on the Brikchain.

**Central Reserve Fidelity:** The measure by which the net total of Brikcoins (user balances + central reserve balance) matches the amount of plastic sequestered (total Kg of authenticated ecobricked plastic on GoBrik), as per the Plastic Standard. It is similar to the ratio of which gold reserves supported a gold standard currency's money supply. The Brikcoin money supply, central reserve balance and fidelity are [tracked live on the GoBrik Platform.](#)

**Collaborative Mandalic Manifestation:** The full concept of social replicability, inclusiveness and accessibility is inspired by GEA founder, Russell Maier’s philosophy of [Collaborative Mandalic Manifestation \(CMM\)](#). Russell first applied this methodology to his personal ecobricking and the seeding of the ecobrick viral social spread in the Northern Philippines.

**Community Hubs:** Locations that collect ecobricks for community projects.





**Cradle-to-Cradle Design:** The principle of planning for the end of a creation, its destruction and next life. Also known as *circular design*.

**Ecobrick:** A reusable building block created by the packing of used plastic to a set density into a PET bottle.

**Ecobricker:** Someone who makes ecobricks.

**Ecobricking:** The collective acts of collecting, segregating, packing, logging and storing an ecobrick, the life-style transformation that ensues and the pursuit of the movement's principles.

**GoBrik:** The platform created, maintained and developed by the Global Ecobrick alliance to log, store and authenticate ecobricks and to maintain, manage and exchange Brikcoins and ecobricks. The platform is found on the URL <https://gobrik.com> and is also embedded into the Ecobricks.org site.

**The Global Ecobrick Alliance (GEA):** The GEA is an Earth Enterprise focused on solving plastic locally and globally by maintaining the physical, digital and intellectual infrastructure that serves the global ecobrick movement.

**Mandalas:** Mandalas are an ancient and sacred art that can be found in cultures and religions around the world. Mandalas harness circular geometry and symmetry to create a pattern filled with meaning, symbolism and intention. Their creative process enables one or more folks to come together and organically unfold consciousness raising co-creations.

**Manual blockchain:** A database system modeled after the block chain cryptography concept of 'proof of work', where computation work is replaced with human work and computational 'proof' is replaced with community validation and authentication. This concept is being pioneered by the GEA in the GoBrik platform.





**Marketplace:** GoBrik platform for exchanging ecobricks, brikcoins, currency and barter.

**Regenerative Living:** Regenerative design acknowledges the harm that humans have had on the biosphere and aspires to shift processes and methods to heal, restore and strengthen the biosystems around us. In this way, we are careful to evaluate the net impact of everything we do to ensure that more plastic and CO<sub>2</sub> are sequestered than released into the biosphere.

**Transcaste:** Pursuing methods and concepts that transcend notions of how men and women, young and old, eastern and western, and everyone in between, should work and be.

**Trans-petrocapital:** The principle of designing methods to minimize participation in the capital economy (i.e. spending money) and the reliance on petroleum powered machines. Involves a consciousness of the correlation between money, capital and the petroleum that powers the capital-economy.

**Validations:** The act of review by an ecobricker of a logged ecobrick on the GoBrik platform.





# End Notes

- 1 [The Global Ecobrick Earth Enterprise Alliance Intention Map](#)
- 2 See live GoBrik Stats: [www.gobrik.com/#global](http://www.gobrik.com/#global)
- 3 See *About the Global Ecobricks Alliance*, [www.ecobricks.org/about](http://www.ecobricks.org/about)
- 4 Roland Geyer, Jenna R. Jambeck and Kara Lavender, '[Production, use and fate of all plastics ever made](#)' (Science Advances 19 Jul 2017: Vol. 3, no. 7, e1700782)
- 5 Hayden K. Webb, Jaimys Arnott, Russell J. Crawford and Elena P. Ivanova, '[Plastic Degradation and Its Environmental Implications with Special Reference to Poly\(ethylene terephthalate\)](#)', (Faculty of Life and Social Sciences, Swinburne University of Technology, 28 December 2012)
- 6 Daniel Hoornweg, Perinaz Bhada-Tata and Chris Kennedy, '[Environment: Waste production must peak this century](#)'. (Nature 502, 615–617 31 October 2013)
- 7 "The first principle of permaculture: The problem is always the solution" Bill Molison, [Permaculture One: A Perennial Agriculture for Human Settlements](#), 1978
- 8 Theory and Criteria of Plastic Sequestration <https://www.ecobricks.org/sequest>
- 9 Plastic Transition <https://www.ecobricks.org/transition>
- 10 Sequestration: "to keep safe and secure" Originates from Old French *sequestrer* or late Latin *sequestrare* 'commit for safekeeping', from Latin *sequester* 'trustee'. The term is also used in reference to carbon credits, i.e. "CO2 sequestration"
- 11 British Plastics Federation, '*Oil consumption*', [http://www.bpf.co.uk/press/oil\\_consumption.aspx](http://www.bpf.co.uk/press/oil_consumption.aspx) (Ref PD/LFH/19/8/08)
- 12 Geyer, Jambeck and Lavender, '[Production, use and fate of all plastics ever made](#)'. (Science Advances)
- 13 Matthew Taylor, '[\\$180bn investment in plastic factories feeds global packaging binge](#)', (theguardian.com, 26 Dec 2017)
- 14 Geyer, Jambeck and Lavender, '[Production, use and fate of all plastics ever made](#)'. (Science Advances)
- 15 [Plastic & Climate: The Hidden Costs of a Plastic Planet, Center for International Environmental Law](#), Executive Summary, May 2019
- 16 *The Energy of Slaves: Oil and the New Servitude*, Greystone Books, Andrew Nikiforuk, 2002
- 17 Hoornweg, Bhada-Tata and Kennedy, '[Environment: Waste production must peak this century](#)', (Nature 502)
- 18 National Research Council (US) Committee on Health Effects of Waste Incineration. Waste Incineration & Public Health. Washington (DC): National Academies Press (US); 2000. 3, [Incineration Processes and Environmental Releases](#).
- 19 [Incineration of Municipal Solid Waste](#), UK Department of Food and Rural Affairs, February 2013
- 20 [Plastic & Climate: The Hidden Costs of a Plastic Planet, Center for International Environmental Law](#), May 2019, p64
- 21 [Plastic & Climate: The Hidden Costs of a Plastic Planet, Center for International Environmental Law](#), May 2019, p58
- 22 [Digest of United Kingdom Energy Statistics](#), Department for Energy, Business and Industrial Strategy, July 2018
- 23 [Energy from waste A guide to the debate \(revised edition\)](#), UK Department of Food and Rural Affairs, February 2014
- 24 [Residual Waste Infrastructure Review \(12th Issue\)](#), by Harriet Parke, Sophie Crossette, Dr Dominic Hogg, 7th August 2017
- 25 "Singapore reuses barely any of its waste. Of the 800 million kilograms of plastic waste generated last year, 94 per cent was incinerated." [Can Singapore Really be a Zero-Waste Nation?](#), By Robin Hicks, Eco Business, Tuesday 29 January 2019
- 26 '[Recycling, The Evil Illusion](#)', Russell Maier, [russs.net](http://russs.net), 30 June 2016
- 27 Webb, Arnott, Crawford and Ivanova, '[Plastic Degradation and Its Environmental Implications with Special Reference to Poly\(ethylene terephthalate\)](#)', (Faculty of Life and Social Sciences)
- 28 [Toxic Pollutants from Plastic Waste- A Review](#), Rinku Verma, K. S. Vinoda, M. Papireddy, A.N.S Gowda, College of Sericulture, Chintamani, University of Agricultural Sciences, Bangalore, India, December 2016





# End Notes

- 29 Anthony L. Andrady, '*Microplastics in the marine environment*', (sciencedirect.com, Marine Pollution Bulletin, vol 62, issue 8, August 2011), 1596–1605. <http://dx.doi.org/10.1016/j.marpolbul.2011.07.021>.
- 30 Sarah-Jeanne Royer, Sara Ferrón, Samuel T. Wilson, David M. Karl, '*Production of methane and ethylene from plastic in the environment*', (Published: August 1, 2018)
- 31 Sarah-Jeanne Royer, Sara Ferrón, Samuel T. Wilson, David M. Karl, '*Production of methane and ethylene from plastic in the environment*', (Published: August 1, 2018)
- 32 Ansje Lohr, Heidi Savelli, Raoul Beunen, Marco Kalz, Ad Ragas, Frank Van Belleghem, '*Solutions for global marine litter pollution*', (sciencedirect.com, Current opinion in Environmental Sustainability, Vol 28, October 2017) 90-99
- 33 [Is Burning Plastic Waste a Good Idea?](#) National Geographic, March 12, 2019
- 34 [Plastic & Climate: The Hidden Costs of a Plastic Planet](#), *Center for International Environmental Law*, p 70, May 2019
- 35 Microplastics Alter the Properties and Sinking Rates of Zooplankton Faecal Pellets, Matthew Cole et al., 50(6) *envtl sCI. teCH.* 3,239(2016), <https://pubs.acs.org/doi/10.1021/acs.est.5b05905>
- 36 Recent Increase in Oceanic Carbon Uptake Driven by Weaker Upper-Ocean Overturning, Tim DeVries et al., 542 *nature* 215 (2017), <https://www.nature.com/articles/nature21068>
- 37 '*Kyoto Protocol – Targets for the first commitment period*', (United Nations Framework Convention on Climate Change) <https://unfccc.int/process/the-kyoto-protocol>
- 38 Ryan Smith, '*What is the environmental impact of Bitcoin mining*' (coincentral.com, 11 June 2018) <https://coincentral.com/what-is-the-environmental-impact-of-bitcoin-mining/>
- 39 '*Bitcoin energy consumption*', (digiconomis.net) <https://digiconomist.net/bitcoin-energy-consumption>
- 40 (worlddata.info) '*Energy consumption in Switzerland*' \*According to various sources, the net energy production of Switzerland is approximately 58 TWh.
- 41 Smith, '*What is the environmental impact of Bitcoin mining*' <https://coincentral.com/what-is-the-environmental-impact-of-bitcoin-mining/>
- 42 (Ecobricks.org) [www.ecobricks.org/movement](http://www.ecobricks.org/movement)
- 43 [Learning Toward an Ecological Consciousness](#), Edmund O'Sullivan and Marilyn M. Taylor, 2004, Palgrave Macmillan, p.30 "...responsible global citizenship requires not only a new social and ecological imagination but a shift in consciousness itself—a transformed way of understanding and construing reality. We have to change our minds—as individuals and as a culture." The GEA defines ecological Consciousness to as *the awareness of our interconnection to the cycles of life*.
- 44 (Ecobricks.org) '[Ecobricks are Cradle to Cradle Low Technology](#)'
- 45 (Ecobricks.org) [www.ecobricks.org/earth](http://www.ecobricks.org/earth)
- 46 It is worth noting that plastic is also highly resistant to microbial degradation: "*Plastics are resistant against microbial attack, since during their relatively short time of presence in nature, evolution has not yet design new enzyme structures capable of degrading synthetic polymers*" [Polyethylene and biodegradable mulches for agricultural applications: a review](#), p 510, Subrahmaniyan Kasirajan & Mathieu Ngouajio, 12 January 2012
- 47 Assuming a 95% petro-combustible and photodegradeable plastic content in an ecobrick. Calculated on the approximate weight ratio for carbon to carbon dioxide of 12 to 44.
- 48 It is important to note that ecobricks that are not made properly, which don't attain [GEA standards](#) of density and technique, do not result in effectively sequestered plastic. Weak, light, 'squishy' ecobricks are not ideal for constructions and break down over time.
- 49 See [www.brikchain.ecobricks.org](http://www.brikchain.ecobricks.org) for the first repository node.
- 50 See the live BrikChain Explorer: [www.GoBrik.com/#brikchain](http://www.GoBrik.com/#brikchain)
- 51 Bernt Johnke, '*Emissions from Waste Incineration*', (Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories Emissions from Waste Incineration)
- 52 Sarah-Jeanne Royer, Sara Ferrón, Samuel T. Wilson, David M. Karl, '*Production of methane and ethylene from plastic in the environment*', (Plos One, Published: August 1, 2018)
- 53 <https://www.gobrik.com/#terms>
- 54 <https://www.gobrik.com/#brk-aes-terms>





# End Notes

- 55 See the GEA Earth and Ecobrick Building Document: <https://www.ecobricks.org/trainings/>
- 56 Ecobricks.org - About the Global Ecobrick Alliance Earth Enterprise: [www.ecobricks.org/about](http://www.ecobricks.org/about)
- 57 Earth Corporation concept was coined by Mark Donoan - <http://earthcorporations.com/about/>
- 58 *How on Earth: Flourishing in a Not-for-Profit World by 2050*, Donnie Maclurcan, Jennifer Hinton, Post Growth Publishing (first chapter issued for book's kickstarter supporters)
- 59 Global Ecobrick Earth Enterprise Intention Map - [www.ecobricks.org/about](http://www.ecobricks.org/about)

