Synergy of Advanced Financial and Industrial Technologies: First Investment Blockchain Option

ZrCoin

Abstract

ZrCoin [1] is the world's first investment-grade blockchain product. It is a derivative that leverages both cutting-edge financial and industrial technologies to manufacture and sell a highly in-demand product, synthetic zirconium dioxide (**Synth. ZrO_2**), which is traded on the global market of refractories.

Synth. ZrO_2 has higher quality and superior physical and chemical properties than its non-synthetic analogue, with greater purity (66% to 75%), and 2.5-3 times greater durability, stability and persistence.

The manufacturing process employs unique and cutting-edge technologies in the use of wastes and the resulting parameters of synthetic zirconium. It is also completely environmentally friendly.

Decentralised direct investments in the Project will be made by purchasing **ZrCoin** options. Their decentralisation should ensure the Project's independence from government-run companies and other large corporations.

The Project is designed to fit the ideology of a national initiative entitled 'Clean Country'.

The **ZrCoin** financial instrument will be launched on the Waves blockchain platform [2].

Contents

Definitions

Underlying asset means an asset on which the financial derivative (option) is based. In our case this is the product, i.e. Synth. ZrO_2, and the derivative **ZrCoin**.

Synthetic zirconium dioxide or Synth. ZrO_2 is a scarce and ultra-durable material with high plasticity, corrosion resistance, strength, durability and stability.

Derivative or derivative financial instrument means a contract, under which the parties are entitled and/or undertake to make certain actions in respect of the underlying asset. The contract represents an agreement between the two parties, whereunder they undertake or are entitled to transfer the underlying asset in the prescribed period at the agreed price.

***ZrCoin** Derivative* means an options contract for the sale of Synth. ZrO_2 as a ZrCoin intangible asset (see below), including an option (put option) on the buy-back of Synth. ZrO_2 in the prescribed period at the agreed price.

Crypto-economy means the social and economic relations of the digital society, which are focused on interaction based on network protocols. Key elements of the crypto-economy include: cryptographic tokens (cryptocurrencies), digital assets, decentralised social security and crowdfunding systems, decentralised management systems, self-executed 'smart' contracts, commercial markets for computing resources, online trust and reputation systems, consensus algorithms, etc.

Option means a form of derivative, i.e. a sale and purchase contract for the underlying asset (**ZrCoin** in our case), whereunder the option purchaser is entitled to purchase the asset at the agreed price within the future period stipulated in the contract.

Initial Coin Offering or ICO means the collection of capital with the help of crypto-investments in the initial stage of the Project, including the use of cryptocurrencies. Hereafter this term is referred to as the ICO.

Clean Country means a flagship national project approved by the Presidential Council on Strategic Development and Priority Projects, to be implemented by the

Government of the Russian Federation in the coming years (2017-2025). The purpose of the Project is to reduce environmental damage from solid domestic waste disposal, minimise environmental risks in respect of accumulated environmental damage, and establish an interactive information system, which will ensure identification and liquidation of unauthorised disposal tips according to information provided by citizens and public organizations. Estimated (total) budget of the Project is RUR 150-200 billion, including RUR 30 billion of extra-budgetary funds [3].

Introduction – Project overview

The ongoing transition to the new technological lifestyle implies and requires investment into the development of its constituent technologies and modernisation of manufacturing, as well as the reorganisation of the centralised economy.

Further development will be characterised by a combination of these two processes – that is, breaking the structures of the technological status quo and building the structures of the new economy. Meanwhile, existing businesses and financial institutions will either have to adapt to the demands of the new technological lifestyle or become obsolete.

These events are typical for both economical and social processes. Against the background of negative sentiment, many investors are shifting towards crypto-investment as an alternative field of wealth growth and preservation. For our purposes, these refer to the projects with fast payback, moderate risk, and the availability of professional experience and support.

The global economy has a substantial demand for zirconium dioxide with greater than 66% purity, owing to its unique physical and chemical properties. These are required for manufacturing processes that require a high degree of durability and stability. This is typical for such major industries as metallurgy, glass and ceramics, and so on.

Zirconium dioxide (lat. Zirconium) has the chemical formula ZrO_2 and is a refractory material. It also features high plasticity and corrosion resistant properties (Claproth, 1789; Berzelius, 1829; van Arkel and de Boer, 1925 and others).

Zirconium is a structural component of alloys used in the construction of atomic reactors. Critical elements of chemical reactors, artificial joints and prostheses are made of Zirconium. It is used to produce high-temperature ceramics (refractory products) and is the refractory material with the best price-quality relationship rating.

Refractories are used in a wide range of different areas of global industry, from metallurgy to the nuclear industry, typically requiring the retention of physico-chemical properties when heated above 1600°C. Zirconium-containing refractories are the most resistant to high-temperature impacts and can sustain heating above 2000°C. The standard base of zirconium-containing refractories is sand with a zirconium dioxide content exceeding 65%. This is extracted from the earth, like any other natural raw material, has a rich content of alkaline-earth metals and requires a great deal of expensive processing before it can be used in refractory materials.

Introduction – Green Manufacture and Economy

The salient feature of the green manufacturing process utilised by the Project's founders is that it does *not* require the extraction of existing or new deposits of zirconium. Instead, the process uses otherwise unmarketable products and wastes.

Manufacturing technologies of the 21st century are developing rapidly and raw materials' quality should develop hand-in-hand with these. However, manufacturers of zirconium-containing raw materials all over the world have not made any significant technological progress for the last 20 years. This has led to hypersaturation of the market with low-quality zirconium dioxide of natural origin, predominantly from South Africa and Australia. This has to pass through many purification stages to reach the standards required by modern high-quality manufacturing.

Synthetic concentrate of zirconium dioxide. The global market of refractories requires ever-higher quality raw materials. For this reason different manufacturers of refractory materials have attempted to improve the quality of their raw materials, but for the most part have failed due to the technological complexity of the process. As a result, only a few companies in the world have been able to establish the manufacture of synthetic refractory materials and only two companies have been successful in the creation of synthetic concentrates of zirconium dioxide for highly-specialised manufacturing processes of their partner companies.

The global market of refractories therefore suffers from a huge deficit in synthetic concentrate of widely-used zirconium dioxide, while there is more than enough 'simple' zirconium dioxide with 65-66% purity on the market. Unlike synthetic zirconium dioxide the demand for zirconium dioxide of natural origins is falling, while the demand for synthetic zirconium concentrates is tenfold higher than available supply.

Unique technology. Our researchers have been searching for ways to extract widely-used synthetic zirconium dioxide for more than three years. After extensive research they have developed a technology that allows the synthesis of zirconium dioxide concentrate, in which zircon and brazilite are entirely stable

and are not susceptible to phase transitions (increasing the chemical stability of the generated products by 2.5-3 times), and with corundum Al_2O_3 present, which increases the concentrate's stability.

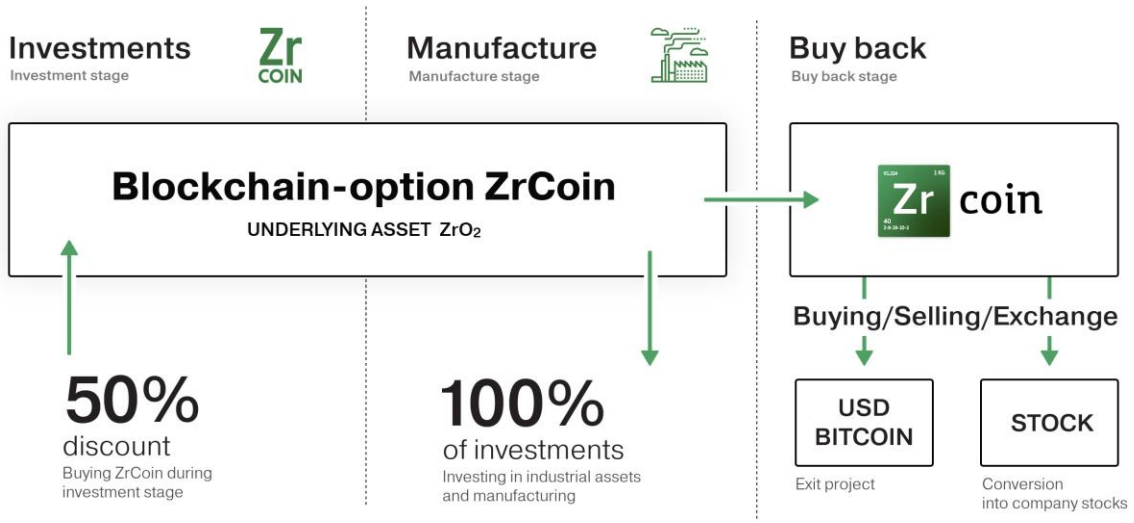
Synthetic concentrate of zirconium dioxide produced using our technology is a unique product, which does not require the addition of any further chemical components and allows for it to be used in refractory materials right away.

More than 10 of the largest enterprises using refractory materials in their manufacturing processes have already appreciated the uniqueness and quality of this synthetic concentrate of zirconium dioxide.

Project Summary
Commercial Aspects of the Project

The Project offers crowdfunded investments in the **ZrCoin** derivative (see definition above), which is implemented as a financial instrument on the Waves [2] blockchain platform and is backed by the industrial commodity (Synth. ZrO_2).

A general overview of the **ZrCoin** Project is shown in Picture 1.



Picture 1. Overview of ZrCoin Project

The three main stages of the Project include ICO, Manufacture and Buy-Back. The timeline of the Project (Picture 1) in stages is as follows:

1. "ICO"
May– June, 2017
Holding an ICO to purchase **ZrCoin** options with the use of USD, BTC and other cryptocurrencies.

During the initial days of the ICO there will be a 'sale' of options at 50% discount from the current (basic) market price of synthetic concentrate of zirconium dioxide. The option price will increase steadily. Note: additional information will be shown in the investor's profile on the Project's website [1].

The investment budget to construct a factory and launch the manufacturing process for Synth. ZrO_2 will use the funds collected during the ICO.

2. "Manufacture"

July – August, 2017: Purchase of real estate in the industrial area of Magnitogorsk, Russia [4].

September, 2017– February, 2018: Construction of facility and production of industrial equipment for the factory.

February, 2018: Installation and testing of industrial equipment, and launch of new manufacturing process.

February, 2018: First sales and shipments of market-ready product (Synth. ZrO_2).

3. "Buy-Back"

March, 2018

Buy-back of **ZrCoin** options will be made eight months after the end of the ICO in an amount equal to not less than $400,000 per month. Investors will be also entitled to exchange ZrCoin for the relevant physical amount of concentrate of synthetic zirconium dioxide (underlying asset) calculated on the basis of 1 ZrCoin = 1 kilogram of the concentrate.

Investors will additionally be able to trade ZrCoin options for the Company's stock, if the Company is eligible for IPO.

Main targets of crowd investment in ZrCoin commodity option:

For investors – to purchase an option with 5.5% yield (estimated average future income per month). The purchased ZrCoin derivative will be backed by the physical commodity, and is 'protected' by the value of this asset of high demand in case of currency fluctuations.

For the community – to form an ecologically sound manufacturing process (so-called 'green manufacture'); to develop the use of a new financial instrument and decentralise financing of manufacturing, which the world has never seen before.

Key performance indicators for construction of the factory for the **ZrCoin** project are shown in Table 1:

Table 1

Performance indicators of ZrCoin Project

Indicator description	**Value**
Investment outlay (RUR thousand)*	223,950.00
Net present value (RUR thousand)	2,029,000.00
Internal rate of return	213%
Investment profitability index	9.75
Payback period (by DDP) from the beginning of construction	12 months
Payback period (by DP) from the beginning of construction	11 months

* See the Project's business plan for more detailed investment outlay [5].

As seen from the Table 1 all performance indicators comply with the approved norms and the methods used.[1]

We aim to make the **ZrCoin** Project financially effective and viable for implementation, according to the selected investment strategy and applied technology. The following may be considered overall advantages of the investment project:

1. Investment attractiveness of **ZrCoin** Project is high, as the information in Table 1 explains.
2. The cornerstone business proposition for investment into the **ZrCoin** Project rests on an innovative manufacturing process for Synth. ZrO_2 refractories, utilising zirconium scrap and channeling profits from investments into the futures token of the same name.
3. High environmental standards of the **ZrCoin** Project and green manufacturing processes, where wastes from glass factories, silicone cotton factories and dumps are used as raw materials. Implementation of the project will allow for significant reduction of accumulated environmental damage and carbon dioxide emissions (CO_2).

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1 The following methodological documents were used to prepare a business plan:

1) Guidelines to assess effectiveness of investment projects (second edition, revised and amended) (approved by the Ministry of Economics, Ministry of Finance and State Committee for Construction, Architectural and Housing Policy of the Russian Federation No. BK-477 dated June 21, 1999) [6].

2) UNIDO methods (United Nations Industrial Development Organization) [7].

Brief description of manufacturing process

Scrap and zirconium-containing wastes from different glass-making enterprises are the raw materials for the factory.

The investment project under review entails the construction of two installations: **First cycle** – RUR 74,000,000 (seventy-four million). Dimensions: length – 24m, width – 18m, height – 18m (hangar-style sandwich structure metal construction) and acceptance area: length – 24m, width – 18m and height – 18m (hangar metal construction). The equipment will be installed according to our custom design. The equipment will be purchased from Ural-Omega, CJSC (ЗАО) (www.uralomega.ru).

Second cycle – RUR 45,500,000 (forty-five million five hundred thousand). Dimensions: length – 48m, width – 24m, height – 18m (hangar-style sandwich structure metal construction). The equipment will be installed according to our custom design. The equipment will be purchased from SIBMASHPOLYMER Trade and Manufacturing Company, LLC (ООО) (www.sibmashpolymer.ru).

We intend to build the factory in the industrial area of Magnitogorsk (Agapovskiy District), Russia [4], where a plot of land with the capacity and communications appropriate for the Project has already been selected. The estimated purchase price of the land plot is RUR 40,000,000 (forty million).

Implementation phases of factory building process

A Cyprus-based holding company will loan funds equal to the amount of investment in **ZrCoin** options to a Russian legal entity, which will consequently implement all construction phases of the factory. The subsequent steps of factory construction process can be divided into the three principal stages described above.

Online broadcasting of the factory construction process with the use of video cameras will be arranged for investors, to maintain openness and transparency at all phases of construction. The cameras will be in place around the construction site and afterwards in the factory area itself.

Pricing Strategy

The main product of the factory is zirconium concentrate (powder) containing synthetic ZrO_2 of not less than 66% purity, plus Hf 2.5-3%, the aggregate of earth metals within the limit of 1.5% and synthetic Slag-Forming Mixture (SFM).

Dry enrichment methods and separation of metals are used in the manufacturing process, which include selective grinding methods, dry magnetic and gravity separation. The factory's products will be suitable for the manufacture of refractory materials in the foundry and chemical industry, and in metallurgy.

The price of the products of the projected factory for production of materials from zirconium-containing wastes will be defined according to the price of its foreign analogues, since such materials made from wastes are not produced in Russia. The essence of the method for price calculation is that the manufacturer defines the current price of the imported commodity minus 20%, which allows for a competitive price. Afterwards, he compares the price obtained by calculation to the price of the closest analogue.

The results of the calculation of minimum price thresholds for the main products of the factory are detailed in Table 2. As mentioned above, the closest foreign-manufactured material was taken as an analogue.

Table 2

Price thresholds for main products

Item No.	Product Description	Price, RUR/ton
1	Zirconium concentrate	165,000
2	SFM	45,000

Zircon Refractories Market

Zircon-class refractories (zircon, brazilite and brazilite-corundum refractories, owing to their high refractoriness and corrosion resistance to metal and mineral melts), refer to materials of high demand in metallurgy and glass manufacturing. Modern glass-manufacturing technologies cannot exist without brazilite-corundum refractories, and the manufacture of these materials has been launched in the last decade in Belgium, Australia, India and China.

Companies such as SEPR Group, Imerys, RHI, Zhongheng, Saint-Gobain and others produce a wide range of zircon refractories for metallurgy and glass manufacturing. 'Borovichskiy Refractories Plant' JSC and 'Dinur' JSC produce a small amount of zircon refractories in Russia.

As there is a lack of domestic zirconium-containing raw materials (zircon and zirconium dioxide), brazilite-corundum refractories for glass manufacturing enterprises are chiefly imported from abroad.

Russia's domestic manufacture covers only 8-10% of the demand in zirconium-containing raw materials. Kovdorskiy GOK (Ore Mining and Processing Plant) is the only enterprise in Russia to produce zirconium raw materials (brazilite powder), with production output of 5-6 tons per year.

The majority of this amount is exported to Norway, Japan and other countries. Zirconium concentrate, which is one of the scarcest mineral raw materials, is not produced in Russia, but is imported from Ukraine and Australia. Russia, ranked 3rd in zirconium reserves, does not have a single industrially developed operation for manufacture of zirconium products. Titanium and zirconium deposits can be developed integrally only with mandatory production of ilmenite (rutile) and zirconium concentrates, as the industry has a confirmed demand for them. As titanium and zirconium constitute strategic natural resources, it is crucial to develop their raw materials base for Russia's self-reliance.

Russia has known resources of titanium and zirconium alluvial deposits, which in case of exploration could meet zirconium raw materials domestic demand for decades. These include Tuganskoye Deposit (Tomsk Region), Lukoyanovskoye Deposit (Nizhniy Novgorod Region), Tarskoye Deposit (Omsk Region), Tsentralonoye Deposit (Tambov Region) and Beshpagirskoye Deposit (Stavropol Territory).

Because of constant rotation of owners, lack of funds and government failures in the implementation of targeted programs, the aforementioned deposits have remain industrially non-developed for decades. Given the high costs, first of all based on comparison of economic indices of development of these deposits, it is necessary to find the most viable one to arrange industrial manufacture of zirconium concentrate and zirconium dioxide. The issue of the creation of

titanium and zirconium raw materials base in Russia has a national character, as it touches upon the economic security of the country as far as provision of zirconium-containing raw materials to various industries is concerned.

Recycling of zirconium-containing industrial wastes with the help of our technology is an alternative to global exploration of deposits in Russia, and application of our technology will help to resolve the problem of the deficit in zirconium-containing raw materials in the most economical, effective and – most importantly – fastest way when compared to the development of explored deposits.

ZrCoin Project Income

Current income related to daily operation of the factory are specified in Table 3.

Table 3
Estimated production incomes from sale of synthetic zirconium concentrate and SFM

Item No.	Index description	Value
1	Production volume of synthetic zirconium concentrate (tons)	400
	Average cost of 1 ton (RUR)	165,000
2	Production volume of SFM (tons)	100
	Average cost of 1 ton (RUR)	46,000
	Total monthly income (RUR)	**70,600,000**

Note: 1 month is taken as a reference period for calculations.

The estimated monthly yield of the factory's operation should be RUR 70.6 million.

Project Summary
Environmental Aspects of the Project

The Project details the application of green technology in the manufacturing process, which will allow for the reduction of direct environmental damage, and reduction of environmental risks from the results of accumulated environmental damage.

The key distinctive feature of the green manufacturing process to be employed is the use of various industrial wastes instead of the raw materials used by current manufacturers of zirconium dioxide. This recycling model can be extended to other locations of heavy industry in Russia and abroad.

The technology is easily scaled and can be deployed in any country within 18 months. Investors will be offered to trade ZrCoin options for the Company's stock upon drawing audited financial statements for the first reporting period and IPO.

The **ZrCoin** project, assuming successful implementation, will have a positive effect on solving issues related to quality of life, the environment and industrial waste recycling.

Project Summary

Project Team

The **ZrCoin** Project team comprises innovative developers, chemists, technologists, expert scientists, managers, and economists with experience in industry and finance.

Project managers have practical experience in the field of R&D, in such organisations as Eastern Institute of Refractories, Institute of Geology and Geochemistry of Ural Branch of Russian Academy of Sciences, Metallurgy Laboratory of Mining Institute (Yekaterinburg), Ural State Mining and Technological Academy, 'MISiS' National University of Science and Technology, and others. They have publications, scientific articles, certificates of authorship and patents in their relevant specialisms, in refractory, metallurgy and chemical industry, geological engineering and materials science.

Members of the team have been engaged as research advisers in various geological survey units of Russia, including the 50th Anniversary of USSR Navorskiy Mountain and Metallurgy Plant, Kachkonarskiy Ore Mining and Processing Plant, Directorate No. 5 of All-Russia Research and Development Institute of Chemical Technology.

Members of the team have business contacts with the largest metallurgy and refractory enterprises in Russia, including the Magnitogorsk Metallurgy Plant, 'Ogneupor' Company, 'Magnesit' Group, SpetsOgneuporComplekt, Pervouralskiy Silica Plant (Dinur), Klyuchevskaya Enrichment Plant, Buruktalskiy Nickel Plant, Lukoil, and Tobolk-Neftekhim.

Our experts have experience of cooperation with industrial, construction, design and manufacturing companies to attract financing from banking, private and foreign organizations, and experience of foreign economic activity in the export of metal-containing materials (for instance, to Canada, England and Germany).

Conclusion

Investors' participation in the Project entails purchase of the **ZrCoin** derivative, which is implemented as a financial instrument on the Waves blockchain platform [2]. **ZrCoin** in turn is backed by an industrial commodity, namely synthetic zirconium dioxide or **Synth. ZrO_2**.

ZrCoin options will be sold at ICO (during stage 1 of the Project in March – April, 2017) and can be bought for USD, bitcoins and other cryptocurrencies.

During the initial days of the sale the option will be offered to potential investors at a 50% discount from the **Zr** asset's cost basis (dynamics are shown in picture 2, above). The option price will increase steadily in the days to follow.

More detailed information on the terms of investment into the **ZrCoin** option will be shown in the profile on the Project's website [1] and will be available upon registration as a potential investor.

The described manufacturing technique for **Synth. ZrO_2** is a striking example of a rational approach to raw materials. Wastes from existing manufacturing processes are given a 'new life', transforming them into high-quality raw materials for recycling. Moreover, before the recycling process these wastes were the products of enriched natural mineral raw materials, which endured chemical and high-temperature impacts in the course of their use. This resulted in the synthesis of minerals, destruction of chemical bonds and formation of new ones. After recycling with the use of this new technology, the zirconium concentrate is no longer a natural material but is transformed into the synthetic product.

This has an overwhelming advantage over its natural analogue. Refractories and anti-adhesion coatings made from synthetic zirconium concentrate have longer service life periods. Also noteworthy are the words of D.I. Mendeleev, spoken more than a hundred years ago, that one of the ways to make manufacturing better is to make it wasteless!

That is why the described technology exemplifies the harmony of industry and nature. Few companies on the planet can boast that industrial development causes no harm to the environment. Besides, the technologies of industrial and comprehensive recycling of wastes allow for the resolution of anthropogenic

harm to the planet. It does not matter where manufacturing is located, whether in Russia or Germany, the Czech Republic or USA. The technology will work in any country and on any continent. The reason for this is that the final products, so-called ‘manufacturing tails’ (thanks to our technology the word ‘wastes’ are no longer apt), become materials of high demand both for the refractory industry and for tertiary metallurgy: the metallurgy of the future!

We have set the ball rolling. Our Project is moving steadily towards generating a profit whilst concurrently solving a number of environmental issues by the comprehensive recycling of industrial products. The described technology is not the only one invented by our team. Holding two ‘golden keys’ in our hands (this is how we describe our approach), we can open doors to the future of a green planet, economy and industry, with solutions to many of the current issues hidden behind those doors.

We are enthusiastic and optimistic about our slogan: ‘We will turn your waste into money’.

References

[1] **ZrCoin.io** (Project's website, web presentation)

[2] https://wavesplatform.com/

[3] http://government.ru/dep_news/25785/

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[5] http://www.consultant.ru/document/cons_doc_LAW_28224/

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