



MINISTRY OF ECONOMIC DEVELOPMENT AND INVESTMENTS

2017

ARMENIA

INVESTMENT PROJECTS



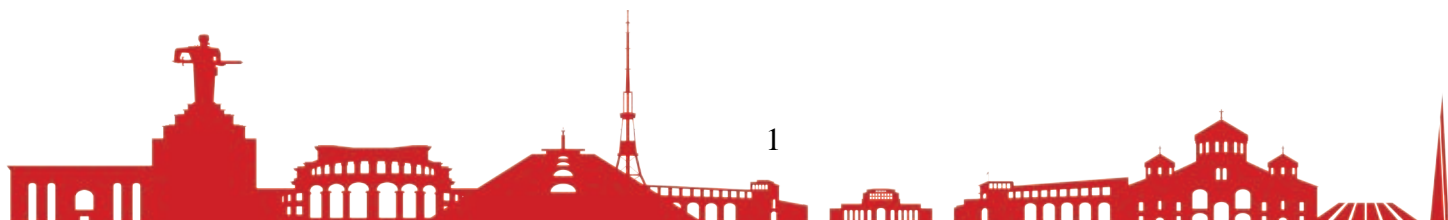


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INDUSTRY

ESTABLISHMENT OF FREE ECONOMIC ZONE IN SYUNIK REGION INVESTMENT PROJECT



BRIEF DESCRIPTION OF THE PROJECT

To foster regional economic cooperation and for further development of the national economy, growth of the export volumes the Armenian Government has decided to initiate the establishment of Free Economic Zone in the marz of Syunik which is situated at the border with Iran.

KEY INDICATORS

- ✓ **Location:** Marz of Syunik, Republic of Armenia
- ✓ **Total area of the FEZ:** 10-15 hectares on available plot land of 55 hectares
- ✓ **Total cost of the project:** around 28 mln. USD (CAPEX)
- ✓ **Revenue (10 years):** around 52 mln. USD
- ✓ **IRR of the project:** 12
- ✓ **Permanent staff of the FEZ organizer:** 60-70
- ✓ **Implementation type:** PPP

PARTIES INVOLVED

- ✓ Government of the Republic of Armenia;
- ✓ Organizer of the FEZ (company initiating, establishing and managing the FEZ)
- ✓ Residents of the FEZ (companies operating in the FEZ)





ESTIMATIONS

- ✓ **Attracted residents during the project period:** 100-120 companies
- ✓ **Average annual exports from the FEZ:** 80-100 mln. USD
- ✓ **Target export destinations:** Iran, Eurasian Economic Union, Middle East (UAE, Kuwait, Qatar, Oman, Iraq, Lebanon), Turkmenistan, etc.
- ✓ **Stock FDI:** 350-400 mln. USD
- ✓ **New workplaces during project lifecycle:** 2500+

STRENGTHS OF THE PROJECT

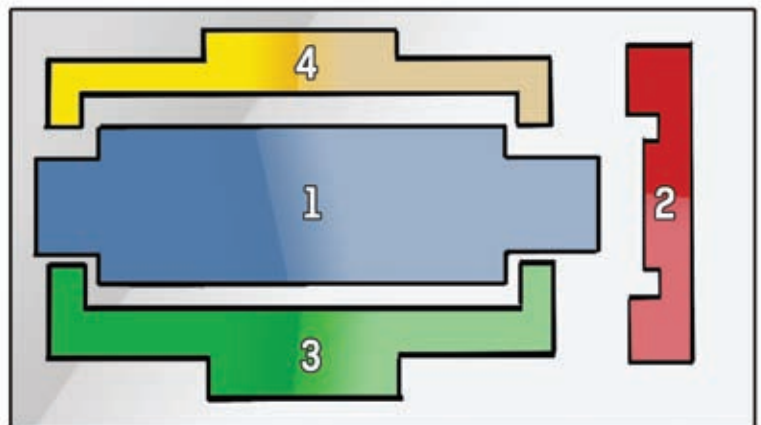
- **Government strong commitment, PPP implementation possibility**
Government of the Republic of Armenia has initiated the project and is fully committed to the implementation of the project. The Government is ready to provide its full assistance to the operator of FEZ by facilitating all processes and granting special preferences.
- **Location / near the Iranian border**
- **Fast payback of the project/ relatively high IRR**
- **Cooperation opportunities with Iranian “Aras” Free Economic Zone / Distance 2km.**
Negotiations has been started with “Aras” FEZ on possible cooperation
- **Possible signing of Free Trade Agreement (temporary) of Eurasian Economic Union (EAEU) with Iran**
- **Strong Armenian Diaspora**
One of the important factors of establishing FEZ is Armenian Diaspora in Iran, Russian Federation, Georgia and Middle East. which plays quite an influential and active role in economic life in that countries. Diaspora can highly contribute to the promotion of this FEZ among local companies and help to attract them to expand and establish activities in the FEZ.
- **Armenia with its favorable investment and businesses climate can serve as a gate to new markets.**
- **North South Road Corridor** which will connect the southern border of the country with its northern point by means of 556 km-long Meghri- Yerevan - Bavra highway. The highway will be located nearby the FEZ.
- **Diverse trade regimes of Armenia:** FTA with EAEU, CIS, GSP and GSP+ regimes with EU, Canada, Switzerland, Japan.

FREE ECONOMIC ZONE

MAIN AREA MASTERPLAN & MAIN INFRASTRUCTURE

TOTAL AREA: around 10-15 hectares

(1) **Industrial / Production**



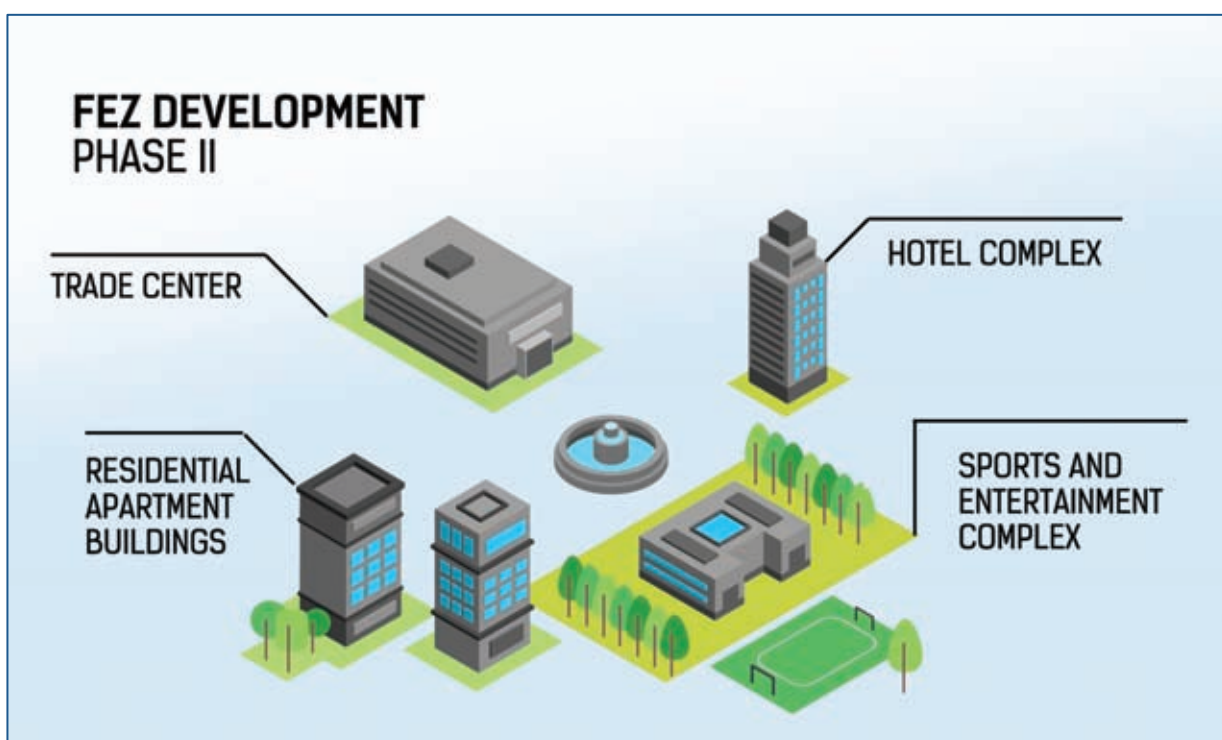


area - 40.000 sq.m.

- (2) **Office / Services area - 10.000 sq.m.**
- (3) **Warehouses / Logistics - 15.000 sq.m.**
- (4) **Business / EXPO center - 10.000 sq.m.**
- (5) **Parking area – 2000 sq.m.**

EXPANSION OF THE PROJECT PHASE II

The vision of the Free Economic Zone is to create modern, international, business friendly ecosystem with special comfortable living and working conditions. In this regard several infrastructure developments are proposed as the second phase of the project implementation. Particularly:



- **Residential area:** the living area will be constructed for permanent residence of employees of resident companies.
- **Sports and Entertainment Complex:** sports complex will be a place of entertainment and sports in the FEZ, tourist venue for various sporting events.
- **Hotel complex:** construction of 3-star hotel complex with 50 rooms capacity for the temporary guests of the free economic zone. Several restaurants and cafes will be situated for the guests of the complex.
- **Trade Center:** grocery, stationery, products of personal use, clothes and other stores will be functioning within the free economic zone.



INDUSTRY

COPPER SMELTING PLANT CONSTRUCTION PROJECT



Mining and metallurgy sectors have traditionally been the leading branches of the industry in Armenia. Copper is being produced in Armenia since 1777, when Alaverdi (Manes) copper smelter plant was founded.



In the 1980s, Alaverdi copper smelter plant has been functioning as a major metallurgical plant, the production capacity of which per year was at about 40-42 thousand tons of refined copper, 30-40 thousand tons of copperas and 200-220 thousand tons of sulfuric acid from the gases formed.

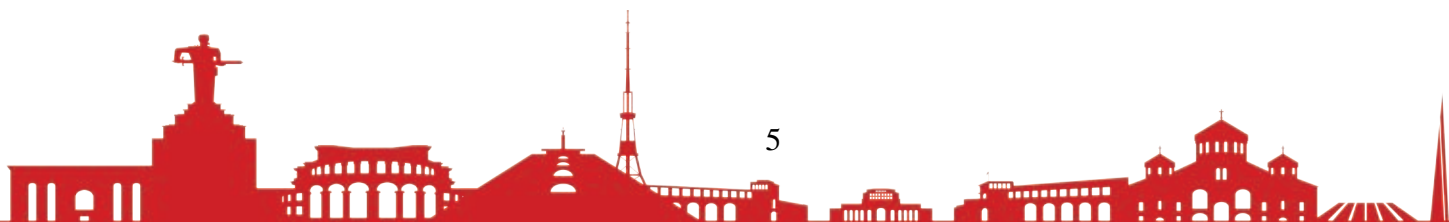
Before the collapse of the Soviet Union, Armenia was the third copper producing country among union republics leaving ahead only Russia and Kazakhstan. Currently, Alaverdi metallurgical plant was reorganized as the "Armenian Copper Program" Company (Armenian cooper program), which annually produces around 10 thousand tons of copper. The

company mainly uses the concentrates produced by "Base metals", "Teghut" and "Zangezur Copper and Molybdenum Combine".

Further development of the sector requires the use of new technologies addressed to the creation of higher added value through the expansion of product procession.

It is expected that mining, especially production of copper will have a significant role in the development of economy of Armenia.

The operation of metallurgical enterprise engaged in copper production will have a locomotive role in the development of the economy and will promote the development of other sectors by creating new workplaces, particularly expansion of copper processing up to electro-technical copper, and later the organization of wire production will promote the development of electrical complex of Republic of Armenia.





CURRENT SITUATION AND POTENTIAL

The significant part of copper reserves are concentrated in copper-molybdenum mines (Kajaran, Agarak and Teghut), as well as in copper-pyrite mines (Kapan, Alaverdi, Shamlugh) and gold-polymetallic (Shahumyan, Armanis) mines.



There are six companies in Armenia engaged in copper mining and in the production of concentrate, the largest companies among them are "Teghut" and "Zangezur Copper and Molybdenum Combine" companies.

In 2014, the production of blister copper was about 10 thousand tons and the production of copper concentrate amounted to about 190 thousand tons.

"Teghut" mine was put into operation in 2015, which annually produces around 100 tons of copper concentrate.

During the period of January-October in 2015, the production of copper concentrate was more than 250 thousand tons.

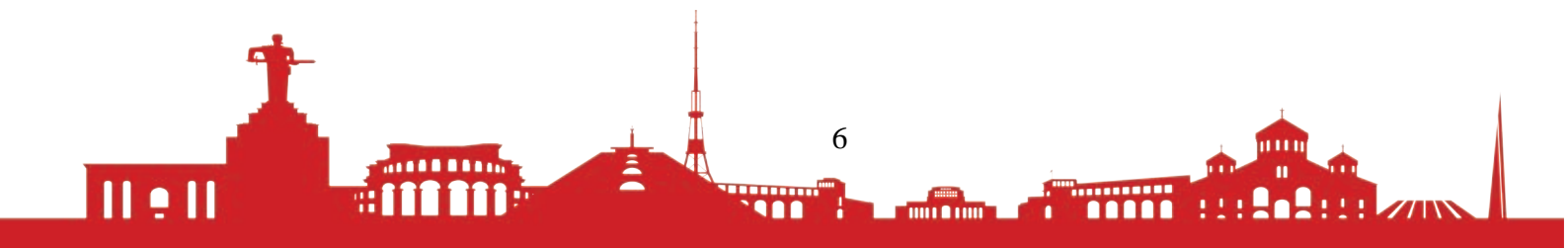
Currently there are 38 mines of metal minerals with approved reserves registered in the state balance of mineral resources reserves, which include 8 copper-molybdenum, 3 copper, 20 gold and gold-polymetallic and 2 multi-metal mines.

Explored and confirmed reserves of copper deposits are assessed at about 14 million tonnes, which enables mining companies to operate for 100-120 years.

The feasibility and investment assessment of constructing copper smelting plant

The feasibility of building a copper smelting plant is conditioned by the following factors:

- The produced concentrate contains 22-27% copper, the actual quantity of produced concentrate in 2015 will enable to produce about 65 thousand tons of refined copper and in case of implementation of complete projects of exploiting mines these quantity will increase significantly, as a result it will allow to get 75-80 thousand tons of refined copper from the copper. In conditions of the above mentioned amounts the operation of a copper smelter becomes more expedient.
- Considering that the content of copper in the concentrate produced by mining complexes is an average of 25%, therefore in case of exporting the concentrate the companies have to pay for the shipment of the remaining 75% of the valueless goods. The possibility of making savings of these costs is another essential factor for the establishment of a new copper smelter in Armenia.





According to preliminary assessments the necessary investment is estimated about 400-450 million USD.

Taking into consideration that it is planned to build a plant with capacity of producing 80 thousand tons per year and based on the point that 1 ton copper costs 4500 USD conventionally, the company's financial performance will be as follows.

Production volume, thousand tons	Unit price USD	Annual revenue, million USD	Profitability, %	Income, million USD	Payback period, year
80	4500	360	8	28.8	13.8

The fact that concentrate also contain other metals (gold, silver, zinc, etc.) and that during the manufacturing process sulfuric acid is formed is not considered in the revenue calculations, while this will significantly increase the revenue. During the manufacturing of concentrates produced in Armenia the above-mentioned factors will increase the revenue for about 20-25%.

Meanwhile, the profitability level is considered taking into account the lowest parameter.

The strengths of the project:

- The availability of copper mines and the possibility of processing, enrichment and production of concentrate,
- Creation of higher value added,
- Reduction in transportation costs,
- Multiplicative impact on other sectors.

The weaknesses of the projects:

- The emergence of possible environmental risks,
- Sulfuric acid storage and distribution problems.

The models and technologies for building the copper smelter.

Two models are suggested for operating the copper smelter:

- Upgrading and expanding the existing capacity, in particular on the basis of Alaverdi copper smelter,
- Construction of a new plant.

The following technological methods may be used for the construction of the copper smelter:

- Pirometallurgical method
- Hydrometallurgical method.



INDUSTRY

SAPPHIRE CRYSTALS PRODUCTION INVESTMENT PROJECT



The purpose of this project is to grow sapphire crystals and to cut plates from them for a wide range of possible usage. Boules will be made weighing 32kg, 65kg and 82 kg, cores sapphire and sapphire plates. Manufacturing focus will depend on the market conjuncture.

The overall cost of the project amounts to 44 mln. USD for 5 years.

Necessary investments about 20 mln. USD, depending on global market pricing. Investments will be returned in the beginning of 5-6 years.

Company named "Pure" will be arranged for this specific business project.



The proposal comes from a company initiative group "Valef". The company "Valef" was founded in 1998, but it was organized entirely based on the staff of "Laserayin Tekhnika" Scientific Production Association (SPA). For over 30 years, this group of employees, later on the company itself was working with Armenian manufacturers of sapphire crystals, in particular - "Sapphire" APE, "Lazerain Engineering" NPA, Kirovakan Chemical Plant, Institute for Physical Research of NAS RA. The main activity of "Valef" is associated with the supply and study of the source material for crystal growth, quality control of tungsten and molybdenum products for the

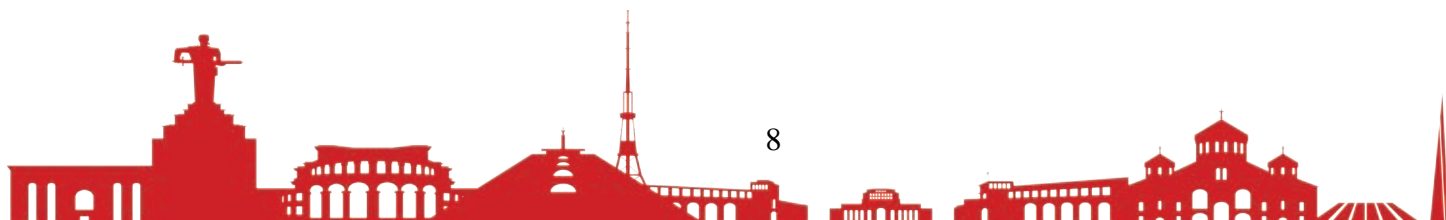
thermal units for crystal growth apparatus, supply of equipment for the treatment of crystals (cutting, grinding, polishing), as well as the design of diamond instrument in cooperation with "Almaz". In its type, the company "Valef" was the only one in the field to supply and quality research for the entire metal base growth in Armenia.

The main structural units of the newly formed company will be:

- Growth site (production sapphire)
- The research site, quality control site
- The area of processing and manufacturing of semi-finished and finished products

By the end of the year 5 the Company will have 70-80 employees.

Main manufacturing implementation staff is located in Armenia. These specialists during the past 20-30 years have been involved in growth, research, processing of sapphires as well as other materials.





Main activities.

The company is planning the following two activities for the first five years:

- Production and distribution of synthetic sapphire for high-tech industries
- Production of various sapphire elements and sales

Application of the production



2" plates, are used for LED production



4" plated, are used for production of highlight LED, automotive head and usual lighting lamps



6" plates, are used for production high-brightness LED and SoS (Silicon on Sapphire)

Production plan

During the first year there will be purchased 15 machines, where five machines with 32 kg capacity, 10 machines with 65kg capacity. 3 months will be required for the arrangement of the production and in 3 months for launching-commissioning and trial crystallization. Thus starting from 7-th month 5 machines will be operating with 32kg and 10 machines with 65 kg. Considering the 80% equipment load, the resulting sapphire production in 6 months will amount 1152kg and 3456kg. In total 4608kg.



During the second year, these 15 machines will produce 9216kg and additional new 15 machines will be purchased – 5 for 32kg and 10 for 65kg. After three months of preparations with the same assumptions (80% and 80%) these equipment will produce 1684kg and 6480kg accordingly.



During the third year, the purchased 30 machines will produce 19584kg of sapphire. The 20 new machines (15 machines for 65kg and 5 machines for 82kg) on the same conditions will produce 10080kg sapphire overall at the end of the third year all the machines together will produce 29664kg.

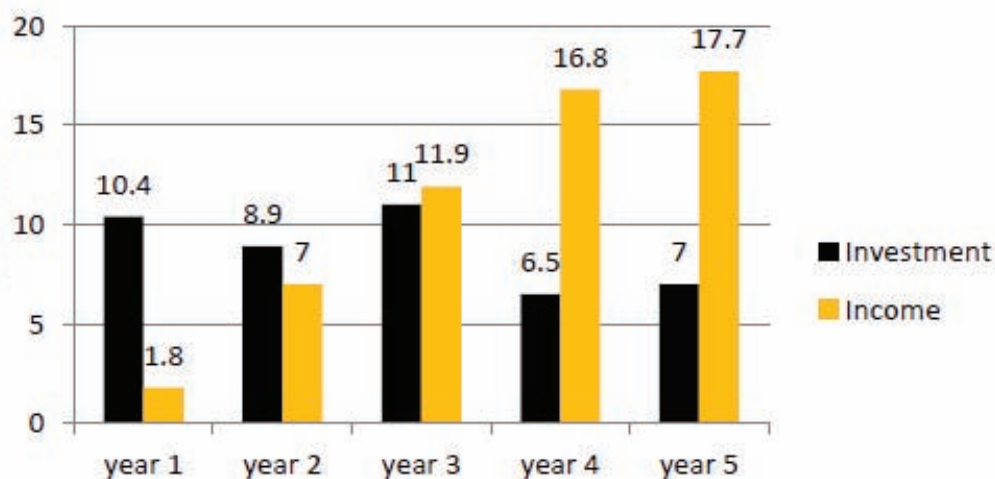
On the fourth year, the 32kg machines will be replaced with 82kg. The latter together with the remaining 65kg machines will produce during the fourth year there will be produced 35136kg. The new 10 devices (82kg) in similar conditions will produces 6912kg. The total production in the fourth year will amount to 42048kg of sapphires.

The assumed area for organizing the production consists of two halls each having an area of 576 square meters, and the required number of rooms each 30-40 sq. m. Production facilities are ABP grid, feeding from three different directions of power supply output of 4.6 MW. The water supply system is equipped with circulating water equipment a cooling (cooling tower and a pool - 500 m3).

Planned volumes and sales

Year	Quantity	Total
1 year	4608	1 843 200
2 year	17 380	6 952 000
3 year	29 664	11 865 600
4 year	42 048	16 819 200
5 year	44 352	17 740 800
Total	138 052	55 220 800

Investment / Income dynamics





INDUSTRY

MAGNESIUM PRODUCTION WITH NEW TECHNOLOGY INVESTMENT PROJECTS



Project cost

6 million USD to launch 1000 tons production

Payback period

5 years after the implementation

Equity investments

Depending on the conditions of project financing ECOATOM LLC may offer 40-70% of shares to potential investor

OVERVIEW

Magnesium production plays significant role in strategic industries, such as energy, mining and metallurgy.

The existing production technologies are highly ineffective due to high level of energy consumption. This fact is considered as a main reason for prevention of application of magnesium in a wider scale.

Development of new and effective technologies is vital for the above mentioned industries, especially at current recessionary economic climate.

ECOATOM LLC has developed a new hydrometallurgical technology for production of magnesium.

Furthermore, the Company has developed small size production units to demonstrate the application of the new technology.

It should be indicated that the new technology is financially sound both for the purpose of direct and indirect investments.

It is proposed to set up a plant for production of magnesium with operational capacity of 1000 tons per year. This annual capacity will be enhanced in the future to 5000 tons per year. With this vision, Armenia may become a regional center for magnesium supply.



COMPANY DESCRIPTION

ECOATOM LLC founded in 1992, is a leading company in the field of research and



development of industrial technologies. The Company has developed numerous industrial technologies with environmentally safe applications. Those are in the fields of renewable energy, purification, mining and metallurgy. In particular, the Company has worked out new models of electrodialysers which have been successfully installed in various industrial areas. The new electrodialysers are designed to solve specific industrial problems such as separation of certain elements and isotopes from solutions, production of hydrogen, and production of electricity through electrochemical generators. It is worthwhile to note that the Company has made considerable industrial input to address the abovementioned issues and has developed prototypes and testing models.

The Company's management comprises of highly reputable scientists and engineers. All of them are recognized for their valuable contributions to the development of science and research as well as for their innovations in technology and commerce.

MARKET

First of all, the domestic Armenian market is an important consumer. At present, Armenia plays a leading role in the region in terms of mining and extraction of certain metals. However, the production process of these metals is not complete. This issue can be resolved by the establishment of magnesium production since magnesium is considered as one of the strongest restorers of metals.

Additionally, magnesium has a strategic importance due to its application in the defence industry where it is used in production of various explosives.

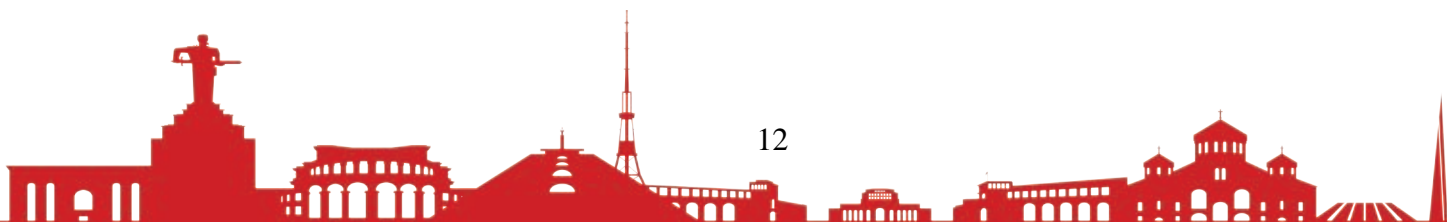


Most of the production is planned to be exported, preliminary purchase contracts are in place.

FINANCIAL ANALYSIS

Financial analysis and cost calculations have been carried out. It has been estimated that investment of USD 6 million would be required for the project. It should be noted that investment of USD 100 mln, is normally required for the establishment of magnesium producing plant in accordance with traditional production technologies. It should be emphasized that the new technology excludes the use of some very expensive components historically present in traditional technologies. Thus, it reduces the level of investment needed significantly. Moreover, production process is quite cost effective, which explains the low level of cost of production of the metallic magnesium produced.

- **World market volume - 2,000,000,000 USD**
- **Estimated annual market growth ca. - 15-20%**
- **Players: China, USA, Kazakhstan, Russia**
- **Production cost - 2000 USD/ton**





Cost of production of magnesium in China is known worldwide as the cheapest. It is around USD 1800 per ton. As a result, China offers the lowest market price, which is USD 2600 per ton, whereas in Russia and Europe the magnesium price is around USD 3100 per tones.

Cost price in case of traditional way of magnesium production using electrolysis - 1800 - 2900 USD / ton

Cost price in case of using Ecoatom new technology of magnesium production - 550 USD / ton

Competitive advantages

- **Current available market offers - 3 times lower cost price**
- **Natural Resources - Armenia is rich with the raw material for magnesium production**

Project Implementation Timeframe

Year 1: The Company will be provided with USD 1 mln, which will be utilized for the purpose of establishment of the first module with 300 tons per annum production capacity. For the first two months, the Company will get USD 0.4 mln in order to start the preparatory work and build up a required technical structures and resources. For the rest of the Year 1, the Company will need USD 60,000 on a monthly basis to pay salaries and to meet its tax obligations.

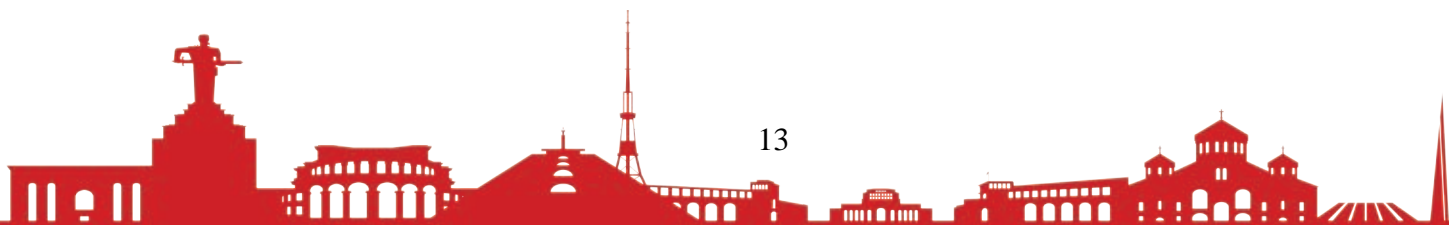
Year 2: To fund the costs of the plant construction and mines (including licensing and exploration), the Company will receive USD 1.5 mln. Meanwhile, the production of the first module will be launched with 25 tons per month production capacity. It is estimated that this will bring a profit of USD 75,000 on a monthly basis.

Year 3: The Company will receive USD 2.5 mln in order to fund the preparatory work of the exploitation of the mine.

Year 4: The plant will start its operation with full capacity i.e. at 1000 tons per annum.

The loan tenor is to be 60 months with 36 month grace period. The loan will be collateralised by the output of production. Additionally, it will be guaranteed by the presence of customers in Armenia and Russia, who would buy the entire annual output (agreements exist with selling price of USD 3000 per ton).

It should be noted that in three years period of time, the Company will make a profit of USD 3 mln, which will be directed to the repayment of the capital and accrued interest of the loan.





INDUSTRY

GOLD REFINING PLANT CONSTRUCTION INVESTMENT PROJECT



Armenia is rich with various minerals and fossils. There are more than 500 sites in Armenia that are rich with more than 60 types of minerals (copper, molybdenum, iron, zinc, nepheline syenite mine, lead, mercury, arsenic, scandium, vanadium, etc.).

Armenia is also rich with gold, silver and platinum mines. The largest operating mines are Zod and Meghradzor. Gold reserves amount in gold-sulphide mines reaches 247 tons, meanwhile the same amount of anticipated resources mines reaches 351 tons.

The process of gold refining can be carried out by chemical, electrochemical so-called Miller method.

The chemical method is used applying to iron sulphate, nitric and hydrochloric acid. It can also be used in case of small quantity refinement and the



electrochemical method is expedient to be applied in the case of large-scale and continuous processes, when refined material has no less than 900 fineness with low silver content.

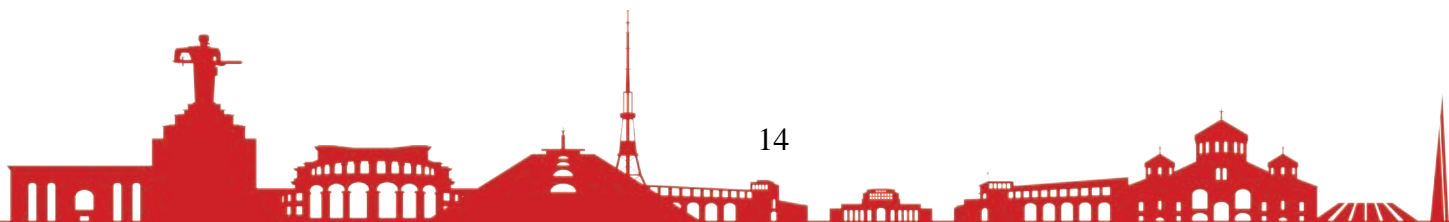
The refinement using Miller method is carried out by means of contacting gold containing material with chlorine gas referring to more than 700 fineness high-purity gold and high content of silver.

The selection of the listed gold refining technologies can be done based on the features of "Dore" alloy that is used as a raw material for refinement.

Currently there are some gold refining capacities, that can refine no more than 4 tons of gold by chemical method.

They are the following:

- **"Assat" LLC**, located in the Masis town, Ararat region. The enterprise has an annual refining capacity of 1.5-2 tons of gold, as well as mining concentration plant.
- **"Gold Factor" LLC**, based in Yerevan. The company has a license issued by the Ministry of Finance of Republic of Armenia for refining precious metals and





producing bank gold and standard bullions, manufacturing bank gold and license
The company's capacity allows to refine 2 tons of gold per year.

- **Purpose**

The close of the value chain and the acquisition of higher value-added through the expansion of gold processing extracted in Armenia (as a result of refining "Dore" type of gold alloy), which would enable to produce standard bank gold bullions of 999.9 fineness.

- **Obstacles**

- Lack of strong gold refining plant,
- Necessity of the international certification for standard bank gold bullions

Project attractiveness (relevance)

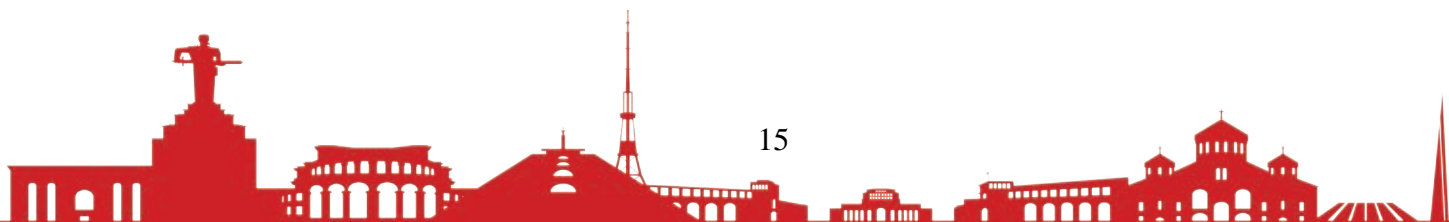
Currently there are 8 gold mines operating in Armenia (14 mines are still under exploration). The largest of them is Sotk mine, which is now operated by "GeoProMining Gold" company and produces around 4.2 tons gold in "Dore" type alloy (in 2015 it will reach 4.7 tons).

As a result of an investment project implementation by "Lydian International" company, 10-12 tons of gold alloys will be produced in Armenia in 2017, which makes expedient the construction of the gold affinage plant in Armenia.

In 2013 Armenia imported 3.8 tons of gold, which was mainly used in the production of jewelry or for sale as bank bullions.



According to the Strategy of Export-Led Industrial Policy approved by the Government of Armenia, jewelry was identified as a priority sector (from the perspective of export potential), in terms of which, in 2013 jewelry, watchmaking and diamond-cutting strategy and a three-year appropriate action plan were approved. It supposes an implementation of such actions and support toolkit by the state that will affect on significant increase of production volumes resulting increase of demand for gold bullions.





The free economic zone operating in Armenia will also contribute to significant growth in gold consumption in the country. Taking into account a long-term increase of demand for gold and considering annual 6-7 tons of gold as an internal demand in the domestic market, the refining (affinage) of gold alloys in Armenia can be used in a production of bank gold bullions, simultaneously taking part in international trade. Examining sectoral developments in the external market, it can be stated that during 2015-2020 continuous growth in consumption is expected in Asian developing countries (India, China, Middle East) up about 30% per year. In West, the jewelry



products consumption growth is expected to be relatively small, about 5% per year on the average.

Taking into account the forecasted growth of gold demand (both internal and external), as well as the application of new capacities in gold mining in Armenia, it is expedient to carry out gold refining (affinage) process in Armenia.

Affinage is an extraction process of precious metals from other compounds. Affinage can be defined not only as an extraction process, but also as a certification of products and companies carrying out affinage. Gold mining companies not only produce refined gold, but also assure (certify) the weight and purity of the bullions produced by them.

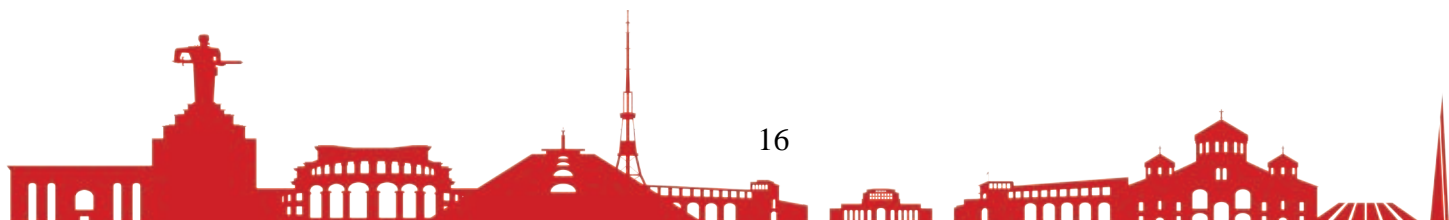
To be recognized as an object of the international trade, bank gold bullions produced in Armenia will need to be certified ("London Good Delivery") by the international certification organization. For this purpose, it is necessary to cooperate with seven member investment banks of London clearing company (London Precious Metals Clearing Limited, LPMCL), which are the following: HSBC, JP Morgan, UBS, Barclays, Deutsche Bank and ScotiaMocatta.

- ***Scenarios and development trends***

Two scenarios of refinement are observed:

Scenario 1. Construction of a powerful plant on the basis of the existing gold refining factory in Armenia ("Assat" LLC, Masis city) through equipping it.

Scenario 2. Selection of the plant construction location and





construction of a new gold affinage plant.

- **Market potential for company's products**

- Jewelry sector in Armenia can become a domestic market for consumption (about 5-7 tons per year),
- Consumption can be also done in a form of standard bank bullions via London Stock Exchange of precious metals,
- State Treasury.

- **Financial assessment of investments**

According to preliminary estimates, the construction of the gold affinage plant with up to 20 tons capacity will require investments up to 10-12 million USD.

International practice shows that affinage service cost is calculated at a rate of up to 1% of the value of the refined gold. That means, in case of refining 15 tons of gold, the annual turnover of the company will reach about 6.5 million USD and if done via the London Stock Exchange of precious metals, the company's profit will increase significantly.

- **Potential stakeholders**

The entities mentioned below are eligible to participate in the funding for the gold affinage plant construction:

- Interested gold mining companies
- Potential consumers (jewelry sector companies)
- Banks
- Sale of stock





INDUSTRY

ACID-RESISTANT, THERMAL INSULATION MATERIALS,
SOLID GLASS PRODUCTION INVESTMENT PROJECTS



PRODUCTION OF ACID-RESISTANT MATERIALS USING BASALT

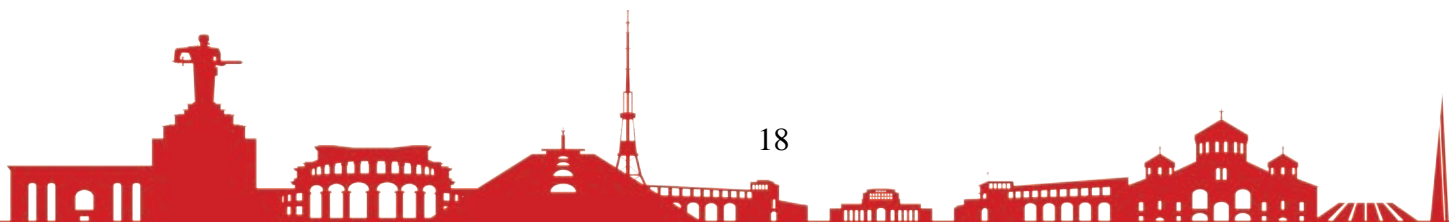
“Karakert stone factory” is equipped with technological melting machinery (open hearth furnaces), which allows to produce basalt acid-resistant materials that are applicable in mining and transport sectors, particularly in the sphere of transportation or storage of chemical aggressive substances, producing basalt acid-resistant pipes and tiles.

Project's expediency and core directions of the required investments.

Project's implementation expediency is determined by the following factors:

- Armenia is rich with basalt having one of the largest basalt reserves in the world (350 mln cubic meters) which are of high quality.
- Currently there is a big demand of basalt acid-resistant materials worldwide as their exploitation period is ten times longer than period of the same products made of metal.

According to preliminary assessments the necessary investment for project implementation is estimated around 5 mln USD.





Investments will be directed to:

- Repair, modernization and replenishment of the existing equipment for the production of acid-resistant materials.
- Replenishment of working capital.

Application of materials.

Acid-resistant materials produced by basalt melting are applicable in the construction of sewage pipelines, underground tunnel niches and tailing pipelines.

Expected outcomes

Annual production of up to 40 thousand tones of basalt acid-resistant materials.

PRODUCTION OF THERMAL INSULATION MATERIALS USING PERLITE PROCESSING

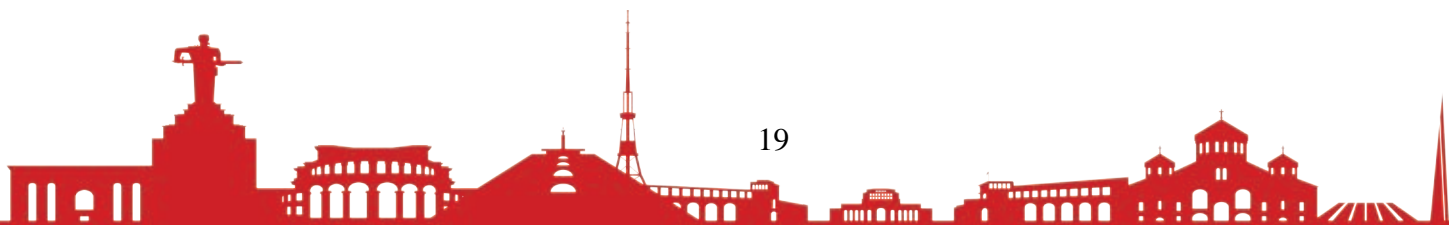
“Karakert stone factory” is equipped with technological machinery, which gives opportunity to process perlite and obtain thermal insulated foamed glass, which is widely used in construction of thermal insulation buildings and in the field of energy-efficiency.

Expediency of the program and the main directions of required investments



The expediency of programs implementation is based on the following.

- One of the largest world’s reserves of perlite (3 billion cubic meters) is located in





Armenia. Perlite in Armenia has high qualitative characteristics.

- Nowadays energy efficient products are in great demand. The whole export potential can be utilized by exporting to CIS and other countries of the region.

According to preliminary assessments the necessary investment for project implementation is estimated around 10-12 million USD.

Investments will be directed to:

- Reconstruction and modernization of equipments, which are used for thermal insulation materials production.
- Replenishment of the working capital.

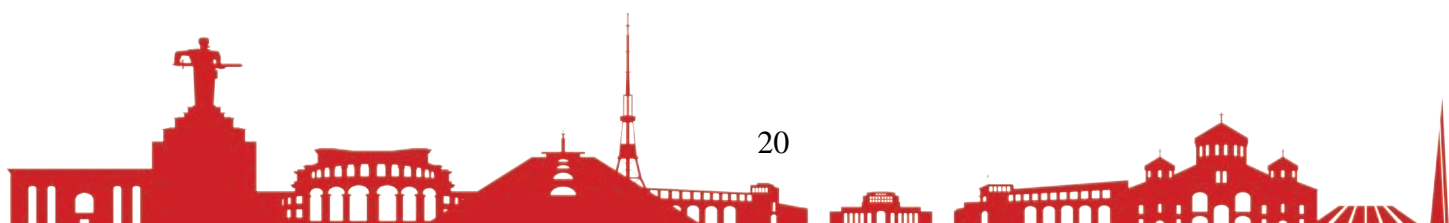
Current capacities allow producing about 430 thousand cubic meters annually.

For annual production of 100 thousand cubic meters of thermal insulation materials financial indicators will be as follows:

Production volume, thousand cubic meters	Price/ USD	Annual revenue/ mln USD	Profitability %	Income, mln USD	Payback period year
100	600	60	10	6	2

Expected results

- Production of thermal insulation materials which have great demand in construction sector.
- Increase of production and export volumes.





PRODUCTION OF SPECIAL SOLID GLASS USING KANAZIT

“Karakert stone factory” is equipped with technological machinery (open hearth furnances), that allows making special solid glass using kanazit. Solid glass is widely used in aviation, space industry and production of products for special purposes.



Expediency of the project and main directions of the required investments

Project's implementation expediency is determined by the following factors:

- The world largest reserves of perlite deposits (3 billion cubic meters), where perlite is of high quality.
- Nowadays solid glass has a huge global demand. There is certain high potential of exporting solid glass to CIS and other countries in the region.

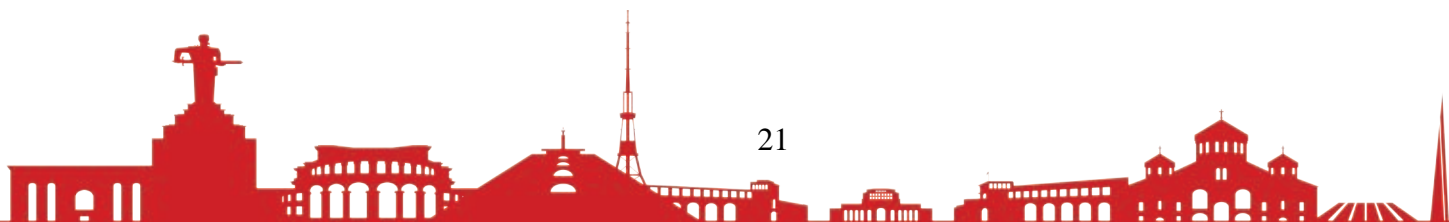
According to preliminary assessments the necessary investment for project implementation is estimated around 15 million USD.

Investments will be directed to:

- Maintenance of buildings and facilities.
- Organization of perlite processing for the purpose of getting kanazit.
- Purchase of equipment for solid glass production.

Expected outcomes

- Production of solid glass which has great deman worldwide.





TEXTILE

MACHINE MADE CARPET MANUFACTURING INVESTMENT PROJECT



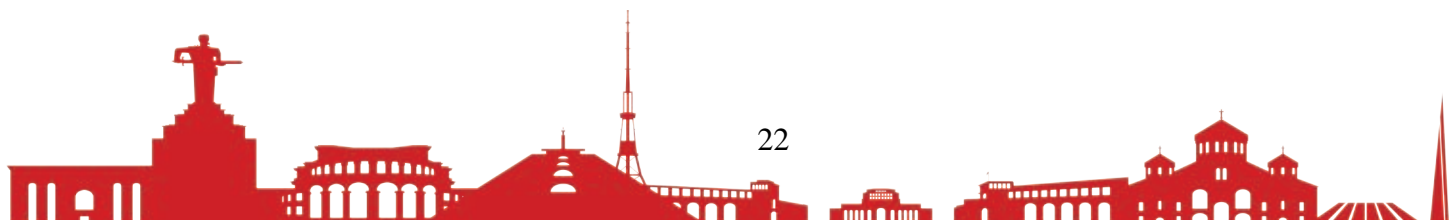
Carpet weaving was one of the most developed sectors in Armenia during Soviet Union period. There were both handmade and machine made carpet productions. Around 1.2 mln. sq. m. of carpets was produced and sold in Soviet Union republics as well as substantial quantity was exported to Lebanon, Kuwait and other countries. The biggest production site of machine made carpets had a capacity of 1.5 mln. sq.m. of annual production. During recent years new manufacturing site was constructed in Armenia

which has 100 thousand sq.m. carpet production capacity.

These plants have retained their manufacturing capacities but are working with minimal loading. The aim of the investment project is to restore machine made carpet production in Armenia.

Project's implementation expediency is determined by the following factors:

- Machine made carpet industries are still functioning and have necessary morally and physically not outdated equipment.
- Availability of appropriate labor force and possibility to use local raw materials, wool in particular.
- Production has the potential to produce carpets, floor mats and carpeting both made of wool and synthetic materials.
- Sales can be organized in Armenia, since studies have shown that in recent years Armenia has imported about 500 thousand sq. m. of carpets and floor carpeting.





- If operate precise and optimal size of production capacity, it is possible to obtain competitive products and export to countries of the Eurasian Economic Union, European Union and Arab countries.

According to preliminary assessments the necessary investment for project implementation is estimated about 1,5 – 2,0 mln USD.

Investments will be directed to:

- Renovation of the production buildings.
- Technical inspection of the equipment, repair works if necessary.
- Working capital required for uninterrupted production cycle.

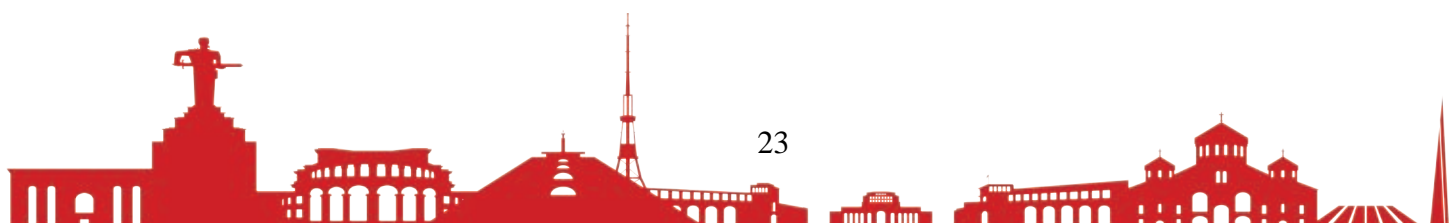
Most of the required investments will be directed to replenishment of the working capital

For annual 200,000 sq.m. carpet production financial indicators will be as follows:

Production volume, thousand sq.m.	Unit Price / USD	Annual Revenue/ million USD	Profitability %	Income, million USD	Payback period / Year
200	30	6	10	0.6	4

Expected outcomes

- 250-300 workplaces will be created.
- Growth of production and export volumes of machine made carpets.





TELECOMMUNICATION

CONSTRUCTION OF A DATA CENTER INVESTMENT PROJECT



Company: Data Safe LLC

Location: Yerevan, Armenia

Project cost: USD 21M

General information about the initiator of the project:

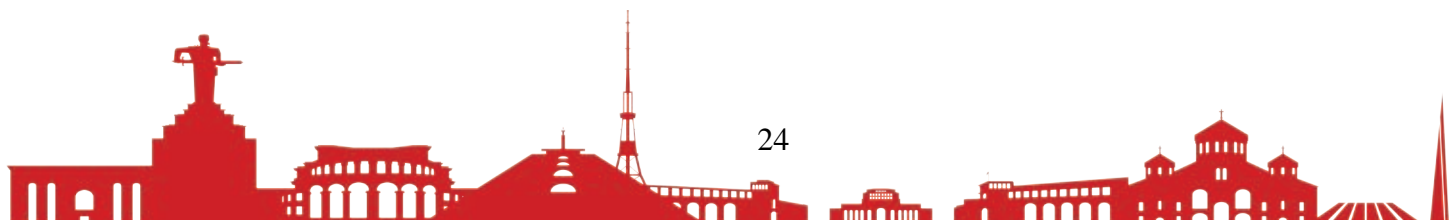
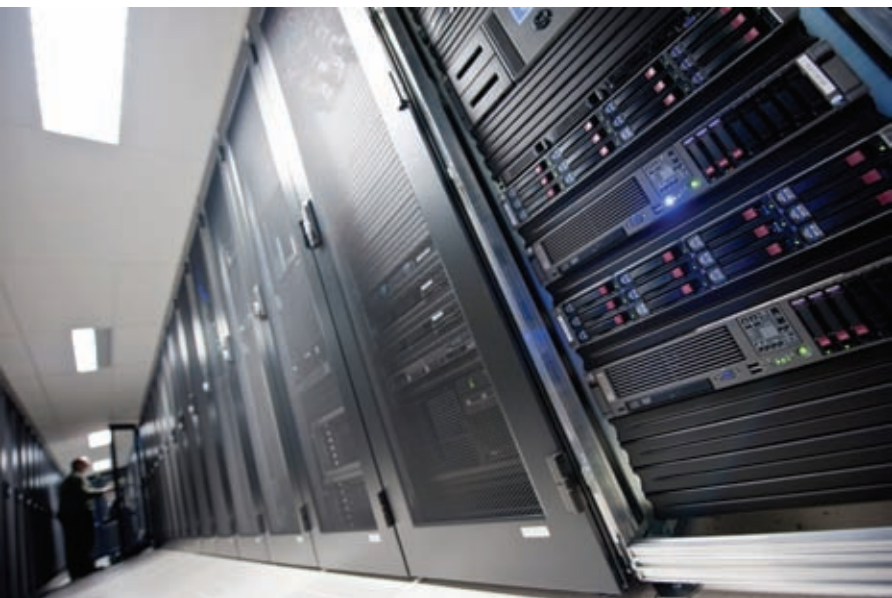
The project involves the construction of a data center in Armenia by a group of investors with success stories in telecommunications (wireless and fiber-optic) and successful startup management team with more than 15 years of experience in ICT.

The investors of the project are renowned for having founded one of the leading telecommunication companies in Armenia GNC-ALFA CJSC where they currently hold a stake. Particularly, GNC-ALFA CJSC was founded in 2007 and in February 2012 the company became a member of Rostelecom PJSC group of companies and provides telecommunication services in RA under

the brand of “Rostelecom” as a subsidiary company. The network of Rostelecom Armenia is solely based on fiber-optic cable (FOC) infrastructure covering 80% of the territory of RA and spreading for over 3000km. It is connected to region’s main terrestrial networks and largest traffic exchange nodes as well as international channels of Iran and Georgia.

As one of the leading telecommunications companies of Armenia GNC-ALFA CJSC provides a wide range of services to physical bodies, corporate clients and operators including Internet access, Fixed telephony and new generation IP TV services.

The Government of Republic of Armenia, State institutions and International organizations, Corporations, local Commercial Banks and Financial institutions, operators are listed as corporate clients of GNC-ALFA CJSC.





Project description:

Within the scope of the project, it is planned to build the first ever Tier3 carrier neutral data center in Armenia with a capacity of 500 Racks (300 in Stage 1 and 200 in Stage 2).

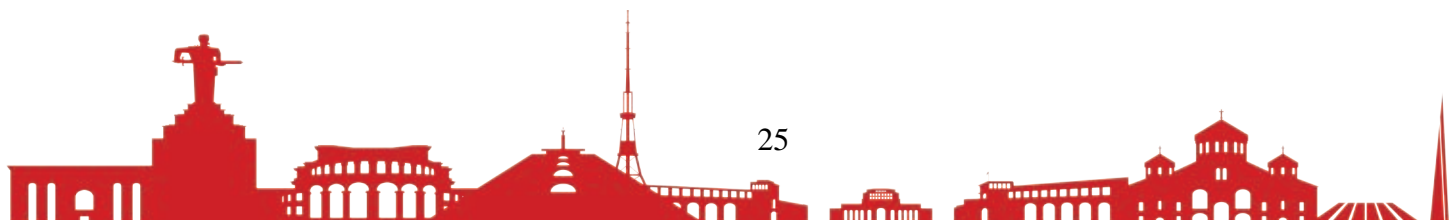
The project will allow the provision of services from A to Z including colocations, clouds, IT security, caching of data content (Google, Akamai etc). The Services are targeted to both domestic and International markets. During the first years of implementation of the project it is expected that 71% of sales will be generated from International markets, including:

- Iran – 60%
- Middle East – 30%
- Eurasian Economic Union – 10%

Increase in the share of domestic revenue is expected starting from Y3 related to the expected growth of the local market both in B2G (E-Governance projects) and B2O (local traffic increase requiring large upgrades in data storage and mirroring capacities).

The main advantages of implementing the project in Armenia are as follows:

- Favorable geopolitical position which allows the company to become a gateway for multinationals for cloud services for Iran and Middle East and countries of Eurasian Economic Union.
- Existence of multiple path fiber-optic backbone connectivity with Georgia and Iran and ultimately the shortest terrestrial route connecting Europe with Asia (using local Investor's telecommunication infrastructure).
- Existence of nuclear energy as well as fast growing alternative energy sector (solar) with the possibilities of cheaper and green energy.
- Liberal data storing laws in the country.
- Existence of highly qualified ICT professionals in the country.

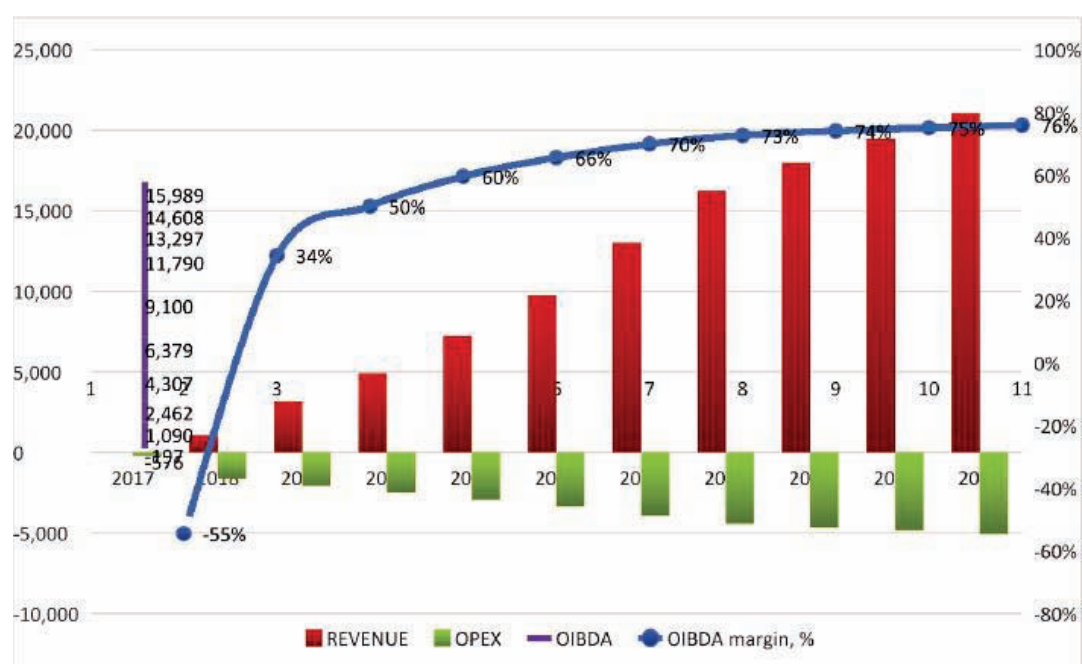




PROJECT FINANCIAL INDICATORS:

The main financial indicators of the project are presented below:

Investment	21M
Sales	1.1 M (first operational year) 3.2 M (second operational year) 4.9 M (third operational year) 7.2 M (fourth operational year) 9.7 M (fifth operational year)
EBITDA	0.6 M (first operational year) 1.1 M (second operational year) 2.4 M (third operational year) 4.3 M (fourth operational year) 6.4 M (fifth operational year)
Net Profit	(1.6) M (first operational year) (0.2) M (second operational year) (0.9) M (third operational year) 2.2 M (fourth operational year) 3.8 M (fifth operational year)
IRR	23%
Payback Period	7 months





AGRIBUSINESS

EXPANSION OF FRESH VEGETABLE GREENHOUSE INVESTMENT PROJECT



Company: Mavas Group LLC

Location: Dzoraghbyur, Kotayk marz, Armenia

Project cost: USD 14M

General information about the initiator of the project:

Established in 2005 as an international freight forwarding company, Mavas Group has gradually expanded to providing certification of food and nonfood products, customs brokerage and laboratory services.

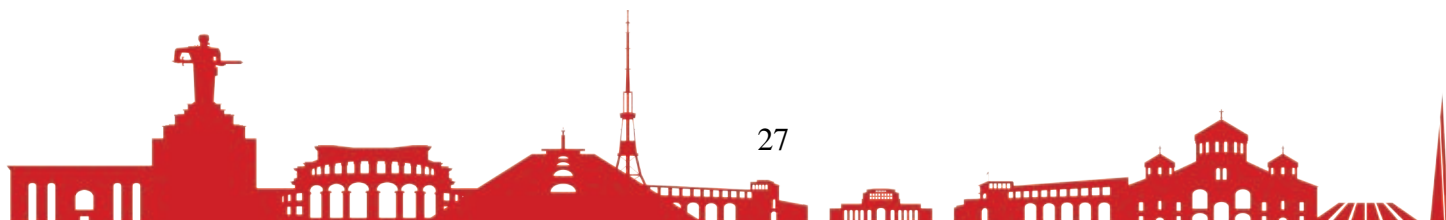
Since 2008 the Company started the production of fresh tomato and cucumber. Currently the Company operates 15

hectares of greenhouse constructed in accordance with latest Dutch technology. All the production phases – heating, growing of plants, fertilization, CO₂ enrichment, prevention of possible diseases – are managed through automated systems controlled by qualified international specialists. Greenhouses are constructed in six different blocks, which allows to have 2.5 hectares equipped with special lighting systems ensuring 24 hour “sunlight”, which is very important factor especially for growing cucumbers, which are very sensitive to light.



The Company is one of the market leaders in Armenia for the production of fresh tomato and cucumber with monthly capacity of 600 tones for tomato and 50 tones for cucumber. It accounts for about 70% (as of 2014) of local production of fresh tomato and circa 95% (Y2014) of fresh cucumber. The company's production capacities are 95% and 5% for tomato and cucumber respectively.

Mavas Group is also one of the major exporters of fresh tomato to Russian market and is developing distribution network in other Eurasian Economic Union member countries.





Worth to mention that, with current capacities, the company is able to satisfy only 20% of the demand from Russian partners. Meanwhile, important to point out, that the Russian producers meet only 10-12% of Russia's demand. Hence, there is a tangible gap to fill in. In parallel with growth at Russian market, the company is considering expansion to Kazakhstan, Belarus and Middle East countries as well.

Project Description:

The company is planning 6,5 ha of expansion on the already acquired land plot – on top of the existing production of 15 hectares with a total project cost of 14M USD. The Company would also like to fully or partially refinance the existing loans of USD33mln to local banks to improve the cash flow and P&L profile of the Company. The expansion will allow the company to increase export volumes to traditional export markets using the economies of scale and expand to new markets in a longer term.

The excess demand from current o -takers gives the opportunity to increase the exports without any additional Sales e orts. The high quality products are highly demanded in di erent regions and new partners are eager to start cooperation with the Company. The expansion will be at a lower cost than the construction of the previous hectares of the greenhouse. Given the existing service area and other amenities the expansion project will take advantage of the economies of scale.

PROJECT FINANCIAL INDICATORS:

Investment	21M
Sales	USD 11.7 M (first operational year)
	USD 11.8 M (second operational year)
	USD 11.9 M (third operational year)
	USD 12.0 M (fourth operational year)
	USD 12.2 M (fifth operational year)
EBITDA	USD 8.5 M (first operational year)
	USD 8.6 M (second operational year)
	USD 8.7 M (third operational year)
	USD 8.8 M (fourth operational year)
	USD 8.9 M (fifth operational year)
Net Profit	USD 1.0 M (first operational year)
	USD 1.7 M (second operational year)
	USD 2.3 M (third operational year)
	USD 3 M (fourth operational year)
	USD 3.7 M (fifth operational year)



AGRIBUSINESS

ESTABLISHMENT OF VEGETABLE GREENHOUSE INVESTMENT PROJECT



Company: SPAYKA LLC

Location: Hrazdan, Kotayk Region, Armenia

Project cost: USD 100M



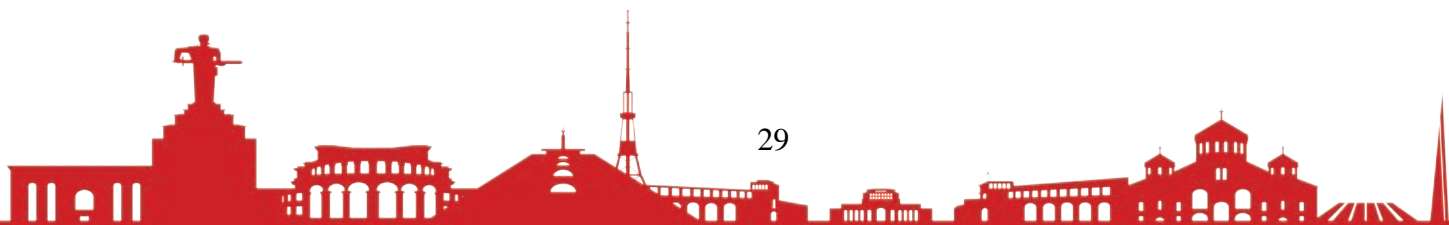
General information about the initiator of the project:

Starting as an international freight forwarding company, Spayka is now a group of companies, which, in addition to providing transportation services to EU and CIS markets, also involved in fresh fruits and vegetables exporting, operating orchards and vegetables greenhouses, manufacturing of variety of

juices with desserts, pickles and preserves. Packaging is another core activity of the company – it produces boxes and pallets from polystyrene foam to the best international standards and health requirements for fishery and pharmaceuticals.

The company started its operations in 2001 as a freight forwarding company and now has a fleet of more than 200 trucks. In 2010, it launched production of packaging boxes and pallets from polystyrene foam and PP, made by cutting edge German technology. In 2011, company established a new production line – Araratfood and Araratfruit canned products. Currently, the company is the biggest exporter of agricultural products from Armenia. It directly purchase agricultural products from farmers, process, package it, and distribute through own controlled sales channels in CIS countries. During the years, the company has developed long-term business relationships with the largest trading networks in target markets, which allows organizing successful exports of high quality agricultural produce from Armenia with a potential of more than 300 thousand tons.

Recently Spayka has established a new line of business – vegetable production in greenhouses, constructed in line with latest available technological achievements in the field. The greenhouse complex with total area of 30ha for radish production is located in in Ararat marz and is operated since March 2015 by Spayka's agro technical team. Currently





company achieved a 20% radish market in Russia, successfully targeting European market and planning to enter Iranian market shortly.

Project Description:

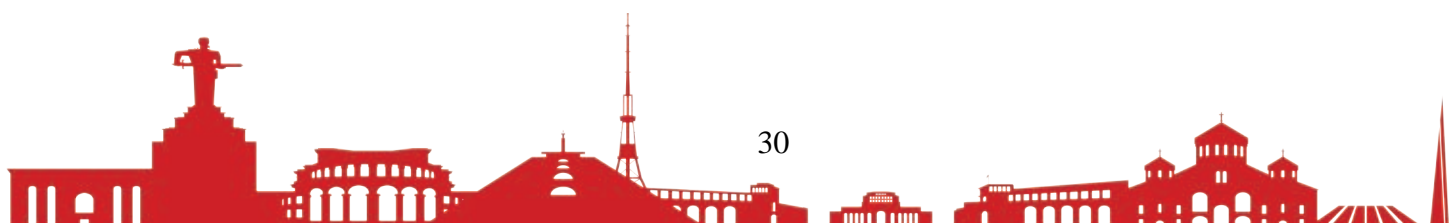
Within the project an up-to-date greenhouse complex will be established in Hrazdan region with total area of around 100ha. It will be equipped with modern technology to ensure high yields, minimum cost and maximum quality using natural advantages of local climate and labor.



It is planned to grow tomato and pepper in this greenhouse. The projected production season will be from October to July and the projected annual production capacities will be 5,000 tons of pepper and 44,000 tons of tomato. The new semi closed greenhouse technology adding new value in competitive climate advantages of the region which will allow decreasing production costs by 15-35% and ensuring comparable quality. Current sales contracts with retail chains in Russia allow covering about 5% of the tomato and 3% of the pepper demand of the Russian market with this project.

PROJECT FINANCIAL INDICATORS:

Investment	USD 100M
Sales	USD 69M
EBITDA	USD 41.5M
Net Profit	USD 33M
IRR	24%
Payback Period	4.1





AGRIBUSINESS

EXPANSION OF CUT ROSES GREENHOUSE INVESTMENT PROJECT



Company: Ecotomato CJSC & Armyanski Urajay LLC (jointly, “the Group”)

Location: Goght village, Kotayk marz, Armenia

Project cost: USD 26M

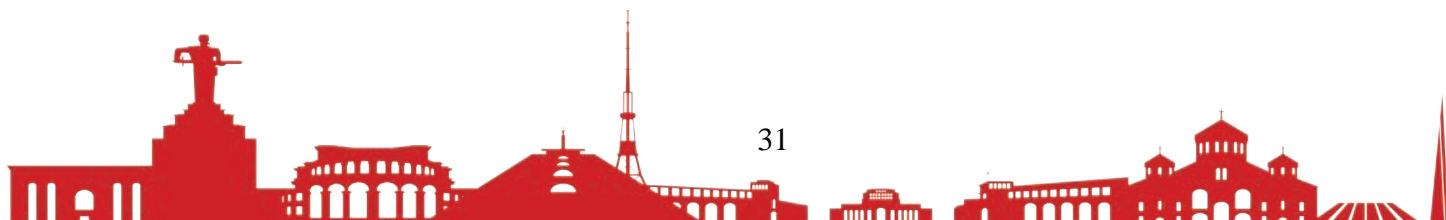
General information about the initiator of the project:

Established in 2011, the company is currently operating one of the largest cut roses' production hydroponic greenhouses in Armenia, which is fully designed and assembled by the leading Dutch and French greenhouse technology supplier – DALSEM and RICHEL. The Group started its operations from a two-hectare greenhouse and gradually, during five years time, expanded to 18.5ha, of which 17ha are fully equipped and operational greenhouses and the rest is service area. The company is one of the market leaders in growing cut roses in Armenia with current monthly production of around 1 million roses, growing up to 22 varieties. The company is currently holding exclusive rights on growing the main commercially successful types of roses, among which are:



- Red Naomi,
- Penny Lane,
- White Naomi,
- Angelina,
- Ski,
- Sugar Lips,
- AnnaKarina.

Around 25% of grown roses are sold on the local market and the rest exported to Russia, Georgia, Belarus, the Netherlands and Sweden. The Company is constantly working on





expanding its exporting geography. Particularly, recently it started cooperation with the wholesalers in Kazakhstan, which soon will become the next export destination. The Group is not exporting by its own, but rather cooperating with specialized leading logistics/transportation companies at the export markets. Worth to mention that as a producer of agricultural products, the company is exempt from paying profit tax (20%). Additionally, membership of Armenia in EEU allows the Company to enjoy the customs duty free exports to the countries of the Union: Russia, Kazakhstan, Belarus and Kyrgyzstan.

Project Description:

The Company is planning 17 ha of expansion on the already acquired land plot – on top of the existing production of 17 hectares with total project cost of 26M USD. The Company would also like to fully or partially refinance the existing loans of USD 33 mln to local banks to improve the cash flow and P&L profile of the Company.

The expansion will allow the company to increase export volumes to traditional export markets using the economies of scale and expand to new markets in a longer term. The excess demand from current o-takers gives the opportunity to increase the exports without any additional sales efforts. The high quality products are highly demanded in different regions and new partners are eager to start cooperation with the Company. The expansion will be at a lower cost than the construction of the previous hectares of the greenhouse. Given the existing service area and other amenities the expansion project will take advantage of the economies of scale.

PROJECT FINANCIAL INDICATORS:

Investment	USD 26M
Sales	USD 27.5M (Second operational year)
EBITDA	USD 18M (Second operational year)
Net Profit	USD 10M (Second operational year)
IRR	54%
Payback Period	18 months



RENEWABLE ENERGY

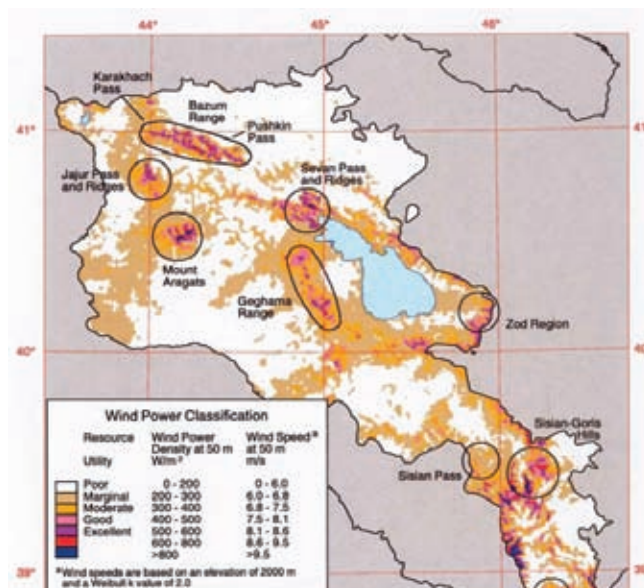
WIND AND GEOTHERMAL POWER PLANTS CONSTRUCTION INVESTMENT PROJECTS



According to Wind Energy Resource Atlas of Armenia elaborated by NREL /National Renewable Energy Laboratory/ of USA in 2003, the economically justified potential of wind energy is about 450 MW.

The main perspective sites are located in Zod pass, in Bazum Mountain (Qaraqhach and Pushkin passes), in Jajur pass, in the territory of Geghama Mountains, in Sevan pass, in the region of Aparan, in highlands between Sisian and Goris, in the region of Meghri.

The first wind power plant in Armenia and in Caucasus with total capacity of 2,6 MW was put in operation at Pushkin pass in December 2005. At the mentioned site it is foreseen construction of wind power plant with total capacity up to 50MW.



In 2012 “Sanders and Partners” company with the assistance of German KFW Bank implemented and provided Ministry of Energy and Natural Resources of Republic of Armenia with the wind potential assessing computer modeling application. The application is a database for 1981-2011 wind potential assessment.

Monitoring works of wind potential at Qaraqhach pass in the Shirak Marz have been completed by «Ar Energy», Armenian - Italian private company. The company has obtained a licence from the Public Services Regulatory Commission to construct “Qaraqhach 1” wind farm with 20 MW

capacity, which will be later enlarged up to 140 MW.



“SEMYONOVKA” WIND POWER PLANT CONSTRUCTION PROJECT

The project assumes the installment of 34 MW wind power plant in Gegharkunik region of Armenia. The project site is located at Semyenovka pass area at elevation of 2,345m above sea level. The site is at distance of 5km from the Tsovagyugh village. It has well developed infrastructure with access roads, proximity to railway and grid (35 and 110 kV transmission lines).

Installed capacity	34 MW
Annual energy generation	62.4 mln. kWh
Required investment	60 mln. EURO

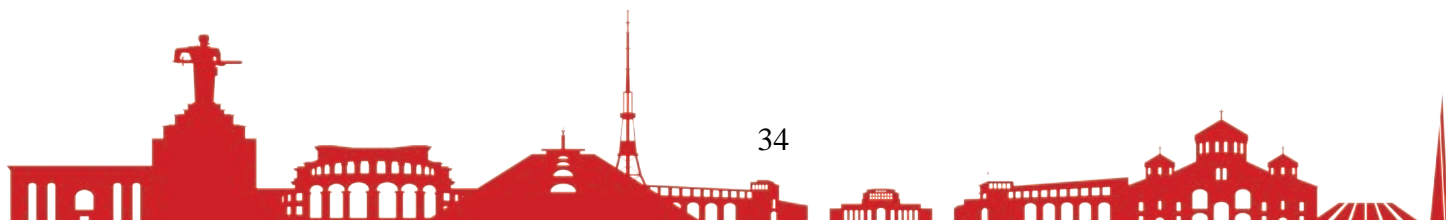
Within the framework of EU TACIS program “Assistance to Energy Policy of Armenia” the monitoring works have been carried out at Semyenovka pass in the Sevan region and the prefeasibility study for the construction of wind power plant was elaborated. Based on the analysis of the landscape, the installment of 17 wind turbines (Gamesa G80) each with an installed capacity of 2.0 MW is planned; hence the total installed capacity of wind park will be 34.0 MW.

Based on existing monitoring data, the average annual wind speed in the area is 6.4 m/s. The gross annual energy production of the wind farm is 71.8 GWh, the calculated amount of annual electricity delivered to the grid is 62.4GWh. The wind farm capacity factor is 21%.

The construction works are expected to last for 9 months, the project lifetime is estimated to be 25 years. Government will provide land plot for the construction of WPP, support for obtaining all necessary permits, determine up-front fixed tariff and ensure purchase of all electric energy produced by the plant.

PROJECT FINANCIAL INDICATORS:

Project IRR (%)	11.6%
NPV, €	701, 600
Simple payback period (years)	8.9
Production cost, €/kWh	0.0755





RENEWABLE ENERGY

Geothermal Energy

During the recent years one of the most actual and important problems in Armenia is investigation and exploration of the geothermal sources – as renewable energy resource with capacity to “firm capacity” for base-load coverage.

Utilization of renewable energy resources reduces dependence on imported fuels

and will increase energy security level. It will also increase the own Renewable energy production in the whole energy production, as well as will reduce an amount of the greenhouse gas emissions.



“JERMAGHBYUR” GEOTHERMAL POWER PLANT CONSTRUCTION

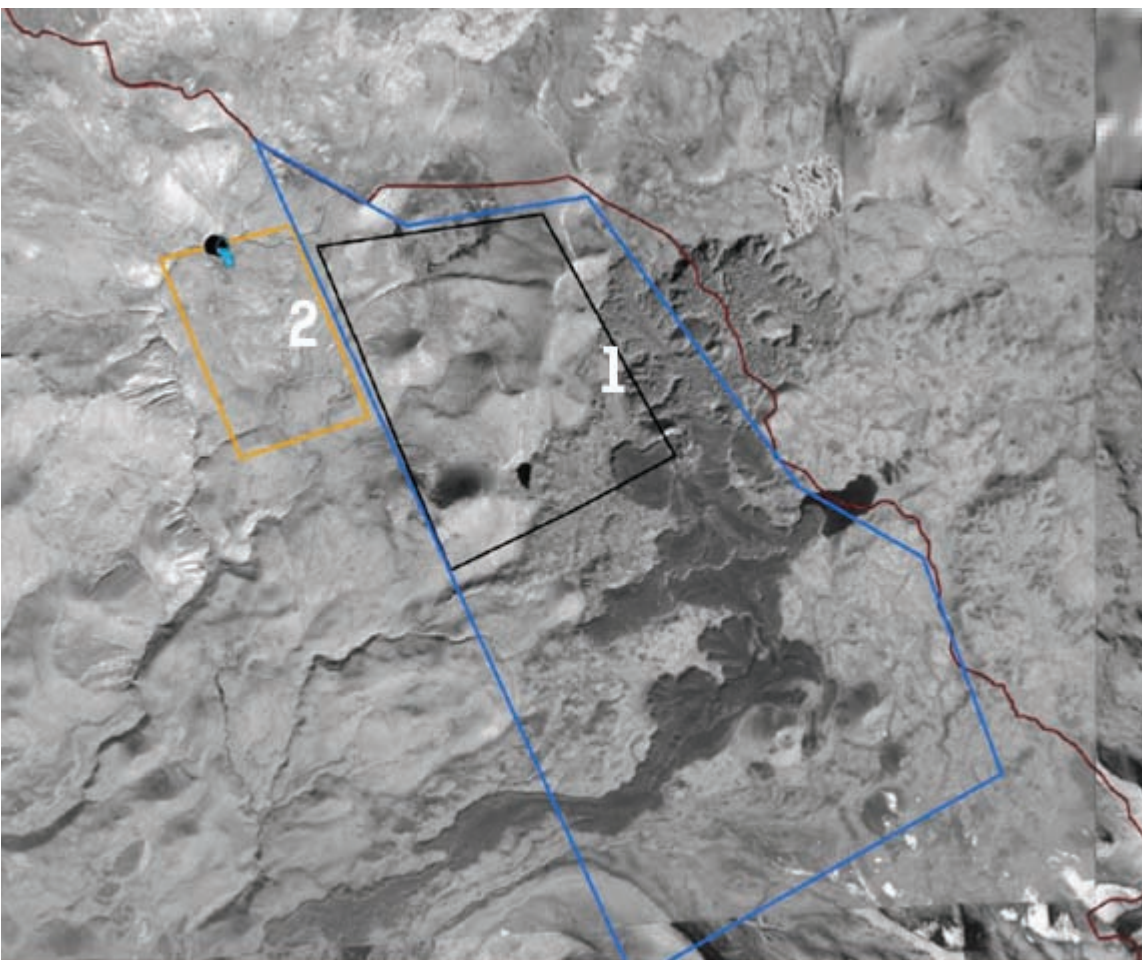
Investigations have been conducted to reveal the precise sites of geothermal energy sources for construction of geothermal power plant

One of these sites is Jermaghbyur, where according to geological and geophysical explorations high pressure (20-25 atmosphere pressure) hot water /up to 250°C / resources are considered to be available in depth of 2500-3000 meter. In case of confirmation of this data, it will be possible to construct the first geothermal power plant in Armenia with 25MW capacity in this area



**JERMAGHBYUR GPP:
GENERAL CHARACTERISTICS**

Plant location	Jermaghbyur, Syunik Marz
Geothermal resources min. temperature, depth	250°C 2500-3000m
Required investments	44 mln. USD
Installed capacity	25 MW
Tariff used in economic calculations	4.50 US cent per kWh
Break-even tariff (self-covering)	2.44 US cent per kWh
Plant factor	88%
Annual generation	194.4 mln. kWh
Construction and installation	2 years
Plant operation cycle	28 years
Project overall duration	30 years
Payback period	12 years including 2 years of construction

**1 - KARKAR SITE****2 - JERMAGHBYUR SITE**

**“KARKAR” GEOTHERMAL POWER PLANT CONSTRUCTION PROJECT**

This area is the center of the youngest volcanic activity in Armenia. In this area, carried out detailed geological mapping and a variety of geophysical surveys, including magnetotelluric, seismic, magnetic and gravity surveys.

As a result of project's implementation at Karkar geothermal site power plant of 28 MW capacity will be constructed.

Installed capacity	28 MW
Investments required	106 mln. EURO

	Temperature 110° C (mln. US\$)	Temperature 130° C (mln. US\$)	Temperature 300° C (mln. US\$)
Surveying	0.5	0.5	0.5
Wells	43-75	29-52	25-39
Power plant	27	22	48
Substation	0.5	0.5	2
Transmission line	2.7	2.7	2.7
Road access	0.5	0.5	0.5
Equipment transportation	0.27-0.41	0.21-0.31	0.34-0.49
Engineering	5.6	4.5	10
Contingency	5.6	4.5	10
Total	85.67 - 117.91	64.41 - 87.51	99.04 - 113.19

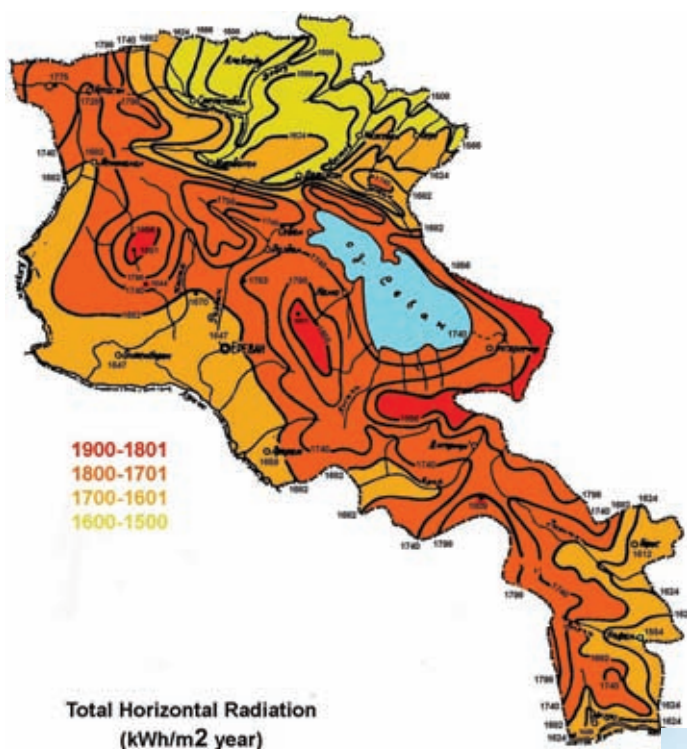


RENEWABLE ENERGY

CONSTRUCTION OF SOLAR POWER PLANTS INVESTMENT PROJECTS

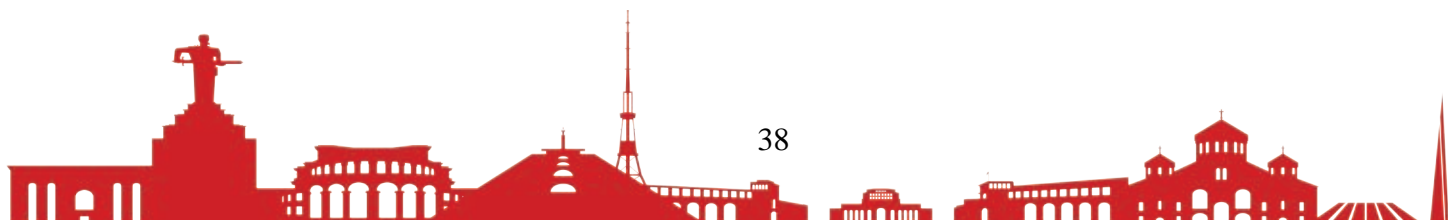


Project Background:



Armenia has a significant advantage in terms of solar energy: the country is situated in the proximity of subtropical zone; most territory of the country have favorable climatic conditions that make wide use of solar energy possible. There are on average more than 2500 sunny hours per year and the average annual amount of solar energy flow per square meter of horizontal surface is about 1720 kWh (the average European 1000 kWh). One fourth of the country's territory is endowed with solar energy resources of 1850 kWh/m².

Additionally, wide variety of siliceous raw material from various sources and morphology is also available in the country.





12.5 MW DASHTADEM PV PLANT CONSTRUCTION PROJECT

Project cost: USD 15.98 million

Location: Dashtadem-Talin, Aragatsotn Province (Armenia)

IRR: 15%

Net profit 2020: USD 249,172

EXECUTIVE SUMMARY

Feasibility study was prepared for a Solar PV 10.47 MW power plant located in the municipality of Dashtadem-Talin. These works are part of the activities carried out by Aries for the Armenia Renewable Resources and Energy Efficiency Fund within the contract “Feasibility Study and Transaction Advisory Services for Preparation of Utility-Scale Power Project”.

The land plot used for the study was selected during the previous stages of the project based on meteorological, topographical, environmental and other characteristics, as well as shape, available area and accesses, in order to optimize the development of the project.

ARIES has rendered a plant design, including its grid connection infrastructure, adjusted to the specific characteristics of the Site, in order to assess the feasibility of a PV plant in the selected Site.

The proposed design consists of 4 units with nominal output power of 2.3MW plus one unit with nominal output power of 1.2 MW, each one formed by several parallel and series associations of photovoltaic modules, which in turn are mounted on fixed structures with horizontal PV module assembly.

Considering the estimated costs and production, as well as the financial structure and conditions expected for the project, a financial assessment has been rendered with a result of US\$ cents 6.63 per kWh.

The preliminary site analysis results indicate that the selected area for the photovoltaic plant is suitable: good solar resource, good communication infrastructures, adequate orientation, without environmental constraints and free from trees or any kind of building which could produce shadows, decreasing the performance ratio of the photovoltaic modules.

SITE LOCATION

Location: Dashtadem-Talin, Aragatsotn Province (Armenia)

Geographical coordinates and altitude:

- Latitude: 40° 20.305' N.
- Longitude: 43° 50.307' E.
- Altitude: 1400 m above sea level.



The plant generation will be 21.30 GWh in the first production year and 18.89 GWh by the end of the projection period.

**Financing of project investments**

The project CAPEX financing is envisaged to be performed by SREP, IBRD, commercial banks and equity. For the base case the overall financing scenario of the current project is summarized in the following table.

Overall project financing scenario

Financing sources	Type	%	US\$
SREP	Concessional Credit	50%	7990651
IBRD	Concessional Loan		
Guarantee covered Commercial Bank	Loan	30%	4794391
Guarantee Uncovered Commercial Bank	Loan		
Developer (equity)	Equity	20%	3196260

Income Statement

YEAR	2018	2019	2020	2021	2022	2027	2032	2037	2042
Net Revenue	US\$ 1577756	1569868	1562018	1554208	1546437	1508161	1470832	1434427	1398923
Operating and maintenance cost	US\$ (213675)	(219017)	(224492)	(230104)	(235857)	(266850)	(301917)	(341591)	(386479)
EBITDA	US\$ 1364082	1350851	1337526	1324104	1310580	1241310	1168915	1092836	1012444
Depreciation	US\$ (743700)	(743700)	(743700)	(743700)	(743700)	(743700)	(743700)	(743700)	-
EBIT	US\$ 620381	607151	593826	580403	566880	497610	425215	349135	1012444
Interest expense	US\$ (339022)	(310691)	(282361)	(254030)	(225700)	(83381)	(12652)	(5993)	0
EBT	US\$ 281360	296460	311465	326373	341180	414229	412563	343142	1012444
Corporate tax	US\$ (56272)	(59292)	(62293)	(65275)	(68236)	(82846)	(82513)	(68628)	(202489)
Net profit	US\$ 225088	237168	249172	261099	272944	331383	330050	274514	809955

The project is feasible from the financial point of view. It shows a tariff need of US\$ cents 6.63 per kWh in the base case where the 50% of the project is financed by SREP concessional credit and 30% by WB guaranteed commercial loan. Fully concessional financed project (SREP+IBRD) will lower the tariff to US\$ cents 4.79 per kWh and fully commercial without WB guarantee will reach a tariff of US\$



55 MW MASRIK PV PLANT CONSTRUCTION PROJECT

Project total cost: 65,230,000 USD

Location: Mets Masrik, Gegharkunik Marz (Armenia)

IRR: 15%

Net profit 2020: USD 488,709

EXECUTIVE SUMMARY

Feasibility study was prepared for a Solar PV 46.55MW power plant located in the municipality of Masrik. These works are part of the activities carried out by Aries for the Armenia Renewable Resources and Energy Efficiency Fund within the contract “Feasibility Study and Transaction Advisory Services for Preparation of Utility-Scale Power Project”.

The land plot used for the study was selected during the previous stages of the project based on meteorological, topographical, environmental and other characteristics, as well as shape, available area and accesses, in order to optimize the development of the project.

ARIES has rendered a plant design, including its grid connection infrastructure, adjusted to the specific characteristics of the Site, in order to assess the feasibility of a PV plant in the selected Site. The proposed design consists of 20 units with nominal output power of 2.3MW, each one formed by several parallel and series associations of photovoltaic modules, which in turn are mounted on fixed structures with horizontal PV module assembly.

Considering the estimated costs and production, as well as the financial structure and conditions expected for the project, a financial assessment has been rendered with a result of US\$ cents 6.39 per kWh.

The preliminary site analysis results indicate that the selected area for the photovoltaic plant is suitable: good solar resource, good communication infrastructures, adequate orientation, without environmental constraints and free from trees or any kind of building which could produce shadows, decreasing the performance ratio of the photovoltaic modules.

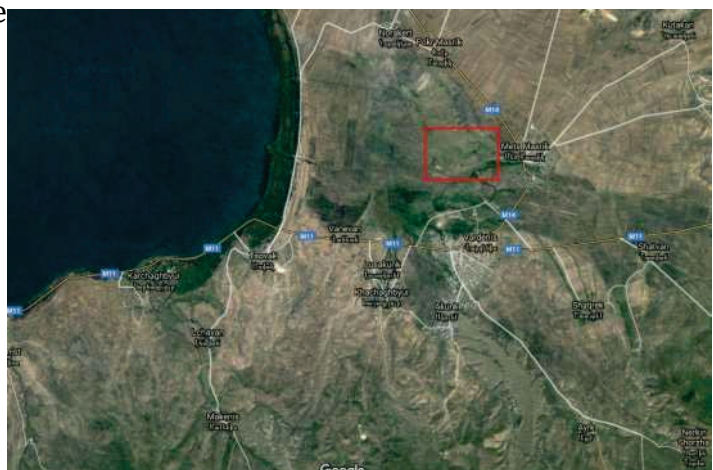
SITE LOCATION

Location: Mets Masrik – Mets Masrik,
Gegharkunik marz (Armenia).

Geographical coordinates and altitude:

- Latitude: 40° 13.564'N.
- Longitude: 45° 43.565'E.

Altitude: 1930 m above sea level.



***The plant generation will be 89.11 GWh in
the first production year and 79.01 GWh by the end of the projection period.***



Financing of project investments

The project CAPEX financing is envisaged to be performed by SREP, IBRD, commercial banks and equity.

For the base case, (scenario 1) the overall financing scenario of the current project is summarized in the following table.

Overall project financing scenario

Financing sources	Type	%	US\$
SREP	Concessional Credit	50%	32617875
IBRD	Concessional Loan		
Guarantee covered Commercial Bank	Loan	30%	19570725
Guarantee Uncovered Commercial Bank	Loan		
Developer (equity)	Equity	20%	13047150

Income Statement

YEAR	2018	2019	2020	2021	2022	2027	2032	2037	2042
Net Revenue	5693641	5665173	5636847	5608663	5580620	5442492	5307784	5176410	504828
Operating and maintenance costs	(782853)	(802424)	(822484)	(843047)	(864123)	(977676)	(110615)	(125150)	(14159)
EBITDA	4910789	4862749	4814363	4765616	4716497	4464817	4201634	3924902	363232
Depreciation	(3050880)	(305088)	(305088)	(305088)	(305088)	(305088)	(305088)	(305088)	-
EBIT	1859909	1811870	1763483	1714737	1665617	1413937	1150754	874023	363232
Interest expense	(1383887)	(126824)	(115259)	(103695)	(921307)	(340363)	(51645)	(24463)	-
EBT	476022	543627	610886	677785	744311	1073575	1099109	849559	363232
Corporate tax	(95204)	(108725)	(122177)	(135557)	(148862)	(214715)	(219822)	(169912)	(72646)
Net profit	380817	434902	488709	542228	595449	858860	879287	679647	290585

The project is feasible from the financial point of view. It shows a tariff need of US\$ cents 6.39 per kWh in the base case where the 50% of the project is financed by SREP concessional credit and 30% by WB guaranteed commercial loan. Fully concessional financed project (SREP+IBRD) will lower the tariff to US\$ cents 4.59 per kWh and fully commercial without WB guarantee will reach a tariff of US\$ US\$ cents 11.43 per kWh.



INFRASTRUCTURE

33RD DISTRICT IN YEREVAN INVESTMENT PROJECT



Investment project of construction of the 33rd district (Firdusi) in Yerevan in the field of urban infrastructure is prepared and is in implementation process.

According to the investment program the area is more than 5 hectares, where it is planned to construct round square of about 40 meters high and 85 meter in diameter, under which it is designed to build a multi-storeyed underground parking.

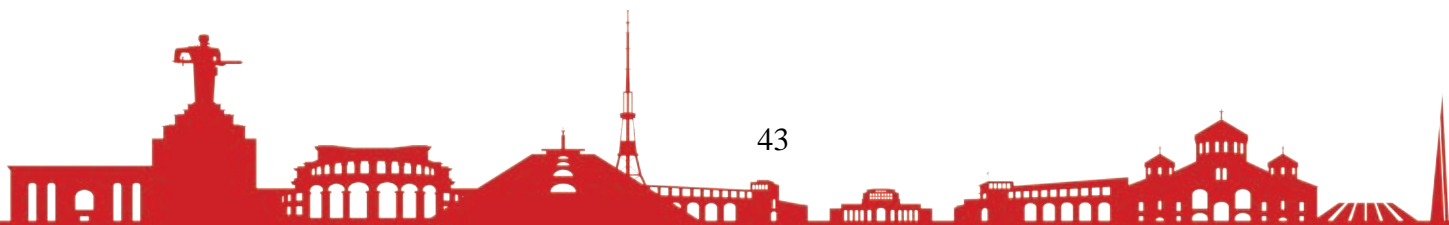
The square will be surrounded by a number of new streets, public and service facilities, business centers, hotels and residential buildings. It is planned to build a total area of around 200,000 square meters of buildings. According to the project new buildings will have 7-9 and 12-13 floors. 19th century's monument buildings will remain in their places.



According to the presented project, this area, from one side, being located near the Republic Square and from the other side near to Tigran Mets Street (according to A.Tamanyan's general plan it was called Sothern Avenue), in future will be connected with new road with Vernissage and it may also have cultural functions.

BENEFITS OF INVESTMENT PROJECT

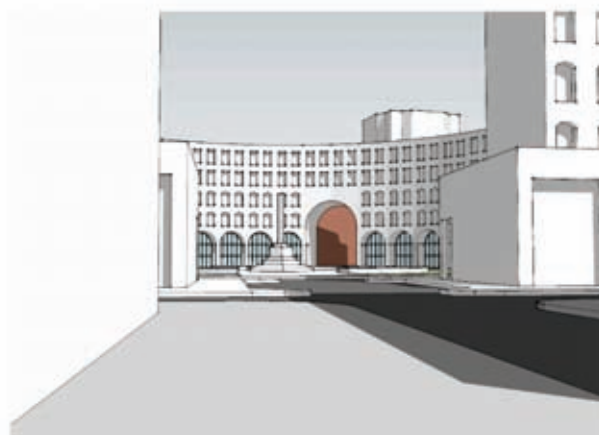
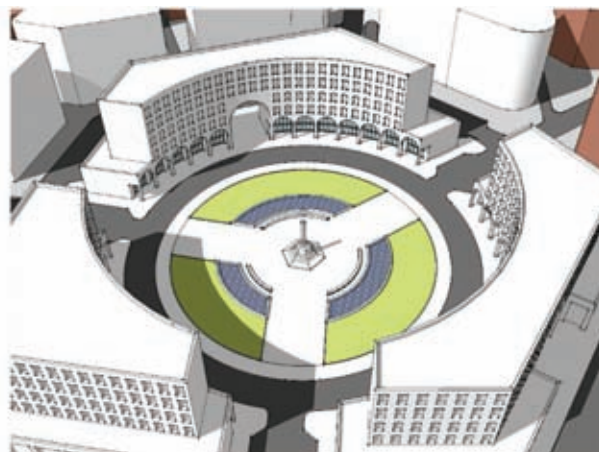
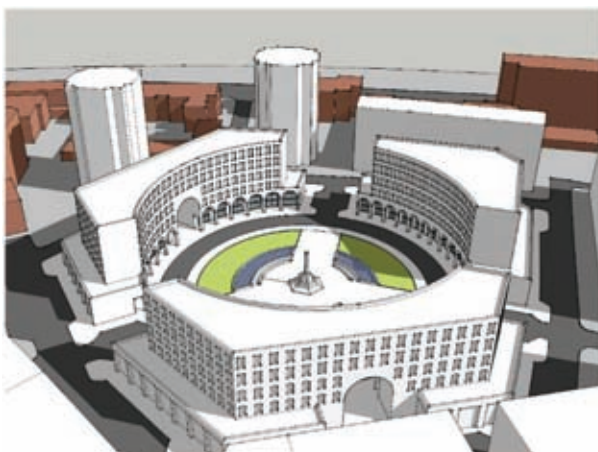
- Special price of \$1500 per square meter of land for limited time offer
- More than 10% of income across each lot
- Possibility to implement project development during 3 years of construction process
- Landscaping and site improvement
- Connection to all external engineering communications
- Consultancy during architectural construction workflow
- Assistance during submission for architectural and construction permits





Attractiveness and the advantages of the investment project according to the plan:

- Investor will deal only with the purchase of the land, and the full implementation of the tasks will be carried out by construction companies under the coordination of the Government of Republic of Armenia.
- Investor won't deal with the aspects concerning engineering infrastructure, improvement activities, lighting, asphalt paving, as all this will be implemented by the specialized companies.



IMPLEMENTATION PERIOD OF THE INVESTMENT PROJECT IS 3-4 YEARS AND THE TOTAL COST OF PROJECT IS 89.9M USD.



INFRASTRUCTURE

NOAH ETHNOGRAPHIC DISTRICT IN YEREVAN INVESTMENT PROJECT



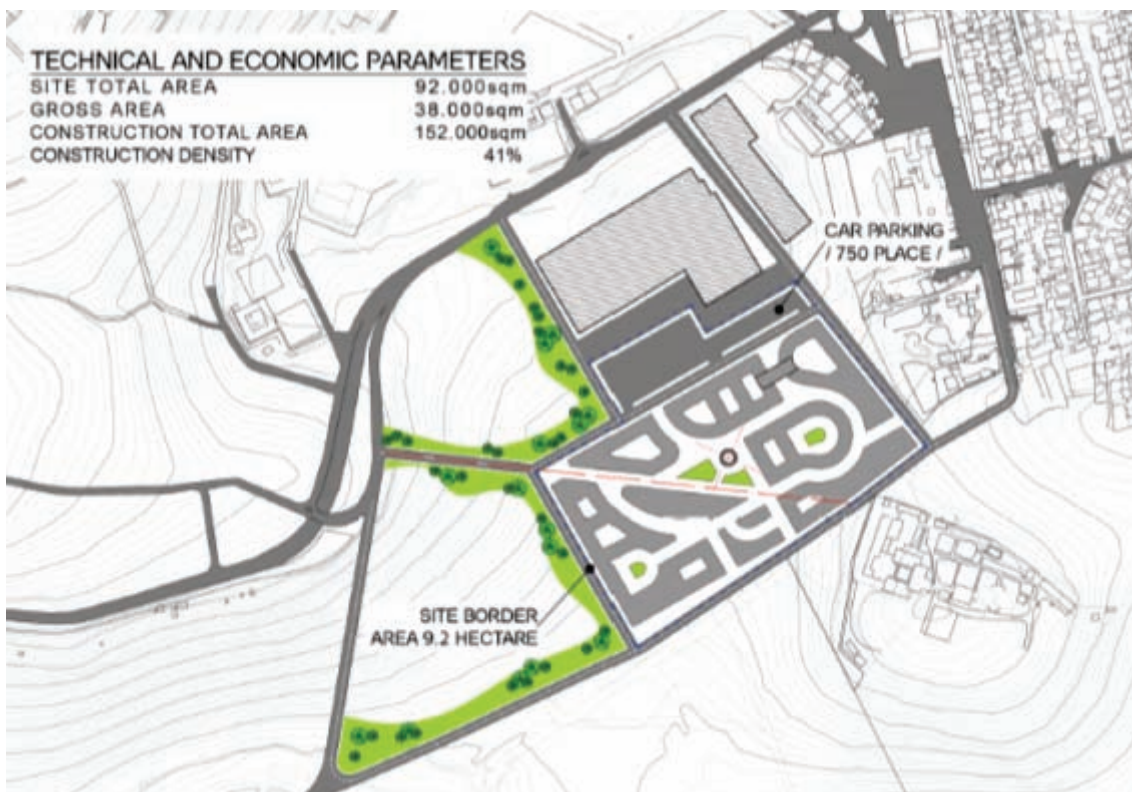
Location: Yerevan,
Armenia
Project cost: 98.34 mln.
USD

Project Background
"Noah" ethnographic district investment project intended to develop a 9.2 hectare land plot situated near the Dalma gardens, in the geographical center of Yerevan. It is planned to implement a new system of pedestrian streets,



which will give an opportunity to locate various social and cultural groups like carpet weaving, handicrafts, painting and also manuscripts exhibitions, museums, hotels, residential areas, ethnic food vendors and more. The biblical tale of Noah and such unique district will play a major role in the development of the cultural tourism.

The district is planned to build up with a local typical, cozy streets with the view to Mount Ararat and with 2 to 3 floor buildings designed in the national folk style. Total construction area of this project budget is about 98,500,000 USD. Taking into account that current investment is taking place under the patronage of the Government of the Republic of Armenia investors will receive unique benefits during project realization. These benefits will be tangible during architectural project approval and construction permission process.





CONCEPT

The proposed site for a new development is surrounded by various public services such as the Dalma Mall, Karen Demirchyan Sports and Concerts Complex, Armenian Genocide Memorial, and high-rise residential towers. Capitalizing on the already heavy foot-traffic to the area, the proposed project aims to offer unique activities that would appeal to locals and tourists alike. New development would be of low-rise and mid-rise buildings with uses such as residential, commercial, retail, and cultural.



Carrying on the theme of uniting the different architectures of the Armenian provinces and cities such as Goris, Dilijan, Van, Kharberd, etc., the district will bring together Armenian wines, foods and crafts from the regions, in one centrally -located tourist haven. Amongst the quaint homes, unearthed history will create the environment of an open-air museum, shops occupying the ground floor will beckon visitors enter and examine the artisanal goods, gourmet

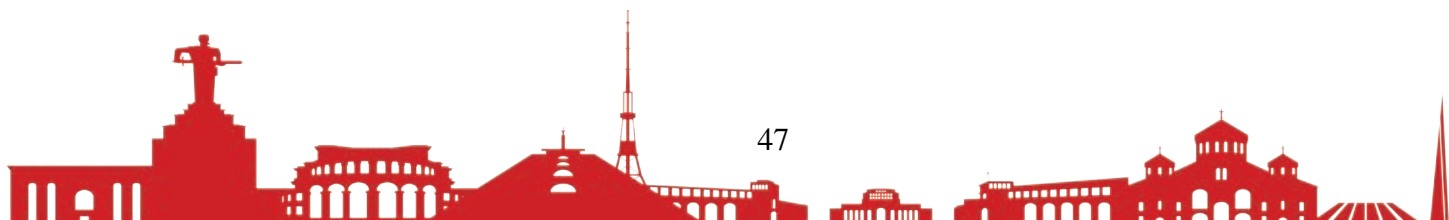


delicacies and high fashion, and lively market vendors will offer samples of their fresh, locally grown produce to the shoppers. The pedestrian streets of this residential neighborhood will be open to the wider public, who can wander amongst the historic symbolism of these folk homes and engage in the activities offered in and around them.



Technical and economic figures of Noah ethnographic district

1	Site area	92.000 sq.m.
2	Gross area	38.000 sq.m.
3	Construction total area	152.000 sq.m.
4	Development budget	98.34 mln. USD
5	Total retail income in 5 years	209.9 mln. USD
6	Net profit	111.6 mln. USD
7	Return on investment within 5 years (ROI)	114%
8	IRR	23%





INFRASTRUCTURE

NORTH-SOUTH ROAD CORRIDOR INVESTMENT PROJECT



Concession, Investment and PPP implementation opportunities

North-South Road Corridor

Estimated length of North-South Road Corridor	470 km
Design speed	100 km/h
Passing time	4,5-5 hours
The length of existing road	about 560 km
Speed	30-90 km/h
Passing time	9,5-10 hours
Total investment	about 2,0-3,0 billion USD is estimated for project implementation

Brief presentation of the investment project

Existing and agreed financing:

- ADB financing - 500 million USD
- EIB financing - 66 million + 132 million USD
- NIF (Neighbourhood Investment Facility) grant - 13.5 million + 13.5 million USD
- EADB financing - 150 million + 350 million USD
- **Total – 1.225 million USD**

Remaining – 0.7-1.7 billion USD

Implementation period - 2010 – 2020



The North-South Road Corridor investment project is aimed at reconstruction of the 2nd - 3rd category carriageway with a speed limit of 30-90 km/hour that runs 560 km from the Armenian border with Georgia at Bavra to the border with Iran at Agarak and upgrading it to 470 km-long 1st category high-speed carriageway with a speed limit of 100-110 km/hour enabling to cross the mentioned section during decreased 4.5-5 hours instead of current 9.5-10 hours.

It will increase the comfortability and safety by ensuring the fulfilment of the Project goal in to make the North-South Road a transit carriageway for passenger and cargo transportation from the East to the West within scope of TRACECA and Silk Road Projects.



The North-South Road Corridor: East (South) - Iran border – Agarak – Bavra – Georgian border – Batumi – Poti – West (North)

The preliminary estimated cost of construction works of the North-South Road Corridor investment program is about USD 2-3 billion (excluding VAT and the cost of land acquisition and resettlement), of which USD 150 million will be allocated for consulting services in respect to design works and technical supervision.



Tranches 1-2-3 are in the implementation process, required financing is available, construction of total 3 tranches is expected by the end of 2018.



TRANCHE 4, ARTASHAT-AGARAK

Estimate length of Artashat-Agarak /border point/ section is: 354 km

Road will be reduced by about 85 km

Feasibility Study is ready. Preliminary Design for all section and Detail Design for Sisian-Qajaran section is ongoing.

Designer: SPEA-IRD Consortium (Italy)

Tender for Construction of Section Agarak-Qajaran will be announced in April 2016 and Contract Signing planned in July-August 2016.

Completion of Construction: 2019. Financed by EADB loan: \$ 150 million

More financing opportunity for Tranche 4:

- EADB loan: \$ 350 million

- ADB loan: \$ 170 million

Possibility of PPP and new cofinancing by other IFI.



TRANCHE 5, GYUMRI-BAVRA

Estimated length of Gyumri bypass- Bavra/border point/ is 60 km

Gyumri-Bavra section will be implemented under EIB loan proceeds

Estimated cost: about \$150 million

Estimated construction

period: 24-36 months

Feasibility Study, Preliminary Design and Detail Design are financed by NIF Grant, Contract Signed

Designer: Lotti (Italy)



INVESTMENT AND PPP IMPLEMENTATION OPPORTUNITIES

- The Feasibility study on Artashat-Qajaran road section (220 km) is ready. The preliminary design for 220 km long section will be presented by the end of 2017, followed by detailed design for Sisian-Qajaran (60km) road section to be presented by the end of 2016.

80% of the mentioned section may be separated and considered as a project implemented under concession (Investment and PPP). The current carriageway will be preserved as a free alternative to toll-road. The section envisages 0.5-8 km long tunnels with two lane single carriageway and the total length of tunnels: for about 25km. The length of current road of the mentioned section is 305 km, which as a result will be reduced by 85 km. To note, merely the length of Sisian-Qajaran section will be reduced by half and will become 60 km long road.

The estimated preliminary cost of construction works for the total Artashat-Qajaran road section is USD 2 billion (including the cost for consulting services, and excluding VAT and the cost for land acquisition and resettlement), of which the preliminary estimated cost of construction works in Sisian-Qajaran road section is USD 600 million (including the cost for consulting services, and excluding VAT and the cost for land acquisition and resettlement).

- The Feasibility study on Qajaran-Agarak road section (42 km), including the Tunnel (5 km), is available. Merely the Tunnel will reduce the length of the road by 12 km with a free alternative current road to be preserved. The Tunnel is envisaged to be equipped with two lane single carriageway with the cost that of totaling USD 140 million (including the cost for consulting services, and excluding VAT and the cost for land acquisition and resettlement).



The mentioned Tunnel may be separated and considered as a project implemented under concession (Investment and PPP). The road part with length of 37km will be constructed by Eurasian Development Bank's loan till end of 2019.

- The Feasibility study and Detailed Design is being procured for Gyumri bypass road section, which will be ready by the end of 2016 and 2017 accordingly. The mentioned section may be separated and considered as a project implemented under concession (Investment and PPP). The current carriageway will be preserved as a free alternative to toll-road. The estimated preliminary cost of construction works is USD 80 million (including the cost for consulting services, and excluding VAT and the cost for land acquisition and resettlement).

MAIN QUESTIONS AND ANSWERS

In which form and volume will be the state participation in the concession (Investment and PPP)?

Under concession (Investment and PPP) projects, the state will co-finance VAT (20%) and the cost of land acquisition and resettlement. The State already financed, financing and is going to finance for about 1-1.5 bln. USD from total cost of project, which is already 50% of preliminary estimates.

What type of concession (Investment and PPP) it will be?

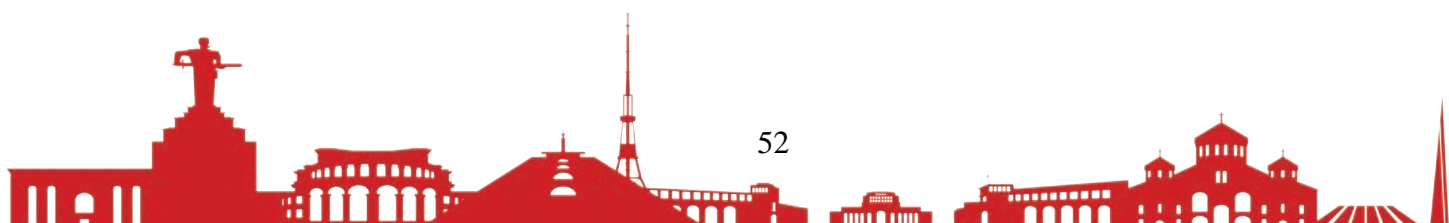
The following sequence is envisaged based on preference:

- Build-Own-Operate-Transfer
- Build-Operate-Transfer,
- Build-Transfer-Operate
- Build-Own-Operate
- Buy-Build-Operate

The mentioned options are subject to discussion, and preference will be given merely to the interested organizations upon submission of properly developed and well-justified price offer.

What are the other intended terms of the concession (Investment and PPP)?

A relevant legislative regulation may set up the State's commitment towards the return of funds/compensation of difference in regard to the planned activities by the end of operating.



**INFRASTRUCTURE****SOUTHERN ARMENIA RAILWAY
INVESTMENT PROJECT*****The Southern Armenia railway project description***

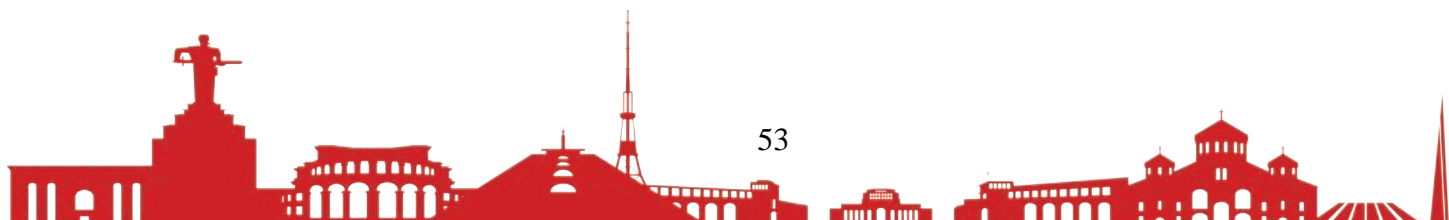
The Southern railway construction project in Armenia will create opportunity to restore Armenia's role as a transit country located on the Silk Road in the important part of the overland supply corridor leading to Europe. A 3,000 kilometer-long Silk Road is an ancient transport corridor, which passed through China, Central and West Asia, Iran, Turkey, Armenia and some European countries, providing commercial ties between them.



Length of railway lines	304.71 km
Estimated speed	80 km per hour for passenger trains
Minimum curve radius	500 m for ordinary cases, 300 m for complicated ones
Maximum curvature	30%
Traction type	Electric
Cargo traction	2100 tons
Estimated width of the arrival-departure lines	550 and 850 m

The project supposes:

- Construction of 84 bridges with a total length of 19.618 m;
- Construction of 60 tunnels with a total length of 10.2360 m;





- Construction of 27 stations, including 13 intermediate stations and the reconstruction of Gagarin station;
- Construction of edaphic posters of 152,73 km for the entire line.

The purpose of the Southern Railway construction

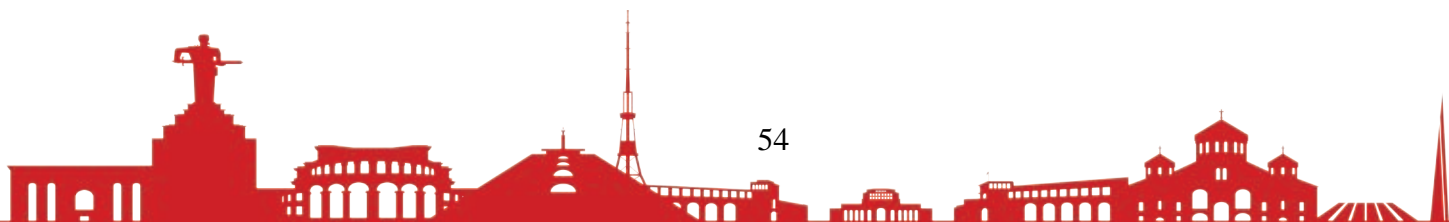
- It becomes the shortest transport route between the Persian Gulf and the Black Sea ports, Central and East Asia, including China and Europe, significantly saving transportation costs and time.
- The project will significantly contribute to the implementation of the passenger and cargo transportation to EU member countries, obviously reducing the distance of oil products transportation to the European countries from Iran and regional countries.

The importance of the Southern Railway construction

- In case of project implementation, as a key element for the international overland transportation between the Persian Gulf and Black Sea ports, it will become the most suitable corridor for overland transportation from the Persian Gulf to Europe and as well as from the perspective of cargo and passenger transportation from the Persian Gulf to the Southeast Asia. It will especially become irreplaceable as a result of reducing oil transportation distance from Iran to Europe.
- Due to the project, as a key part of the functioning North-South international transport corridor between the Central, Western Asia and Europe, significant infrastructures will be created that will greatly promote the economic development of the region.

Cooperation

- On July 28, 2012 the Government of the Republic of Armenia signed a concession agreement on the construction of the Southern Armenia railway with “Russia FZE” company, founded in the United Arab Emirates.
- “Russia FZE” signed a contract on the project’s implementation study with “China’s communicating Company” (CCC), and as a result a feasibility study of a new construction project, as well suggested a new alignment was prepared. The presentation of the preliminary alignment and the feasibility study of the Southern Armenia railway construction took place on February 19, 2014.
- On January 20, 2016 a memorandum of understanding was signed between the Ministry of Transport and Communication of the Republic of Armenia and the Ministry of Transportation and Urban Development of the Islamic Republic of Iran regarding the railway networks connection between the two countries, according which the construction of the railway in the territory of Iran will start after the





completion of the 30 % of railway construction in the territory of Armenia.

- Negotiations were held with the interested companies of different countries regarding the participation in the project implementation process.
- The Government of Georgia expressed its satisfaction regarding the project crucial for the region, hoping that the project will also have its positive impact on the development of the Georgian economy.

The main provisions of the project's feasibility study

The economic calculations were made based on the following estimated annual cargo volumes:

- **initial short-term (up to 2025): 15.4 million tons per year;**
- **long-term (up to 2035): 18.3 million tons per year.**

As a result, taking into account the upward and downward directions, annual cargo volumes will be around 25 million tons.

According to the preliminary estimates, the required investment amount for the project is around 3.2 billion USD, which does not include:

- the costs necessary for the implementation of the technical inspection and control
- electricity costs
- environmental and land acquisition costs
- duties, taxes, as well as project expertise and control costs
- other costs for construction permits, formulation of the final act.

The calculated internal profit rate of the project is 5.5%. It is estimated that even in case of 3% internal profit, the profit will be around 1.18 billion dollars.

The project's return on investments is calculated for 24 years. In case of failing the cost recovery period, the Government of RA is ready to discuss the possibility of the concession period extension for extra 20 years.

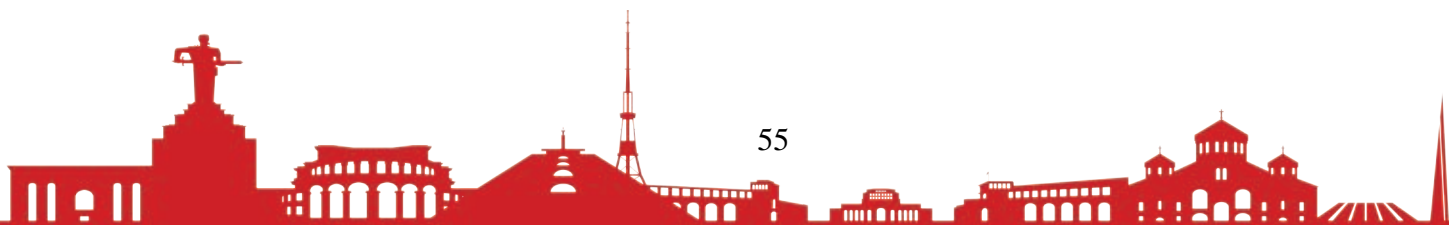
The main projections

Domestic cargo volumes forecast

It is predicted that on average about 3.52 million tons of domestic cargo will be transported through new railway.

- **Transit cargo volumes forecast**

Currently European importers are importing oil from Iran mainly through the strait of Hormuz, the marine transportation. According to the preliminary estimates, in 2011, Iran exported about 20.57 million tons of oil to Europe. After the construction of the new





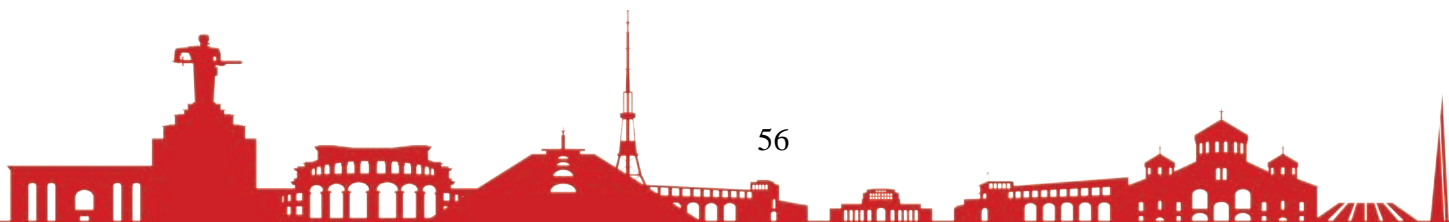
railway, a part of oil can be exported from Iran to European Union countries firstly overland to the Black sea and then through marine transportation up to the destination point. This will significantly reduce transportation costs compared with marine transportation. Thus, it is projected, that after the launch of the new railway, the transit transportation volume (mainly oil and oil products) will amount to 7.9 million, 8.7 million and 10.12 million tons, respectively on an initial, short-term and long-term basis.

- **Transit passenger volume forecast**

Taking into account, that the railway is the most convenient overland transport corridor between the countries of the Persian Gulf and the Black Sea regions, exploring other transportation indicators, it is expected that the volume of transit passengers (mainly tourism) in upward direction amounts to 270,000, 340,000, 510,000 persons per year, respectively on an initial, short-term and long-term basis, in downward direction and 310,000, 390,000 and 590,000 persons per year, respectively on an initial, short-term and long-term basis.

Expected outcomes

- The new railway that will connect the Persian Gulf to Europe is the key element missing of the North-South transport corridor. Its construction creates a strong bridge, improving trade and passenger transportation between Central and Southeast Asia, including China.
- After being implemented, the new railway will provide the most convenient and speedy overland transport corridor between the Southwest and Central Asia, particularly the Persian Gulf and the Black sea, as well as between the neighbouring European countries. The time for cargo transportation from Middle East to Europe time will be reduced up to 1.5 times.
- After being implemented, the new railway will reach the following transportation oriented results: facilitate trade between North and South of Armenia, cargo and passenger transportation, extraction of mineral resources and export to Europe, oil export from the Persian Gulf to Europe, Central and West Asia, carrying out trade, barter and cargo transportation.
- Southern Armenia Railway, located on the ancient Silk Road and being a missing link of overland transport corridor leading to Europe, after its construction, will promote the economic development of the Persian Gulf's oil producing countries, providing comfortable, convenient and rapid transit corridor for Southwestern and Central Asia, China and Europe. It will provide real economic benefit for all participating countries.





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