



# CRYPTO-TOKEN BACKED BY **COLOMBIAN EMERALDS**

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# Introduction

Investing in Colombian emeralds is becoming more popular due to their unique characteristics, beauty, and scarcity. There are Colombian emeralds worth more than USD 10 billion in the market. Currently, 5 to 10% of the yearly production is used for investment purposes, and it is expected to grow up to 50% in the coming years.



**Figure 1. Uses of Emeralds**

Colombian emerald production is a multimillion dollar industry, thanks to the outstanding quality of these gemstones and their international fame. For instance, in the scale of tonality, Colombian emeralds, according to experts and gemologists, are the most balanced, which means they are not very dark nor very light; in other words, they have a perfect saturation. Also, they stand out for their deep clarity and often extraordinary size.

All these attributes make Colombian emeralds a desired precious gemstone, whose demand has been growing day by day and whose value has not decreased in the latest years. Plus, there are very few mines; new ones have not been discovered in a long time, which means they are a scarce asset, with unique qualities, which make them an attractive and profitable investment.

However, investing in emeralds is a difficult decision, due to several factors: a standard investment involves a transaction of thousands of dollars, the investor must have a specialized knowledge of the characteristics of the emeralds and their value in the market to be sure on paying a fair price, discounts are only possible with large investments and there is uncertainty about the origin of the gemstones, as well as about the legal, environmental and labor practices during the production.

On the other hand, there are too many intermediaries all along the emerald production chain, from the mines where the gemstones are extracted to the final customers.

Besides, these intermediaries do not give any added value to the product. Without these intermediaries, it would be possible that final customer pays less for the investment and the producer earns more for the emeralds.

GEMERA will help to transform that traditional investment model into a modern, fairer, transparent and democratic ecosystem, by connecting investors and emerald producers directly with a blockchain based platform, that contains a crypto-token 100% backed by Colombian emeralds and a marketplace with all the decentralized information about each one of these gemstones.

## **GEMERA Project**

GEMERA is a crypto-token backed by Colombian emeralds that provides a mixture of secure digital assets managed by blockchain and physical Colombian emeralds stored in security vaults of safe deposit box companies.

The Project offers an innovative and modern investment opportunity, more profitable, accessible, democratic and transparent, by connecting producers and investors through the advantages granted by the blockchain technology, producing in that manner win-win benefits for these two actors.

The project will also develop a blockchain-based marketplace platform to store the information of the emeralds that back the GEMERA tokens in a decentralized way.

As GEMERA works hand in hand with emerald producers, it is also part of its politics to partner only with companies with good environmental practices in the extraction of gemstones and with corporate social responsibility standards that seek for the integrity of their workers and the communities nearby, helping them and other stakeholders to improve their quality of life and to open their path towards sustainable development. The project uses part of the project funds to achieve this purpose.

# Problems

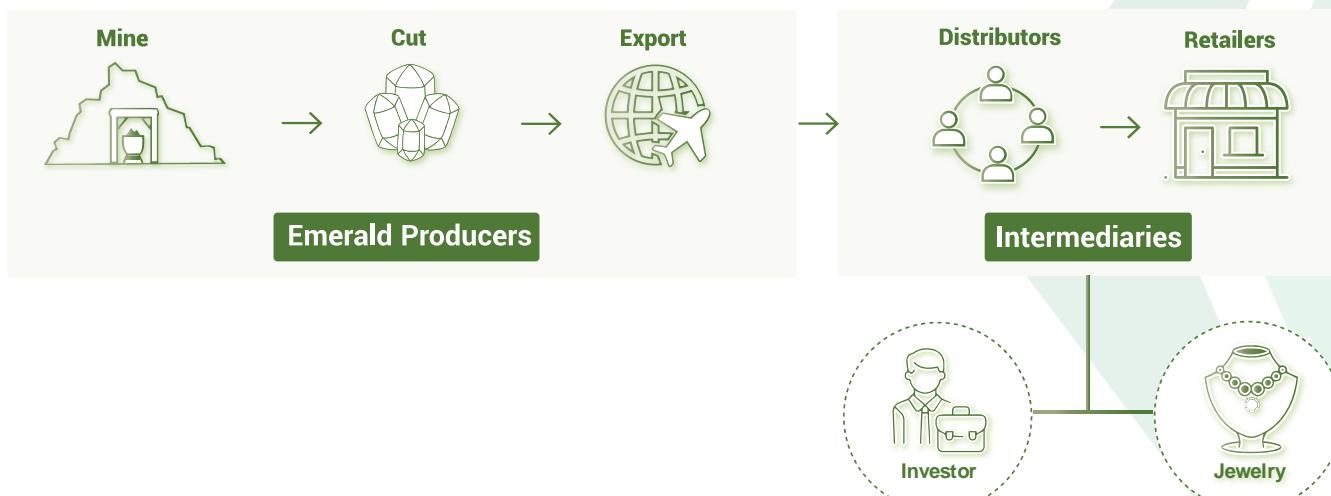
There is a long process that an emerald goes through the value chain, from its discovery in Colombian mines to the final holder, which generates several problems for both the investors and the producers, as specified below:

## Problems on the Investor's Side:

- High prices.
- Investing in emeralds can be complicated and risky without adequate knowledge about them.
- Partial and small investments are not possible.
- Lack of trust in the emeralds origin.

## Problems on the Producer's Side:

- Receive less than 35% of the final customer retail price due to many intermediaries.
- Difficulty in expanding into new markets.



**Figure 2. Emerald Production Chain**

## GEMERA's Solutions

GEMERA's purpose is to create an innovative and modern investment opportunity that at the same time solves problems in the Colombian emerald's value chain, through the creation of crypto-tokens 100% backed by this asset, that can be redeemed for the very gemstones they represent, and even used as a store of value or as a trading token.

Hence, by holding GEMERA tokens, investors hold at the same time the value of the emeralds that come directly from Colombian emerald producers and are stored in secure vaults. In that way, no intermediaries are needed, which translates into benefits for both, investor and producer: the first one gets incentives of around 20% of bonuses during the Token Generation Events (TGE), available also for small investments, and the producer receives up to 15% more, based on the retail price.

GEMERA has focused its efforts on the early stage of the project to create a model, along with gemologists and experts in fine Colombian emeralds, with all the necessary criteria to assess and determine the quality of the emeralds, in a clear and transparent manner. That way an investor does not need to be a great connoisseur in the emeralds field or hire expensive specialists when wanting to make an investment decision. In other words, GEMERA has a reliable method to guarantee the quality of the gemstones, as well as the adequate price according to the established criteria.

The information about the characteristics, certification, pictures, and video of the emeralds is exhibited in detail on GEMERA's marketplace, including audit results and the safe deposit box company location where they are stored. The emerald characteristics information will be stored in the blockchain using Ethereum main network, and the certification and audit records will be stored in a decentralized manner, using the InterPlanetary File System (IPFS).

In general, GEMERA is offering a set of modern solutions for the producer to expand to new markets and to final customers to invest in emeralds in a much easier way, besides the enormous advantage of counting on an online platform, based on blockchain, to do so, an alternative that was not available in the emerald industry or in the crypto community until now.

ADVANTAGES	TRADITIONAL	GEMERA
Store of value	✓	✓
No middleman	✗	✓
Marketplace with decentralized information	✗	✓
Partial and small investments	✗	✓
Tradeable and transfereable in real time	✗	✓
Emerald Assessment Process	✗	✓
Incentives for small investments	✗	✓

**Table 1. Advantages of the traditional investment model of emeralds vs. GEMERA model**

# Colombian Emeralds

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Emeralds are excellent as a store of value due to a set of different factors: physical attributes, scarcity, and even the historical background. The most famous come from Colombia, which has dominated the international trade for almost five centuries. Although there are other lead producers, such as Zambia and Brazil, the unique characteristics of the Colombian emeralds are an important differentiation, which makes them the most desired in the world.

The secret resides in the millenary recipe of elements, including aluminum, silicate oxide, chromium, iron, and vanadium, which initiated the eons-long formation process of the emeralds starting 30-38 million years ago, during the development of the Andean mountains.

But the process also depends on how intensively the elements act during formation. In the case of Colombian emeralds, the shining chromium, combined with the leveled vanadium and iron in lower quantities give the unique tone to the beryl before it is turned into an emerald. If the gemstone had a higher level of iron, its green color would be opaque. If the vanadium were the distinct element, the stone would obtain a yellowish hue. So, it is the balanced combination of these elements what gives Colombian emeralds a rich, vivid and intense green color, unreachable even for Zambian or Brazilian emeralds.

On the other hand, Colombia hosts inside its mountains the oldest and most important emerald mining areas in the world, Muzo, Coscuez, Maripí and Chivor, where the best, rarest and most expensive emeralds are produced. Although there are slight differences in the color of the emeralds these mines produce, the perfect saturation and vividness are a common characteristic among them, and this is precisely one of the main factors that make them more desired.

Even before the Spaniard conquest, in the XV century, emeralds were mined in that region by indigenous tribes, and, of course, they became desired and started to be traded widely during the conquest, as part of the treasures collected in the so-called New World. That gives these precious gemstones another added value, attractive to buyers and investors worldwide: a historical, mythical and enigmatic background.

## Colombian Emerald Market

Colombia has been the main provider of high-quality emeralds for more than five centuries and has become a reference and standard of quality for traders, producers, and investors. Nowadays, more than 70% of the world's market supplies of emeralds come from this country, and they are the most expensive per carat. The total amount of cut emeralds exported from Colombia in 2017 is close to USD 126 million, according to the National Federation of Colombian Emeralds –Fedesmeraldas's Management Report (see Figure 3).



**Figure 3. Export of Cut Colombian Emeralds (USD)**

Source: Fedesmeraldas

But also, the emeralds in general and the Colombian in particular are becoming the most appreciated and valuable of all precious gemstones. For instance, according to Gemval (an organization of value reference and appraisal of gems), with figures of 1 February 2018, the price of rough emeralds has increased 135% since 2013.

In the case of Colombian emeralds, they have fetched the range of USD 5,000 to USD 15,000 per carat, depending of course on the size, color, clarity, and enhancement type. But even a Colombian emerald with the best quality could reach a price of around USD 120,000 per carat, a high contrast when making the comparison with an emerald of similar quality from other parts of the world, where the price could reach USD 80,000 per carat.

With these numbers, it would not be inaccurate to say that a fine emerald's price could be higher than that of a fine diamond. Even experts and traders agree on the fact that emeralds could become a more appreciated gemstone than diamonds; it is said that the first could exceed the latter in the market share by 20% in the next two decades, taking into account the growing tendency of emeralds in the latest years, according to the Diamonds International Manufacturers Association. This is also due to their rarity: emeralds are 20 times scarcer than diamonds, thanks to all the special elements and conditions required on their formation, mentioned above.

This growing tendency of emeralds in the gemstone industry is of course led by Colombia, and traders, producers, and experts coincide that it will continue to be in the forefront, in the following years, adding the fact that emeralds are projected to increase its use for investment in the upcoming years, even equaling the percentage of its current use for jewelry.

Another advantage is the processes and methods applied to emeralds in Colombia after the extraction, such as cutting, enhancement, assessment and certification, which meet international standards, both in the scientific and technological areas. This industry is also known for its good environmental and working practices, and for being an important source of social progress for the communities around the mines where the emeralds are extracted. Therefore, besides profit, Colombian emeralds are a responsible, ethical and integral asset.

In conclusion, Colombian emeralds are a promising and stable industry, full of history and enchantment, which is destined to reach more and more markets worldwide and an excellent investment decision.

## Highlights

- Emeralds produced in Colombia are well known internationally for their beauty and quality.
- Colombian emeralds stand out for their perfect saturation, unique shine, and vivid color.
- For more than five centuries, Colombia has been the world's biggest producer of emeralds.
- Colombian emeralds have reached almost every part of the world. The main purchasers in 2016 were the United States, Hong Kong, Thailand, India, Israel, Italy, Switzerland, Germany, and Japan, among others.

- Colombian emeralds were formed from hydrothermal deposits; that is, seabeds that are now mountains. This gives them unique characteristics that define their value.
- The environmental footprint of emerald mining is lower in comparison to other types of mining because it is a manual process, and no mercury or cyanide is necessary for the extraction process.

## Emerald Producers Alliance

GEMERA's first alliance with emerald producers was with 4Cs Emeralds, a company that produces and exports Colombian emeralds from the biggest Colombian mines, such as Cunas, in Maripí region, and Nuevo Milenio and Las Pavas, in the Muzo region. It was incorporated in Colombia in 2008, with a major trajectory in the market since then. In 2016 and 2017, the company exported USD 4.6 million and USD 11 million, respectively.

4Cs has the full capacity of supplying the emeralds that support the tokens issuance after GEMERA's Token Generation Events (TGE).

# GEMERA Crypto-Token

GEMERA is an asset-backed token, which means tokens will be backed 100% by physical emeralds.

NAME	GEMERA
TICKER	GEMA
PLATFORM	ETHEREUM ERC20
DECIMAL PLACES	18

**Table 2. Token Information**

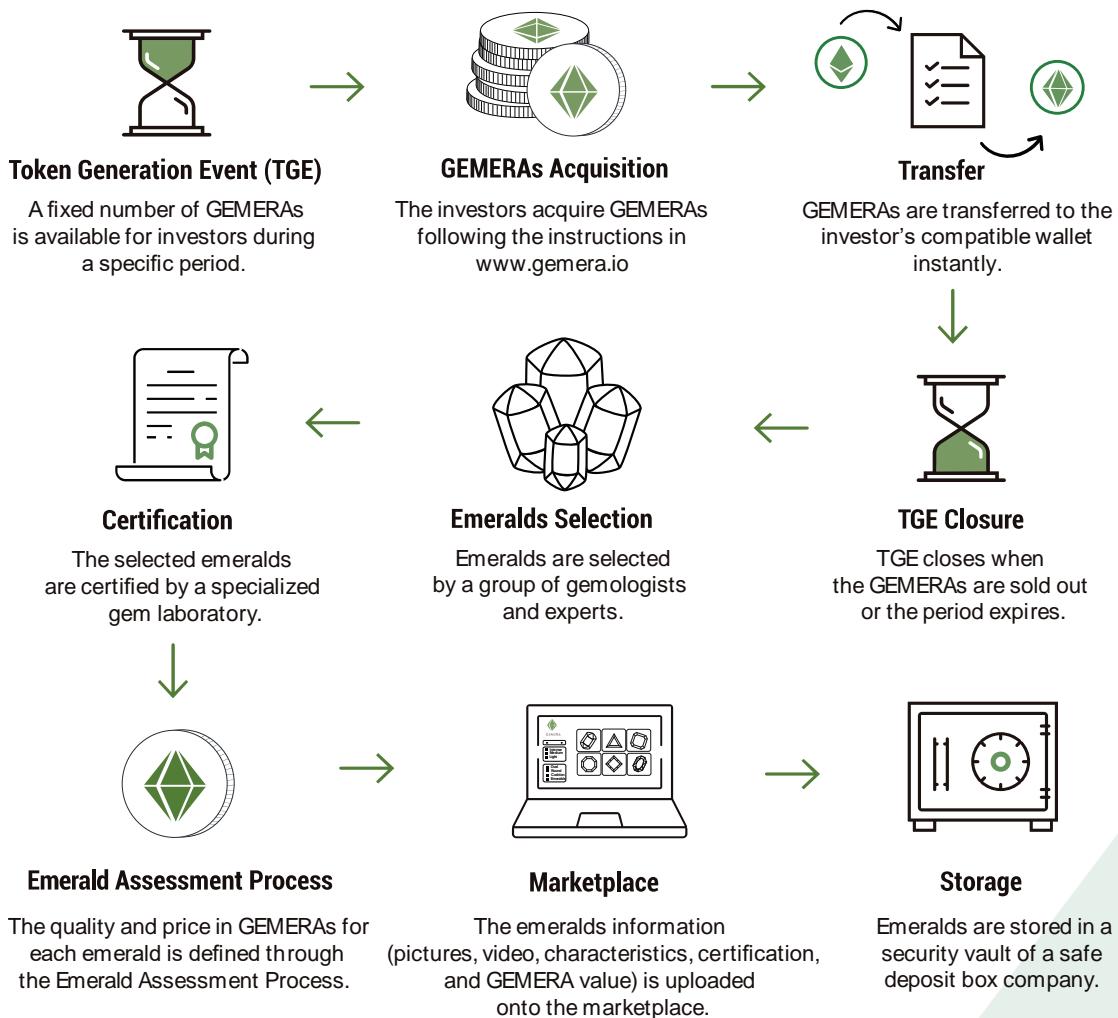
Each emerald has a fixed value in GEMERAs, according to its weight and quality, which is determined through the Emerald Assessment Process, a model developed by GEMERA along with gemologists and fine Colombian emerald experts to determine the quality and price of these gemstones.

GEMERA is a token based on Ethereum ERC20 standard and has the following features:

- **GEMERAs** can be traded in exchanges.
- **GEMERAs** can be used as a store of value.
- **GEMERAs** can be transferred to compatible wallets.
- **GEMERAs** can be redeemed for physical emeralds.

## Token Generation Event Process

A Token Generation Event (TGE) is open during a period, where an amount of GEMERAs is offered and ready to be acquired by investors. Once the TGE closes, the project starts a process of selection, certification, assessment, transport, and storage of emeralds to back the sold tokens. The selected emeralds are then exposed onto GEMERA's marketplace ([market.gemera.io](http://market.gemera.io)). The total value of the emeralds will be coincident with the value of the issued tokens.



**Figure 4. TGE Process**

## Total Token Issuances

Gemera is a proof-of-asset token and does not have a fixed supply, it is created dynamically, and it is limited to Colombian emeralds production. This gemstone is scarcer than diamonds; therefore, the project does not expect to issue high amounts of tokens. This is an important factor for investors.

The project's vision is to tokenize Colombian emeralds and having 100 million tokens issued by 2029. (See the GEMERA Token Projection on page 20).

# Marketplace

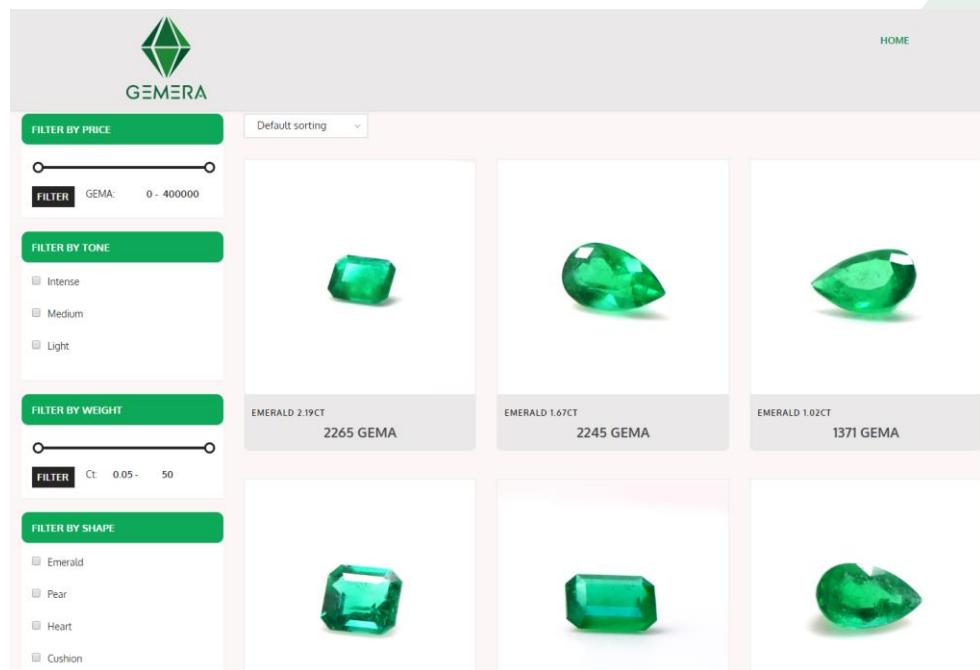
An emerald marketplace on the GEMERA Project website is available for GEMERA holders who want to redeem their tokens for the emeralds ([market.gemera.io](https://market.gemera.io)). Each one of them is accompanied with precise information: name, characteristics, price in GEMERAs, certification, as well as photographs from different angles, and a 360° video.

The Project will use the Ethereum main network to store all the emerald information and status and the InterPlanetary File System (IPFS) to store the audit and recertification files.

The following is the information exhibited on the marketplace:

PRICE IN GEMERAS	TONE	CARAT WEIGHT	DIMENSIONS	EMERALD ID	LOCATION
SHAPE	ENHANCEMENT	ORIGIN	COLOR	AUDIT DATE	REDEMPTION DATE
STATUS	TRANSPARENCY	ENTRY DATE			

**Table 3. Emerald Information in Marketplace**



**Figure 5. Marketplace**

**CDTEC**  
Centro de Desarrollo Tecnológico  
de la Esmeralda Colombiana

Laboratorio de Investigación e Identificación de Gemas  
Research and Identification Gem Lab

Fecha / Date: 21 / 12 / 2017

Reporte / Report: 19966

REPORTE DE PIEDRAS DE COLOR / COLORED STONE REPORT

Gemas / Gems:	..... 1
Transparencia / Transparency:	..... Transparente / Transparent
Color / Color:	..... Verde / Green
Tono / Tone:	..... Intenso / Intense
Peso / Weight:	..... 2.19 ct
Medidas / Dimensions:	..... 7.66 x 9.67 x 4.30 mm
Talla / Cutting Style:	..... Facetada / Faceted
Forma / Shape:	..... Esmeralda / Emerald

**IDENTIFICACIÓN / IDENTIFICATION**

Imagen aproximada / Image is approximate:

Especie / Species: ..... Berilo Natural / Natural Beryl  
Variedad / Variety: ..... Esmeralda / Emerald  
Origen / Origin: ..... Colombia  
Embellimiento / Enhancement:  
Cantidad / Degree ..... Moderado (F2) / Moderate (F2)  
Tipo / type ..... No solicitado / Not requested

**NOTAS IMPORTANTES Y DECLARACIONES**  
Detalles que los profesionales pueden ver modificados en cualquier momento con tratamientos o embellecimiento. Los conclusiones de este reporte reflejan resultados obtenidos de su envío, después de la cual cosa resta responsabilidad al Laboratorio. Este reporte no contiene un certificado de garantía, ni análisis. Este reporte contiene los resultados de las pruebas realizadas en el laboratorio y no es una garantía de calidad ni de comercio. Los resultados de las pruebas se basan en las técnicas y procedimientos utilizados en el momento de su examen. La Corporación CDTEC, no responde por alteraciones posteriores a las que son sometidas tanto el objeto de estudio como los reportes siguientes expedidos. Asimismo, todo tipo de uso del informe constituye un fraude según lo dispuesto en la Corporación CDTEC.

**IMPORTANT NOTE AND DECLARATIONS**  
Being that a gemstone can be modified, treated or enhanced, at any time, the result of this report reflects the state of the gemstone at the time of analysis, after which the laboratory has no responsibility. This report does not contain a guarantee certificate, nor analysis. This report contains the results of the tests carried out in the laboratory and is not a quality or commercial guarantee. The test results are based on the techniques and procedures used at the time of examination. The Corporation CDTEC, does not respond for any alterations made to either the object of study or the subsequent reports issued. Furthermore, any use of the report constitutes a fraud according to what is established by the Corporation CDTEC.

CDTEC Logo

9022100199669

Figure 6. Emerald Certification

## Redemption

The redemption is the process whereby the GEMERA holders can redeem their tokens for the emeralds that back them. This period takes place once a year and the date is announced to the token holders with enough notice.

The redemption process is composed of the following steps:

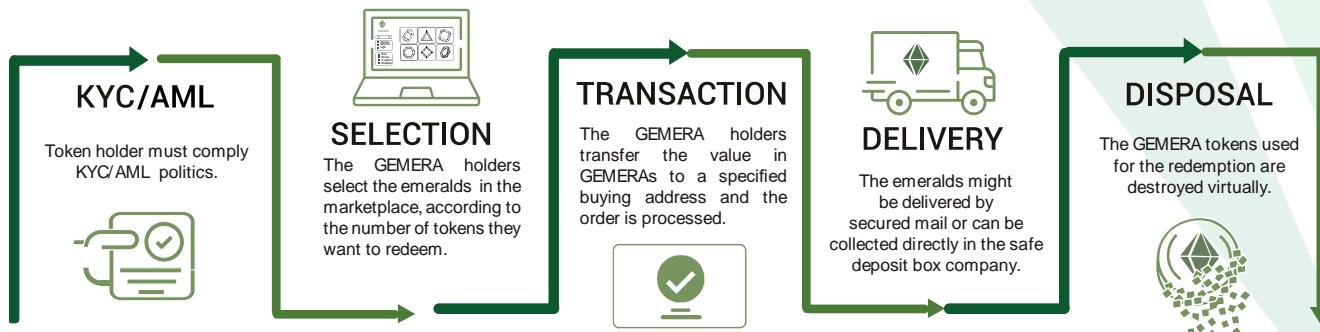


Figure 7. Redemption Process Flow

- **Know Your Customer (KYC)/Anti-Money Laundering (AML):** GEMERA verifies that the token holder fully complies with the KYC/AML procedure.
- **Selection:** The GEMERA holders select the emeralds they desire to purchase depending on the amount of GEMERAs they want to redeem.
- **Transaction:** The token holders send the required amount of GEMERAs to a buying address previously addressed by GEMERA.
- **Delivery:** The emeralds can be delivered by secured mail (the redeemer will cover this cost) to the country of residence of the token holder. In this case, the redeemer must consult the local tax office to see what import duties and/or VAT are required. Also, the redeemer can collect the emeralds directly in the safe deposit box company where they are stored. Some countries have restrictions to import loose gemstones.
- **Disposal:** The redeemed tokens are destroyed virtually, in order to keep the balance between the tokens in circulation and the total value of the stored emeralds.

GEMERA charges a fee of 3% over the tokens to be redeemed to process the redemption.

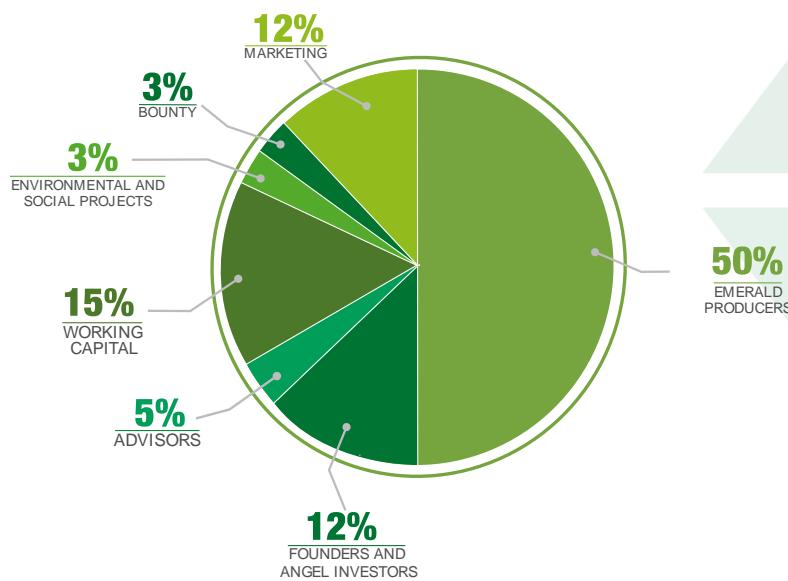
# Business Model

To be a sustainable and profitable project, GEMERA has two revenue sources. The first comes from the Token Generation Events (TGE) and the second from the redemption process.

The early stage of the project, from the conception of the idea to the first TGE, is being sponsored by Colombian emerald producers, the founders and angel investors. Currently, there is a batch of emeralds stored in Hong Kong, with a value of around USD 1 million in the retail price. This stock was supplied by the producers to initiate the project. The founders and angel investors contributed with USD 500.000 to carry out the first stage of the project, such as software development, legal advice, company incorporation, team salary and marketing strategy to launch the first TGE.

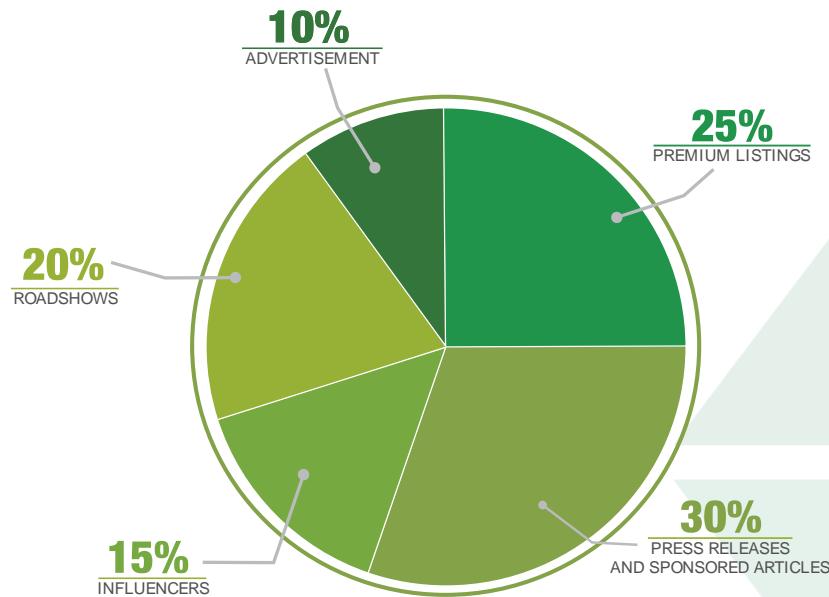
## TGE Funds Allocation

The funds collected during the TGEs will be distributed in the following manner:



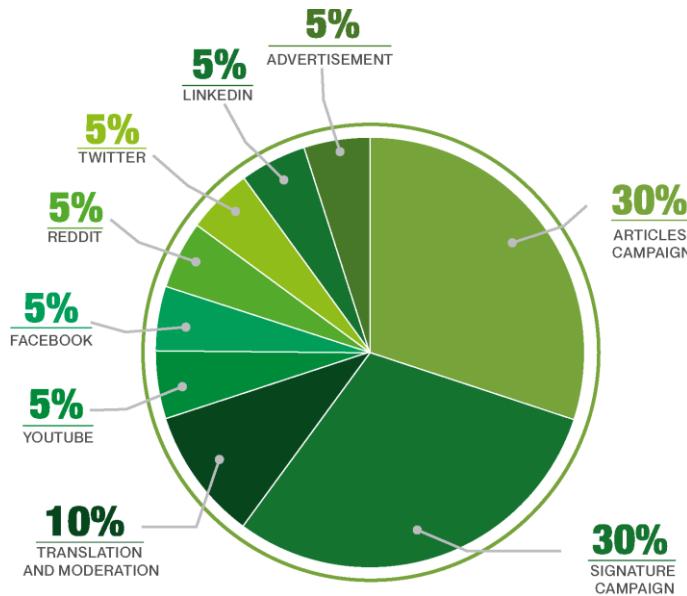
**Figure 8. Funds Allocation**

- **Emerald Producers:** With GEMERA Project, Colombian emerald producers expect to expand the global emerald market and open new ones, which translate into more investment opportunities. Currently, producers receive less than 35% of the final customer's sales price. Through GEMERA, this income will increase up to 15%. Then, as the Project's main partners, the first 50% of the funds will be intended for the emerald producers.
- **GEMERA Founders and Angel Investors:** It is intended for the founders and angel investors, who participated in the seed round, and whose funds were used to finance the early stage of the project. They are currently GEMERA's shareholders.
- **Marketing:** It is used to carry out the project's marketing strategies, such as presence in roadshows, press releases, and sponsored articles, premium specialized listings, advertisement, and influencers. For this purpose, the funds are allocated in the following manner:



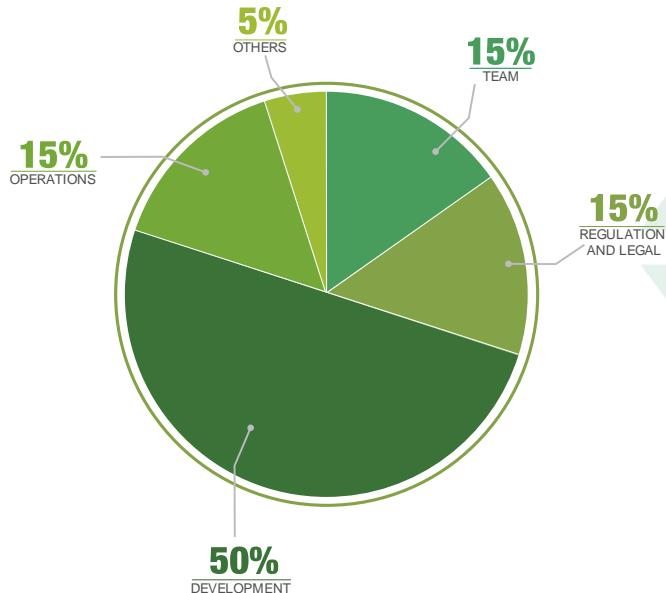
**Figure 9. Marketing Distribution for First TGE**

- **Bounty:** It is an incentive for the blockchain community to achieve tasks like translations, moderations, and social media influence. For this strategy, the funds are allocated as shown in the following figure:



**Figure 10. Bounty Distribution**

- **Working Capital:** it is used to carry out the company's operation, like software development, team salaries, legal, travels, insurance, rents, etc. For these activities the funds are allocated in the following way:



**Figure 11. Working Capital Distribution**

- **Environmental and Social Projects:** The 3% of the funds collected are used to develop social responsibility and environmental projects, both in the mines and the communities around them.
- **Advisors:** These funds correspond to those experts who have offered advice to plan the necessary strategies to carry out the project successfully.

## GEMERA Token Projection

The GEMERA's ten-year projection is to issue 30.000.000 tokens the first year (2018), and 10.000.000 tokens each year to 2029.

YEAR	TOTAL TOKENS	TOKENS OFFERED	REDEEMED TOKENS
2018	30.000.000	30.000.000	0
2019	38.500.000	10.000.000	1.500.000
2020	46.575.000	10.000.000	1.925.000
2021	54.246.250	10.000.000	2.328.750
2022	61.533.938	10.000.000	2.712.313
2023	68.457.241	10.000.000	3.076.697
2024	75.034.379	10.000.000	3.422.862
2025	81.282.660	10.000.000	3.751.719
2026	87.218.527	10.000.000	4.064.133
2027	92.857.600	10.000.000	4.360.926
2028	98.214.720	10.000.000	4.642.880
2029	103.303.984	10.000.000	4.910.736

**Table 4. Scenario with a yearly 5% redemption of total tokens.**

## Redemption Revenue

Additionally, GEMERA charges a fee of 3% over the tokens to be redeemed to carry out the redemption process.

# Technology

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GEMERA tokens are based on the blockchain technology, which can be compared to a ledger or database. Each block in the chain contains data, just like a page in a traditional ledger. But the crucial advancement over a traditional ledger is that the blockchain exists in a distributed fashion. Every block can only be added to the previous one if the information contained within is agreed upon by the consensus of a majority of the participants of the network. In the case of Ethereum, there are hundreds of thousands of participants called nodes confirming transactions as they appear. All participants agree to follow the rules laid out in the blockchain protocol. Once a block is agreed as correct according to the protocol (consensus algorithm), it is added to the chain and cannot be altered. This means that transactions cannot be reversed once confirmed.

In this way, blockchain technology enables, for the first time, a secure transaction of value without the need for an intermediary. While credit and debit cards enable money to change hands digitally, they still rely on a central authority, like a bank. The disadvantage of requiring a central authority is that users are subject to high fees, especially when transacting across borders. Blockchain technology, however, eliminates the need for banks by enabling direct peer-to-peer exchange, and because transactions are distributed across servers all over the world and data is cryptographically secured, it is nearly impossible to hack. Blockchain is then a disruptive technology, so it is important to understand the technology behind it and how it will shape the economy of the future.

Thus, to store the emerald characteristics and status, the marketplace will use blockchain and the InterPlanetary File System (IPFS) will be used to store the certification and audit files, a decentralized file storage technology that works as a peer-to-peer protocol that guarantees more trust, security, and speed access.

## GEMERA Token

The Ethereum blockchain supports GEMERA tokens and uses a standard ERC20 smart contract.

According to [www.ethereum.org](http://www.ethereum.org), "Ethereum is a decentralized platform that runs smart contracts: applications that run exactly as programmed without any possibility of

downtime, censorship, fraud, or third-party interference. These apps run on a custom built blockchain, an enormously powerful shared global infrastructure that can move value around and represent the ownership of property."

Ethereum is one of the most reputable, used, established, safe and proven platforms for smart contracts. For these reasons, the GEMERA Project chose this technology to support the GEMERA tokens.

ERC20 based token smart contract and sale smart contract will be developed using unit tests. Functional tests are based on:

- Ethereum Private Blockchain at the development stage.
- Ethereum Rinkeby Testnet (staging) with the help of web front-end developed.

The following security best practices will be used:

- <http://solidity.readthedocs.io/en/latest/security-considerations.html>
- <https://github.com/ConsenSys/smart-contract-best-practices>
- <https://blog.zeppelin.solutions/onward-with-ethereum-smart-contract-security-97a827e47702>

## Smart Contract Features

- **Number of Tokens:** Dynamically mintable. Limited to emerald production.
- **Freeze Tokens Feature:** NO

Tokens cannot be frozen at any given time.

- **Burn Tokens Feature:** YES

The tokens used on the redemption periods are destroyed, thereby reducing the total amount of released tokens and keeping the balance between the tokens offered and the value of the emeralds in the marketplace. This feature can only be called by permitted 50 Ethereum addresses specified by GEMERA.

- **Total Amount of Tokens to Be Sold:** is specified by GEMERA for each TGE.
- **Token Price (Rate):** is specified by GEMERA for each TGE.

- **Bonuses:** GEMERA specifies the amount of the bonus for customers (as a percentage of the purchase) for each TGE.
- **Success terms:** Any token sale would be considered as successful by default. Refunds to customers are not implied.
- **Withdrawal Terms:** Tokens withdrawal will happen in the end of the TGE.
- **End Terms:** TGE automatically ends if any of the following terms is met:
  - The specified duration of TGE is expired.
  - The specified total amounts of tokens during this TGE are sold.

## Marketplace

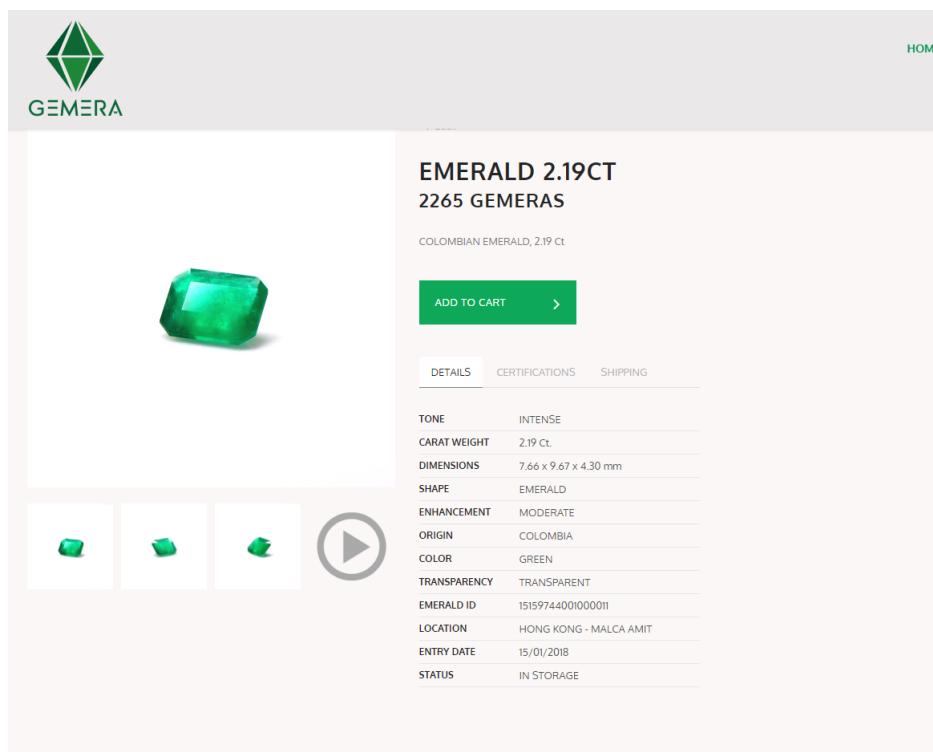
GEMERA's marketplace uses a mixture of traditional technologies, blockchain, and IPFS. The current technology used for each layer is described below:

DESCRIPTION	TECHNOLOGY
Decentralized Storage	InterPlanetary File System (IPFS)
Blockchain Network	Ethereum Main Net
Token Standard	ERC-20
Blockchain Gateway	INFURA
IPFS Gateway	INFURA
Back-End	PHP, JAVA
Web Application Firewall (WAF)	Cloudflare
Firewall	Cloudflare
Load Balancers	Cloudflare
DNS	Cloudflare
Content Delivery Network (CDN)	Cloudflare
Presentation Server	Apache, Nginx
Application Servers	Tomcat, PHP
Database	MySQL
Server Infrastructure Provider	Amazon Web Services
Front - End	HTML5, bootstrap, css3, javascript

Table 5. Marketplace Technology

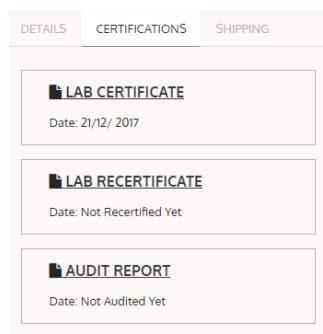
The INFURA API provides secure, reliable, and scalable access to Ethereum and IPFS. This solution eliminates the need to configure and maintain the infrastructure required to access these networks. INFURA is used for important projects in the market like Metamask, Digix, and Oraclize, among others.

All the information in the details tab (see Figure 12), besides the price in GEMERAs of the emeralds, will be stored on the Ethereum network.



**Figure 12. Emerald Details Loaded from the Ethereum Network**

And the following report files, from the Certification tab will be stored on the InterPlanetary File System (IPFS):



**Figure 13. Report Files Loaded from IPFS**

# Emerald Assessment Process

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GEMERA created a model along with gemologists and experts to determine the quality of emeralds and set up a price for them in tokens.

## Emerald Quality Parameters

Evaluating the quality of an emerald is not an easy task since there are different factors to take into consideration; for instance, it is possible to find emeralds of the same carat and cut with a significant difference in price.

That is why an analysis, as well as a clear and transparent methodology, is necessary to determine the quality of the emeralds and therefore establish the price in GEMERA tokens. Thus, to accomplish this, the project designed a model along with a team of specialists in fine Colombian emeralds and followed the parameters of the **Gemological Institute of America (GIA)** for assessing some of the characteristics of these gemstones.

Furthermore, to analyze the quality of an emerald, the GEMERA Project takes into account the color, clarity, enhancement and cut parameters, which are used by gemstone traders to determine the value of emeralds. Their support has been paramount in designing the present model.

The description of each one of these parameters and how the GEMERA Project links them in its model is given below:

### Color

It is considered the most important feature in the price estimation of emeralds, and it is divided into three categories: hue, tone, and saturation, according to the GIA.

The GEMERA Project considers only the tone of the emeralds, classified in intense, medium and light to make the first quality classification. This is a subjective process.

## Clarity

Emeralds usually have certain spots within that affect their clarity and transparency. These spots are known as inclusions. They are divided into three types: crystals, fluids (prints left during the formation of the stone) and fissures. These inclusions are very common and natural, and they are found even in high-quality emeralds, so they are accepted in the jewelry industry; 99% of emeralds have them. Actually, when an emerald is not included, it might mean the stone is not authentic. However, the fewer inclusions an emerald has, it is considered cleaner, so its price rises.

The GEMERA Project considers the **Clarity Type III of the GIA**. The stones analyzed in this category are almost always included and show eye-visible inclusions. They are classified according to the following clarity grades:

- **Eye-Clean:** the emerald appears clean to the unaided eye.
- **Slightly Included:** noticeable inclusions apparent to the unaided eye.
- **Moderately Included:** obvious inclusions very apparent to the unaided eye.
- **Heavily Included:** prominent inclusions that have a negative effect on appearance and durability on the emerald.
- **Severely Included:** prominent inclusions that have a severe effect on appearance, durability, or both.

## Enhancement

Emeralds undergo an enhancement process with essential oils, resins or wax in fissures and cavities to improve the clarity of the stone. Fissures are defined as small fractures within the stone that do not compromise the beauty of emeralds significantly. However, when a stone has a large number of fissures, it is common for it to be treated to reduce their visibility and therefore enhance the beauty and durability of the gem. Cavities, on the other hand, are wide fractures present on the surface of some emeralds, which can affect the durability of the stone significantly. These cavities always have to be treated.

In that order, the price of an emerald changes depending on the amount of enhancement and whether it is applied to fissures or cavities (in cases where the analyzed gemstones have them).

To assess the enhancement level, the GEMERA Project uses the basis of the category scale designed by the Laboratory Manual Harmonisation Committee (LMHC), which gathers the best laboratories in the world and whose purpose is to “create a general philosophy for proper nomenclature and disclosure for laboratories as well to initiate and suggest ‘preferable’ language to be used in the trade,” and the World Jewelry Confederation (CIBJO), whose mission is “to represent the interest of all individuals, organisations and companies earning their livelihoods from jewelry, gemstones and precious metals, and to encourage harmonisation, promote international cooperation in the jewelry industry, and to consider issues which concern the trade worldwide”.

The following is the proposed quantification:

STATUS	NO FISSURE PRESENT IN STONE	NO OR INSIGNIFICANT FILLER IN FISSURES	QUANTIFICATION AND IDENTIFICATION OF FILLER IN FISSURES		
REPORT ALPHANUMERIC			F1-MINOR	F2-MODERATE	F3-SIGNIFICANT
REPORT TEXT	NONE	INSIGNIFICANT INDICATIONS OF CLARITY ENHANCEMENT.	INDICATIONS OF MINOR CLARITY ENHANCEMENT.	INDICATIONS OF MODERATE CLARITY ENHANCEMENT.	INDICATIONS OF SIGNIFICANT CLARITY ENHANCEMENT.

**Table 6. Quantification and Identification of Enhancement**

Any emerald that shows indications of having been modified through the filling of extensive fractures and/or cavities are classified in the following manner:

CONDITION	QUANTIFICATION AND IDENTIFICATION OF FILLER IN FRACTURES/CAVITIES		
REPORT ALPHANUMERIC	C1-MINOR	C2-MODERATE	C3-SIGNIFICANT
REPORT TEXT	MINOR AMOUNT OF RESIN/WAX IN CAVITIES	Moderate amount of resin/wax in cavities	Significant amount of resin/wax in cavities

**Table 7. Emerald Quantification and Identification of Filled Cavities**

As cavities require a major enhancement process, the emeralds with these conditions will receive a reduction in the estimated price, as can be seen in the [Emerald Assessment Process](#).

## Cut

This refers to the various forms the emerald is cut into, based on its original characteristics and the desired piece of jewelry that is to be made. The cut gives the shape to the stone, such as round, princess, cushion, emerald, oval, radiant, asscher, marquise, heart or pear, among others. Emerald, cushion, and pear are the most appreciated shapes in the market, in the mentioned order.

Cabochon is the name of the emeralds with a round and convex form. Taking into account that these stones are polished and not cut into facets, they are less appreciated. The project will reduce the price of the stones of this type.

## Carat Weight

Although the weight of an emerald might be decisive to set up a price, it is not the main factor that determines the quality of the emerald. However, the larger an emerald is, the higher its price per carat is.

Therefore, GEMERA Project uses the carat weight to establish the price of the emeralds, according to the **Tone Range**, along with the **Clarity** and **Enhancement Classification**, as specified in the [Emerald Assessment Process](#).

# Marketing

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Asia-Pacific is the market that shows more interest in Colombian emeralds as an attractive asset for investment, according to GEMERA's research about the emerald industry. So, added to the fact that this region also plays an outstanding role in the crypto community, it becomes an important target audience for GEMERA's marketing strategy.

However, other regions will also be included in the planning, such as Europe, who has been an important actor in the crypto community, and Latin America, who has big growth potential in this matter.

The marketing strategy will be divided in the following manner:

- **Press Releases and Sponsored Articles:** Press releases and sponsored articles will be released in important media outlets about crypto economy and blockchain, social media and the GEMERA community.
- **Premium Listings:** GEMERA Project will be present in the most prestigious listings, such as ICObench, Coinschedule or ICO Alert.
- **Roadshows:** Presence of GEMERA in the major events, summits and congresses of blockchain and crypto economy, as well as in emerald, and gemstones fairs.
- **Influencers:** GEMERA will make alliances with active influencers of different channels and social media, such as YouTube or Twitter.
- **Advertisement:** Presence of GEMERA with ads in different media outlets of the crypto and blockchain community.

## Competitors

GEMERA is a niche player, whose main advantage is its close connection with emerald producers. The Project has detected the following competitors, with the most notorious differentiations:

FEATURES	ONE GRAM	GOLDMINT	DIGIX	CARATS	GEMERA
Backed by a physical asset	✓	✓	✓	✓	✓
Tradeable in exchanges	✓	✓	✓	✓	✓
Redeemable	✓	✓	✓	✓	✓
Very limited supply	✗	✗	✗	✗	✓
Niche player	✗	✗	✗	✗	✓
Direct connection with producers	✗	✗	✗	✗	✓
Sponsors social and environmental projects	✗	✗	✗	✗	✓

**Table 8. GEMERA´s Competitive Matrix**

# Operations

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Beside the daily operation of GEMERA, other processes take place in different periods, related with the management of the emeralds once the TGEs are close, when they are supplied by the producers, such as storage and insurance of the gemstones, or when they are already stored, such as the audit process.

These stages make part of the transparency policy of GEMERA, reason why a rigorous analysis and processes are necessary and have to be informed adequately, including information through press releases to the token holders and the rest of the GEMERA's community.

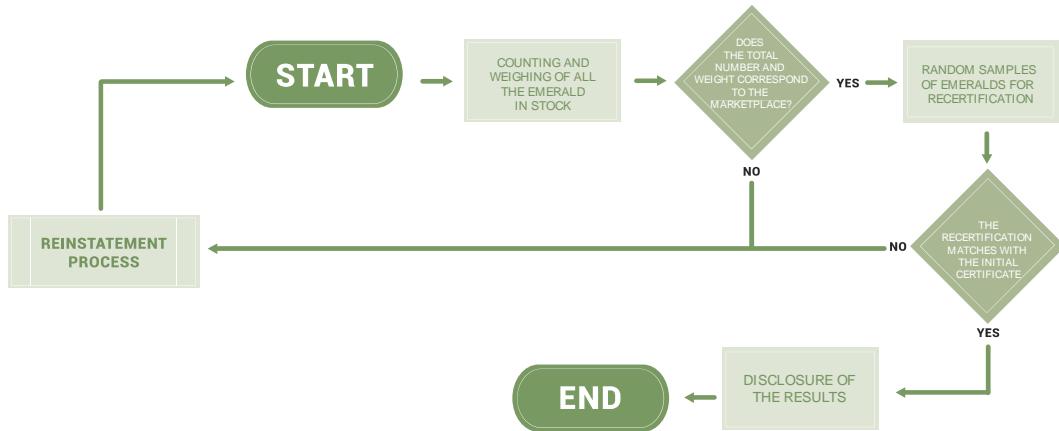
## Storage and Insurance

Before the storage stage, trusted providers insure the emeralds in secure vaults of safe deposit box companies in countries with the security standards for gemstone storage. The GEMERA Project also has a rigorous protocol for introducing new emeralds to the secure vault or withdrawing the ones to be redeemed.

To select a new deposit box company, the Project studies the city and country conditions where it is located, in issues as economic situation, security indices, political stability and strategic location according to GEMERA's target markets, among other factors.

## Audit

To reinforce the transparency of the process, a yearly audit to verify the authenticity and quality of the emeralds is developed by a trusted company, which carries out the following process:

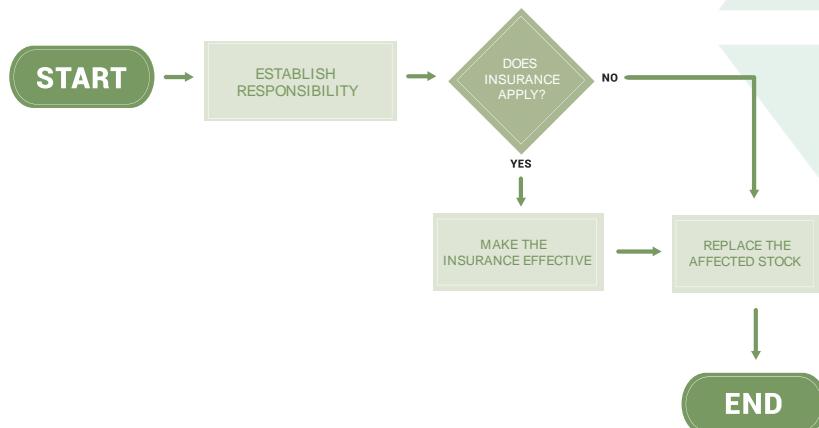


**Figure 14. Audit Process Flow**

## Reinstatement Process

When any of the emeralds audited factors is not successful, a process to reinstate the emeralds initiates. In the case the inventory of the emeralds does not correspond to the emeralds exhibited in the marketplace, it must be established whose responsibility it is. If it is a GEMERA's error, the company would make an internal analysis and respond with its own funds to reinstate the missed stone, which must have the same price. If it is a responsibility of the storage provider, the emerald insurance will be effective.

In the case the recertification does not match with the initial certification, GEMERA must incorporate an emerald with the same price and characteristics and start a new certification and assessment process, as seen in Figure 15.



**Figure 15. Reinforcement Process Flow**

## Legal Aspects

GEMERA operates through a separate and distinct issuer company and operating entity. The first, GEMERA Ltd., is incorporated in the British Virgin Islands (BVI), and the second, Emera Ltd., in Hong Kong.

Therefore, the company is under the rules of law and legislation, including taxes, AML and KYC laws, from the BVI.

4Cs Emeralds Colombia Ltd. exports the emeralds and delivers them to GEMERA Project in Hong Kong with all the legal requirements.

# Environmental and Social Responsibility

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Good environmental practices in the emerald production and social responsibility standards are a transcendental issue in GEMERA's politics. For that reason, as part of its fund's allocation, 3% of the whole revenues will be destined to carry out social and environmental projects in the emerald production and the communities of the emerald mining areas.

This type of initiatives will be executed by the Colombian Emerald Producers Association (Aprecol), that has a major role in the emerald industry influence zone and has been developing activities such as infrastructure enhancement of educational facilities, food subsidy, capacitation for workforce and planning of the waste management in the emeralds productive chain, among many other strategies.

The environmental footprint for emerald mining, in general, is by definition lower than other types of mining. This is because it is a manual process and no polluting substances such as mercury or cyanide are required.

When it comes to the exploitation of emeralds in Colombia specifically, the industry has been progressive in its acceptance of social responsibility. In addition to adhering to international standards for the protection of the environment, Colombian emerald mines have been proactive in protecting workers rights. Excavation tunnels are constructed with specialized machinery to the highest safety standards (for example with steel reinforcement and oxygenation).

Workplace safety training, transportation methods, and personal protection for workers meet or even exceed international standards. Additionally, Colombian emerald mines support local communities through endowments for scholarships and funding for cultural and sports activities. In other words, emerald mining in Colombia is not an isolated activity which consists only of extracting gemstones to satisfy the necessity of the market, but it is also a way to advance and improve the lifestyle of local communities.

# Road Map

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## 2017 Q2

- The conception of the idea
- Research on the industry of Colombian emeralds
- Project feasibility

## 2017 Q3

- Partnership establishment with emerald producers
- Development of the financial structure and business model
- Team setup

## 2017 Q4

- Construction of the Emerald Assessment Process
- Smart contract, webpage, and marketplace development

## 2018 Q1

- White Paper publication
- Certification, assessment, shipping and storage of the first batch of emeralds

## 2018 Q2

- Marketing strategy planning
- Fundraising campaign

## 2018 Q3

- Private Token Generation Event
- Execution of marketing strategy
- Pre-Token Generation Event

## 2018 Q4

- Public Token Generation Event
- Incorporation of new members to GEMERA's team
- Exchange integration

## **2019 Q1**

- Certification, assessment, transport, and storage of emeralds to back all tokens issued at the first Token Generation Event.

## **2019 Q2**

- Integration with new exchanges
- Development of blockchain repository of emeralds information and IPFS certificates and audit reports

## **2019 Q3**

- Audit of the stored emeralds
- Redemption period
- Second Token Generation Event

## **2019 Q4**

- Corporate Social Responsibility Report
- Certification, assessment, transport, and storage of emeralds to back all tokens issued at the Second Token Generation Event.

## **2020 +**

- Yearly Public Token Generation Events until 2029

# FAQ

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## **Why is GEMERA a revolutionary project?**

GEMERA is one step ahead of the new tendency of tokenization of assets, as it is a project that provides a token backed by a scarce and a desired asset, that can also be used for trading and that can be redeemed for the very emeralds they represent. Also, the whole project will transform the distribution chain of emeralds, connecting producers, and final customers, through a crypto-token that can be traded or used as a store of value.

## **Why should an investor consider participating in GEMERA?**

Through the tokenization of Colombian emeralds, GEMERA wants to help the market expand significantly, and increase the demand worldwide, making it a more democratic, transparent and accessible investment. However, as the supply of emeralds is limited, their price is expected to rise.

Also, as part of the philosophy and purpose of GEMERA is to carry out social and environmental initiatives with part of the project funds, investors will have the opportunity to indirectly contribute to the sustainable development of the communities near the gemstone mines.

## **How long does GEMERA take to store the emeralds that back the tokens?**

GEMERA project takes approximately three months after every Token Generation Event (TGE) ends to store the emeralds that back the tokens in a secure vault of a safe deposit box company.

## **Where are the emeralds stored?**

Emeralds will be stored in secure vaults of safe deposit box companies that meet the security standards of storing this type of asset. The first batch of these stones is stored in the Malca-Amit facilities in Hong Kong.

## **What is the marketplace?**

It is a website ([market.gemera.io](http://market.gemera.io)) with the information of each one of the emeralds stored in a secure vault of safe deposit box companies worldwide and ready to be redeemed with GEMERAs. The information of the emeralds includes name, characteristics, price in GEMERAs, and certification, as well as a 360° video, photographs from different angles and traceability decentralized records from the origin of the gemstones.

## **How is the value of the emeralds in GEMERAs determined?**

GEMERA has along with gemologists and experts in fine Colombian emeralds developed an Emerald Assessment Process, a model that considers color, clarity, carat, enhancement, weight and cut to determine the quality of the emeralds and set up the price.

## **Are my GEMERA tokens directly linked to a specific emerald?**

No. Whenever the GEMERA holders want to redeem their tokens for emeralds, they can visit the marketplace ([market.gemera.io](http://market.gemera.io)) to find the ones they want to acquire in accordance to the number of GEMERAs they would like to redeem.

## **How can I be sure the emeralds are stored in a safe deposit box company?**

The GEMERA Project focuses on the transparency of the process throughout its value chain: the origin, the selection of the emeralds, the certification every stone must have, the storage, how the emeralds' quality and its value in GEMERA tokens are determined, and how the holders can redeem them, among other aspects of equal importance.

Therefore, each gemstone is exhibited in GEMERA Project's marketplace ([market.gemera.io](http://market.gemera.io)), along with the name of the safe deposit box company it is stored at. An audit process will take place to guarantee the existence, origin, and characteristics of the emeralds.

# Conclusion

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Blockchain technology is a revolutionary new way for people to make different sorts of transactions, in a democratic, secure, decentralized, and transparent way. This allows GEMERA to accomplish its purpose of connecting emerald producers and investors and to create an easily accessible channel for investing in this asset.

Through this technology, the GEMERA Project wants to offer investors crypto-tokens that can be used as a store of value, along with a guarantee that the tokens are based on real emeralds which can also be purchased by investors with their GEMERA tokens, during the redemption periods.

Therefore, investors will have the chance to invest in a profitable asset and at the same time will hold tokens that will likely increase its value.

The GEMERA Project focuses on the transparency of the process, from the initial selection of the gemstones, through obtaining the certification every stone must have, the storage, how the stone's quality and its price in GEMERA tokens are determined, and finally to how the holders can use them, among other features of equal importance.

The partnership with gemstone producers also creates the circumstances for GEMERA to contribute to carrying out social and environmental activities in the communities where the gemstones are extracted and produced.

Hence, a part of the project funds will be used to execute strategies that help these influence zones to achieve the so-called sustainable development. This means GEMERA holders are also contributing to this praiseworthy cause by supporting this project.