***The Commons Project White Paper :* Rational and Details**

**Statement of the Problem**

We live in an age where the problems are globally interconnected but the solutions are piecemeal and woefully inadequate as we continue to look for solutions with the same economic paradigms that created the problem in the first place. Our current economic system, sees environmental resources as independent assets to be managed, exploited and hoarded as if each action could be isolated from another without consequence to others or the larger ecosystem. More significantly, the [GapMinder](https://www.gapminder.org/) organization has shown that globally, poor people are moving into the middle class where they will have routine access to food, energy and transportation putting further pressure on shared resources. Without fundamental change, this increased pressure on the world’s resources will only accelerate the impact of climate change and economic inequality.

Seeing resources, problems and solutions as isolated is no longer viable because we know that resources, problems and solutions are interconnected, and every action taken by every living being has an impact on planet earth no matter how small it is. The only way forward is to think of these issues as an interdependent system. Changing our thinking on how to view the problem opens new possibilities that could not be considered previously. The Commons Project takes a different approach to these most difficult issues by using complexity science and systems thinking to craft a globally interconnected social media platform of individual and multilevel group behavior change around environmental impact that allows for maximum participation and maximum benefit across the world.

**Project Overview:**

The project is designed around two key assumptions:

1. The principles of efficiency demonstrated by biological systems in resource use, has applicability to the behavior of humans adapting individually and collectively in “real-time” human environments.
2. The effective adaptability of human behavior in resource use, requires continuous access to trusted and open data that demonstrates the impact of individual and collective actions on local and global environment resource use.

Behaviors that have a positive impact in reducing the use of the common resources of air water and land will be rewarded. The cumulative impact of reduced resource from local data will be aggregated to drive change in behaviors and environmental impact on the global level. The project is scale free, dynamic and adapts to individual interaction with linked environmental systems, providing augmented feedback on both local and global scales. Creating a new system for demonstrating how individual and collective actions, sets the conditions for “self-organization” within our ecosystems, a pro-active awareness of human behaviors is established. The core framework of The Commons Project is a web-based system for mutual cooperation based on a trust economy platform such as blockchain that also supports Distributed Autonomous Organizations allowing it to scale collectively and be locally adaptable. The platform will concentrate on the food, transportation and energy production industries which have the greatest impact on climate change.

Initially the platform will feature two major modes of collaborative action. The first is to make the invisible visible through a virtual environment were the environmental impacts of real actions by individuals and communities will be graphically represented so that air and water can be seen to be cleaner and land conserved. The impact of collective action across the globe will be compiled into a global picture of progress. The second intervention is the creation of a digital currency that is valued on the degree of positive environmental impact of individual and collective behavior change. Environmentally positive actions generate tokens which are allocated to the individual or group who took the action. Unlike more common digital currencies such as bitcoin, this currency cannot be gained through investment but only earned through engagement in the platform. In this project the currency is based on a quantifiable physical resource and so falls into the category of a stable coin and at the same time essentially giving the environment an opinion on value.

The virtual environment and the digital currency are designed to be a measurement system to capture and convey the dynamic flow of information about resource use between individuals, organizations and communities. The feedback from the actions made in real time creates a new emergent self-awareness for  individuals and their communities. Perception-actions are the primary source for individuals to test and interpret their understanding of the world around them. In the information economy, individuals and organizations depend on the feedback data they receive so that they can maximize the value of the behavior patterns that emerge. The behavior patterns can be reproduced in the digital world and tested to see if there is value for not only the individual but the entire system. Beyond creating value for the present system this new feedback mechanism can potentially create a transformational change of awareness for both individual agents and the collective awareness of the whole ecosystem.

**Overview of the technology**

Lately, social media platforms have taken a well-deserved beating related to the stealing of personal data, treating users as products to be exploited and as platforms for the propagation of hate and violence. Trust economy technologies offer a possible way forward allowing for a trustful and reliable experience where the individual can have an expectation of not being misused but instead benefited with the ability to make meaningful contributions. The Commons Project will use a combination of five key evolving technology components to create this platform.

* Digital Identity: A secure and trusted digital identity will allow individuals to reliably interact online without fear that their identity may be compromised and that everyone they meet online is also a real person. The country of Estonia has proven the value of an electronic ID system in making it easier for citizens to engage in civic life with bilateral trust. Because the process of valuing the environment begins with the individual, having a reliable digital ID will be critical for the individual and security.
* Trust economy: A trust economy is the general term for systems of trustworthy electronic ledgers such as Blockchain. While Blockchain is the most well-known of these technologies, the entire field is evolving incredibly fast with easier and more secure options coming to light regularly.
* Smart contracts: Smart contracts are similar to “if this then that” statements and will determine who is credited with tokens with improvements in the efficient use of common resources.
* Distributed autonomous organizations: A trust economy such as blockchain using smart contracts opens the possibility for a distributed from of system governance that is not centrally controlled allowing for maximum adaptive action at all levels.
* Algorithms: The streams of common resource use worldwide are already known and well modeled. The efficiency of various methods of energy production from coal to solar are similar enough across the globe to assign a resource use value to no matter their location. The value that is determined by these formulas will be used in the smart contracts to award digital tokens to the individual and community behaviors that show an improvement in the use of common resources.

**Making the invisible visible**

Each of us, just by living, have an inevitable impact on the environment even though these impacts are not immediately obvious. There is a distance both in time and space, between the production of what we use and the impact it has on the environment. The most immediate example is the food we eat. A vegan diet uses less land, water and air than a meat focused diet but because the production and consumption of food is separated in time and distance, the resources used or not used in production cannot be directly observed even though they are real. The most common way to make this connection visible is through the use of educational material or graphs comparing one level of resource use to another. In the US, most energy companies send these usage graphs to their customers hoping to change consumption behavior.

A much more effective way to change behavior is to show the impact of actions in a realistic virtual environment in as real time as possible where it becomes a basis for reflection on action and a change in behavior. The virtual environment will be similar to the many community building game apps available currently. Each participant will have their own virtual home with kitchen where information about food choices can be entered. If a person chooses to add solar paneling to their house in the real world they can add it in the virtual world. As the positive or negative impacts on the environment are recorded they will show up in the virtual environment as restored land, cleaner water or air. This platform can be gamified  through system logic that if a sufficient amount of land is restored they may earn a virtual rabbit or family of rabbits that would show up on the land around their house and play. Alternately, if the recorded behavior does not have a positive impact the user would see a decrease in viable land or dirtier air and water. With the trust economy and smart contracts, this data can be compiled to show changes on both local and global levels.

Social sharing would be a key component of this platform, allowing individuals and groups to share encouragement and suggestions of what works and doesn’t work. A separate practice virtual environment will be available to allow individuals and communities to trial changes to see potential impact. This social platform will also be extremely valuable to governmental and utility services to visualize end use and plan for improvements.

**Valuing Environmental impact**

**Traditional valuing**

Standard economic theory provides a basis for the design, implementation and evaluation of social systems that distribute goods and services based on an exchange of value. Individuals and organizations in this system try to maximize the value they receive and minimize the costs that they pay, and the system is said to work because everyone in the system has the same self-interested goal. The current economic systems use of common resources of air, water and land is putting the world on a path to what is as a known as the tragedy of the Commons. The costs of common resources are normally not part of the calculation of costs related to the production and distribution of goods and services. These invisible costs, called social costs, are borne by society in general because they do not accrue to individuals and typically include things like pollution, overuse of resources, and economic inequality, which are all a source of social instability. The largest  social cost of all is climate change and the bill is rapidly coming due. Because the existing economic system is not designed to account for these costs, it also will have difficulty or reversing the accelerating accumulation of these costs or providing the economic resources for remediation. The system wide global effects of climate change call for a complexity or systems approach that will provide for a more robust analysis and solution to a sustainable and equitable use of the commons.

**A systems valuing of the commons**

Economics is concerned with the production and distribution of usable goods and services that have value to individuals and societies. Money serves as a convenient medium of exchange which has always been representational of the good or service being exchanged rather than as in a barter system where goods and services are exchanged physically and directly. Until relatively recently the legitimacy of money as a proxy for value was always based in a commodity such as gold or silver. With the abandonment of the gold standard in 1971, the legitimacy of money changed to a concept of value called fiat money, which means that it has value because we say it does and it is useful for exchange. The problem with this is that any government's currency will fluctuate in value as it competes in the global marketplace for dominance where dominance is derived from a combination of trade balance, popularity of the currency and trust in the government that backs the currency. In the end, all currencies serve as a information system that reflects the social values and goals of the community it serves.

The economic efficiency paradigm of the Commons Project fundamentally changes the economic value system to include both individual and social costs related to the use of common resources in the production and distribution of goods and services. The value system is based on an understanding of the complex efficiencies of biological systems where efficiency is expanding the least effort to gain the required resources for the continuation of existence. The complexity science study of efficiency in biological systems has found that efficiency is achieved through the minimization of predictive error; meaning each action is as meaningful as possible while also avoiding unnecessary and unproductive actions as much as possible. This minimization of predictive error is accomplished through the execution of multiple predictive trials by multiple individuals in real environments that result in a continuous evolutionary improvement of the collective predictive process. An effective minimization of predictive error in biological systems requires the participation of all individuals in order to provide the best predictive information and then openly share the results of predictive trials throughout the entire system for the best group prediction.

The Commons Project mimics this biologic predictive process by assigning a value to common resources represented by a digital token. An efficient predictive process that results in a decrease in the use of the common resources will result in an increase of value and an inefficient use of resources will result in a decrease in value. The token representing the use of common resources, will be used to generate accurate information and collect value information from as many sources as possible and then use that information to provide dynamic feedback in a complex adaptive environment to drive the goal of minimization of common resource use. To achieve this, the informational properties of the token must be a reflection of the actual use of resources including resource lifecycle. The data should be gathered and shared in as close to real time as possible, and provide for an easy common method to share the data for the enhancement of methods to further reduce resource use. The token will be grounded in the valuing of a verifiable reduction in the use of common resources of land, water and air. Because this token is based on a tangible resource, that has without exception universal value, it will be less likely to be subject to the swings in value common to other commodities real or otherwise. This puts the Commons token into the category of a stable coin.

A systems approach to the exchange of economic value presents a wide variety of opportunities for exploration of new methods of data generation and analysis for problem solving. Biological systems rely on a strong sharing of predictive information starting at the individual level then extending throughout the group for an overall minimization of predictive error and set the platform for a robust response to the inevitable environmental perturbations. To do this each individual in the social group must be able to generate from their specific environmental perspective the best predictive information possible and then be able to share that with the larger group. Inaccurate individual predictions will propagate throughout the social group and lead to inaccurate predictions at larger levels and poor group predictions will adversely affect the reliability of individual predictions.

The Commons platform recognizes the vital contribution of every individual of any natural system makes to the overall health of the group. The platform assigns to each individual daily, the number of tokens representing the necessary basic resources needed for that day with an incentive for the individual to increase the value of tokens assigned through behaviors that reduce the use of these common resources. The value of making sure each individual in any system has the resources needed for individual existence is a mathematical judgement and not a moral one because the group can only minimize it’s predictive error through the diversity of perspectives provided by all individual predictions. Currently the individual resource use needed daily varies greatly from region to region due to a variety of factors historical and otherwise. The number of tokens allocated to individuals would be different to reflect these regional variations Even though this would leave a residual effect in the current global income disparity, individuals in high resource consuming regions would maintain sufficient resources although less than under the current system, individuals who do not have access to sufficient resources would see an increase in the ability to access the resources needed for life. This could be one of the paths decreasing climate change effects while at the same time moving the world's poor sustainably into the middle class.

The impact of global problems brought on by climate change are addressed in two ways, the first being a direct reduction in the sources of climate change directly attributable to the impact of global human activity. Secondly, through the use of smart contracts administered in a trust economy using a distributed autonomous system, individuals and groups have the financial incentive to create the conditions that contribute to the continuous reduction in use of common resources. The contributions being administered through the distributed autonomous system have the characteristics of a natural adaptive system as they can be discovered, implemented and evaluated at a local level based on local conditions while at the same time contributing to more global goals.

The Commons platform resembles a biological system in the resiliency it has to environmental perturbations either natural or from the evolution of the platform itself. The ability of the Commons platform to capture more real time information through the property of a life cycle token that reflects natural life cycles avoids the problems associated with legacy pools of economic value that represent economic activities that may have formally been considered productive but no longer are. On the commons platform, economic value is created as it is needed and earned again on a real time basis. Because the token is stable the smart contracts on the platform can be changed without changing the underlying token value which allows the activity that has the greatest impact to always be awarded the greatest value.

**Basic value generation**

The token would be assigned a numeric value representing each of the common resources, for example, a single token might stand for a square meter of land, one liter of water or one mole of carbon dioxide or another greenhouse gas. The tokens would either be earned by individuals at the point of participation and reduction in consumption, or by groups who facilitate the reduction in consumption through the use of smart contracts. For individuals, each user of the Commons app would receive each day of app use, a number of tokens, say 50, in each 24-hour period reflective of the consumption pattern in that nation or region. Tokens would then be gained or lost from the days total based on the individual's consumption of common resources for that day. If for example the typical meat consumption was four ounces per meal and the person had a meat free meal, they may earn an additional four tokens reflective of the resources saved to a gain of 54 tokens on the day. If the individual had more than four ounces, they may lose four tokens reflective of the additional resources used ending up with 46 for the day. The smart contracts awarding the tokens would be based on existing data tables connecting patterns of consumption to the use of common resources.

Tokens would not accumulate but have a life cycle based on the natural life cycle of the resource. If an individual action was in a food choice, as in a direct consumption of a grain or the processing of that grain through livestock for meat production, the tokens awarded as a result of the reduction in land usage, would hold its value for a complete harvest cycle. The value of having the token connected the resource life cycle value of activity in the system would be more accurately reflected in the number of tokens awarded system wide. Another potential component of the Common’s platform would allow individuals to invest individually earned tokens in collective projects reducing resource consumption to earn additional tokens.

To create the truest informational picture of common use resource, tokens can only be earned and cannot be purchased with any government backed security or other digital currency. Allowing legacy currencies into this value system has the potential to dilute and invalidate the informational picture that the commons token creates. Tokens can be earned in the human activity areas that have the greatest environmental impact, food, power generation and transportation.

**Group value creation and distribution**

An overly simple take on minimizing human environmental impact could lead to some less than optimal solutions such as if we want less human impact, then all we need are fewer humans or go back to foraging for food and gathering wood to burn for heat. The right path is not consuming like a glutton or like an ascetic but in between with what is known in Buddhism as the middle road.  The middle road is one of not too much and not too little but just enough which is another way of stating the minimization of predictive error in common resource use. Counterintuitively a continuous evolutionary process of increasing efficiency in the usage of common resources through the minimization of predictive error requires an elaborate social structure to provide resiliency to deal with both known and unknown environmental challenges. This resiliency is captured in a wide variety of human social activities as straightforward as an increasing understanding of the impact of behavior on resources but would also encompass scientific research into reducing resources use or investment in infrastructure that decreases resource use.

The smart contract governing group behavior generating tokens would operate differently than that of the individual because it is a change in group behavior that reduces common resource use and these tokens have to be distributed in an equitable manner. One possibility is that the majority of the tokens earned from a group activity would be distributed to the end users engaged in the activity, but the facilitators of the activity would be entitled to a small percentage of each end users’ engagement with the activity. Say for example in a community of 100 households, a leader group established a locally distributed solar power generation station. If each household connected to the system daily earned 10 tokens for a total of 1,000 tokens per day, then the group leaders may earn ten percent of that total or 100 tokens daily and nine tokens would go to each household. Tokens earned through social activities would also have a life cycle reflective of the natural life cycle of the activity. If the solar power station is assigned a life span of thirty years, then the tokens would also have a life span of thirty years. Having a life cycle associated with token value guarantees that the emergent path of the system is not too influenced by values that were generated by historical circumstances. Complexity science says that change is constant, and the evolutionary path of change needs to be reflected in the value of the token.

**Local value creation**

The possibilities for individuals and businesses to generate value at the local level are endless and this is where the greatest impact on climate change and income inequality will be realized. At the individual level, additional income can be earned by changing individual consumption behavior to reduce resource use. Individual embedded in communities from neighborhoods to cities, can use the incentives of a market economy built around reducing resource use, can create opportunities for earning tokens based on local resources, culture and within local environmental context. The innovation and creativity generated at the local level can be shared with communities across the globe for adoption and enhancement.

The business opportunities in a Commons based market economy, where resources are conserved, would be just as real and as varied as in our current extraction-based economy with additional opportunities correcting problems created by the current economic system. The business opportunities would fall into two general classifications, those that directly decrease the use of common resources and those that enhance the resiliency of individuals and communities. For example, cities across the United States have an ongoing infrastructure crisis of aging pipes in municipal water systems including those serving individual homes which are usually the homeowners responsibility. Leaking pipes can cause enormous water bills which become overdue leading to fines with residents unable to afford repair costs. The loss of water at even at the level of an individual residence reflects a systemic, commonly shared, but unaccounted for cost in the los of a valuable resource. If value was created by the conservation of water a plumber would have an economic incentive to offer to repair the pipes of a homeowner in exchange for a small percentage of the tokens earned from the conservation of water. Pipe manufacturers would have an incentive to design pipes with a long lifespan, extending the term of token earnings for both the plumber and the manufacturer. This would create a long-term steady stream of known income that would be of value to any business.

Resiliency is a crucial component of any successful society over the long term and is the second major area of business opportunity. All biological systems, including human social systems, demonstrate the characteristics of complex adaptive systems and live in constantly changing environments where the opportunities and risks are only partially knowable. To compensate for both known and unknown opportunities and risks, complex systems can adaptively search for and find the best possible fit as the environment changes. The Commons economic system has the ability to value business, organizational and individual activities that enhance system resiliency.

**Government and institutional value creation**

Biological systems are organized so that they have a resilience to environmental changes allowing for adaptation and continued survival. One of the roles of government and social institutions is to create the conditions for resiliency by providing Universal Basic Services in the areas of infrastructure, education and health among others. Because the only source of token creation is at end user engagement with the environment, there will be an institutional incentive to support and protect the ability of the end user to minimize their environmental impact. Governmental and institutional projects could potentially to be financed by a combination of collecting tokens from individual members and the resource savings generated from projects that benefit the community. The adoption of a commons market economy has the potential to increase governmental effectiveness, enhance individual and community engagement and improve the well-being of communities.

**Governance**

The project will be administered through a decentralized autonomous organization which will allow the evolution of local efficiencies based on local conditions and achieve the greatest effiencies. The commons project is a fundamentally a measurement system of common resource use which can be improved using the data collected. There will need to be a method of assigning and then as appropriate, adjusting the values of common resources and the associated life cycles. One possibility is an organization such as Internet Assigned Numbers Authority (IANA) which determines web domain names and number resources or the foundation that oversees Wikipedia. There will be multiple opportunities to enhance the measurement value of the system by including concepts such as a circular economy. The possibility of exploitive value extraction should always be a concern through smart contracts that are written to benefit only a few.