

The Islamic Republic of Iran  
Organization for investment economic and technical assistance of Iran

## **"Summary of Technical-Economical Prefeasible Study"**

Name:

**Micronized Hydrated Lime Production**

Sector: Non-Metallic Mineral Product

Subsector: Production of Cement, Lime, Gypsum, and Micronized Lime

isic code: 2694412303

The owner of:

Industry, mining and trade

Counselor plan:

Razi University

The Address:

Kermanshah

Date of P.F.S:

2024/10/22

**Manager of Iran Investment Opportunities  
SHAHRIG Engineering Company**

[www.shahrig.com](http://www.shahrig.com)



1- Abstract .....	2
2- Plan Location .....	5
2-1- Province.....	5
2-2- County .....	6
2-3- Project Location .....	8
2-4- Access to the Infrastructures .....	10
3- Plan Technical Specifications.....	10
3-1– Product.....	10
3-2- Project Requirements .....	11
3-2-1- Required Space and Infrastructure.....	11
3-2-2- Equipment and Machinery .....	11
3-2-3- Raw Materials and Intermediate Components.....	11
3-2-4- Management and Human Resources.....	11
4- Ownership and Legal Permits.....	12
4-1- Land Ownership .....	13
4-2- Intellectual Property and Incentives .....	13
4-3- Legal Permits.....	13
5- Market Analysis and Competition.....	14
5-1- Target Market Introduction .....	15
6- Project Physical Progress.....	18
7- Operational Plan and Implementation Schedule .....	18
8- Project Financial Plan.....	18
8-1- Cost Estimates .....	19
8-2- Revenues Estimates.....	27
8-3- Project Operation Duration .....	27
8-4- Break- Even Analysis.....	28
8-5- Cost-Benefit Analysis .....	29
8-6- IRR Sensitivity Analysis .....	30
8-7- Summarization Table .....	30
8-8- Exchange Rate Fluctuations Estimates During Project Implementation .....	30
9- Capital Requirements, Funding Methods, and Collateral .....	31
9-1- Required Foreign Currency Investment .....	31
9-2- Financing and Partnership Mechanism .....	31
9-3- Payback Period.....	32
10- Incentives, Features, and Benefits of Project .....	32

## 1- Abstract:

### PROJECT PROFILE - SUMMARY SHEET

Project Introduction
<b>1- Project title:</b> Production of Micronized Hydrated Lime
<b>2- Sector:</b> Non-Metallic Mineral Product <b>Subsector:</b> Production of Cement, Lime, Gypsum, and Micronized Lime
<b>3- Products / Services:</b> <p>The proposed project falls under the category of manufacturing other non-metallic mineral products (ISIC code 26), specifically within the subgroup of cement, lime, and gypsum (ISIC code 2696), with micronized lime (ISIC code 2694412303) as the primary product.</p> <p>The products are classified under tariff subsections (2522) of Iran's Customs Regulations as "Quicklime, Hydrated Lime (slaked lime), and Hydraulic Lime, excluding Calcium Oxide and Hydroxide," and are imported and exported under tariff code (25223000).</p>
<b>4- location (address):</b> Free Zone of Qasr-e Shirin, Qasr-e Shirin County, Kermanshah Province <b>Free Zone</b> <input checked="" type="checkbox"/> <b>Economic Special Zone</b> <input type="checkbox"/> <b>Industrial Estate</b> <input type="checkbox"/> <b>Main Land</b> <input type="checkbox"/>
<b>5- Project description:</b> <p>This project is designed with an annual capacity of 70,000 tons and will commence construction following the acquisition of necessary permits and operational licenses. The project aims to generate revenue through the sale of hydrated lime and micronized lime, which will cover its operational costs and yield annual profits.</p> <p>According to existing standards, a production unit for hydrated and micronized lime with a capacity of 100,000 tons requires approximately 25,000 square meters of land, of which 10,000 square meters will be covered and 15,000 square meters will be open space, while the remainder is designated for industrial outdoor areas. The project will occupy a total area of 25,000 square meters, with excess land allocated for green space and outdoor facilities. The necessary power supply and transformer will be obtained from the Qasr-e Shirin Free Trade-Industrial Zone, and a water supply has also been secured from the same area. The site's piping, within the halls and other parts of the production unit, will be installed by qualified contractors.</p>

<b>Project Status</b>	
6- Local / internal raw material access: 100 %	
7- Sale: <ul style="list-style-type: none"> <li>- Anticipated local market: 50 %</li> <li>- Anticipated export market: 50 %</li> </ul>	
8 – Project total time (from start of activities to start of commercial operation in years): The timeline for project phases leading to operational commencement is planned for 18 months.	
Schedule	Start of activities : Start of works at site End of Works : Start of commercial operation : The timeline for project phases leading to operational commencement is planned for 18 months.
9- Project status : <ul style="list-style-type: none"> <li>- Feasibility study available? Yes</li> <li>- Required land provided? No</li> <li>- Legal permissions (establishment license, foreign currency quota, environment, etc) taken? No</li> <li>- Partnership agreement concluding with local /foreign investor? No</li> <li>- Financing agreement concluding? No</li> <li>- Agreement with local /foreign contractor(s) concluding? No</li> <li>- Infrastructural utilities (electricity water supply, telecommunication, fuel, road, etc) procured? No</li> <li>- List of know- how, machinery, equipment, as well as seller /builder companies defined? Yes</li> <li>- Purchases agreement machinery, equipment and know-how concluded? No</li> </ul>	
<b>Financial Table</b>	

**10- Financial structure :**

Descriptions	Local Currency Required			Foreign Currency Required Million Euro	Total Million Euro
	Million Rials	Rate	Equivalent in Million Euro		
Fix Capital	1802490	600	2	1	3
Current Capital	404960	600	0.7	0	0.7
Total Investment	2207450	600	2.7	1	3.7

- Value of foreign equipment / machinery **1** Million Euro
- Value of local equipment / machinery **0.1** Million Euro
- Value of foreign technical know-how..... Million Euro
- Value of local technical know-how..... Million Euro
- Net present value (NPV): 223.345 Million Euro
- Internal Rate of Return (IRR): 29 %
- Capital Rate of Return: 22 %
- Payback Period **4 years and 8 months**

**General Information****11 - Project type : Establishment ■****Expansion and completion □****12- Company Profile**

- **Name (Legal/Natural persons):** 1. Dr. Somayeh Azami 2. Dr. Nader Naderi
- **Company's current activities:** Razi University
- **Address:** Razi University, Taq-e Bostan, Kermanshah, Iran.
- **Tel:** +988334277605-6 **Fax:** +988334277605-6
- **E-mail:** [info@razi.ac.ir](mailto:info@razi.ac.ir) **Web Site:** <https://en.razi.ac.ir>
- **Company's legal structure :**

Government ■

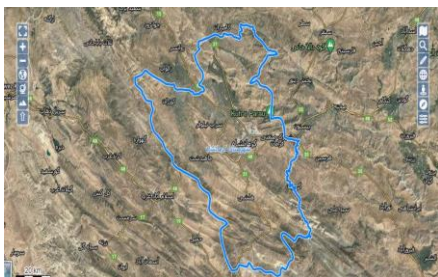
Non-Governmental □

Public non-governmental □

## 2- Plan Location:

### 2-1- Province:

Map Showing the Location of Kermanshah Province in Iran



**Kermanshah** province, encompassing an area of 25,009 square kilometers, ranks as the 17th largest province in Iran. Geographically positioned in the western region of the country, it spans latitudes  $33^{\circ}40'$  to  $35^{\circ}18'$  N and longitudes  $45^{\circ}24'$  to  $48^{\circ}7'$  E. The province borders Kurdistan to the north, Lorestan and Ilam to the south, and Hamadan to the east, while also sharing a 371-kilometer boundary with Iraq to the west. With an average elevation of approximately 1,200 meters above sea level, Kermanshah constitutes around 1.5% of Iran's total landmass.

As per the 2015 census, Kermanshah province had a population of 1,952,434, leading to a population density of 78 individuals per square kilometer. The capital city, Kermanshah, is the most populous urban center, housing 946,651 residents.

In terms of transportation infrastructure, Kermanshah ranks 11th nationally regarding total road length (excluding rural roads) and 17th in highway and freeway length per 1,000 kilometers of roadway. Its primary road network also holds an 18th position in the

ranking. The concentration of roads, particularly highways, is notable in the Kermanshah region due to its expansive land coverage. The province exhibits substantial potential to enhance its road infrastructure by converting many existing routes into highways.

Kermanshah's strategic advantage is further amplified by its six border markets—Khosravi, Parvizkhan, Somar, Shushmi, Shikh Saleh, and Tileh Kuh—and its considerable tourism prospects. These factors position Kermanshah as a vital player in generating foreign exchange and revenue for Iran. Expanding the road and transportation networks stands out as a critical strategy to elevate its economic contributions and regional connectivity. Kermanshah International Airport is already one of the busiest in the country, and a railway line is planned to connect to the international border at Khosravi and Iraq.

Kermanshah is characterized by its predominantly mountainous geography, with approximately 70.8% of its terrain classified as mountainous, 22.1% as plains, and a mere 7.1% as foothills. A significant portion of the province, about 76.5%, is situated at altitudes ranging from 1000 to 2200 meters, with

the highest concentration occurring between 1400 and 1800 meters. If Kermanshah Province is divided into two major altitude categories — below 1400 meters and above 1400 meters — approximately 58.2% of its area falls within the altitude category above 1400 meters, while the remaining 41.8% is located in areas below 1400 meters.

The province experiences a temperate mountainous climate, historically notable as the second royal residence of the Sassanian Empire in the 4th century AD. During this period, extensive gardens were established, serving both recreational and aesthetic purposes for the Sassanian nobility. Throughout the Islamic era, Kermanshah was frequently described as a city with a delightful climate, ample water supply, lush vegetation, and affordable goods. Ibn Faqih, in his celebrated geographic work, "Al-Buldan," written in 290 AH, offers a detailed depiction of Kermanshah:

"From Madain to the Balkh River, Qabad traversed vast lands, yet nowhere did he find a region as enchanting as Kermanshah and the Hamdan-Asadabad pass. The purity of its air, the sweetness of its water, and the delight of its breeze compelled him to construct Qarmasin."



Sunlight exposure in Kermanshah peaks at 2,999 hours annually, with maximum solar radiation recorded during the summer months of Tir (July) and Mordad (August) and minimal levels during winter, particularly in Dey (December) and Bahman (January).

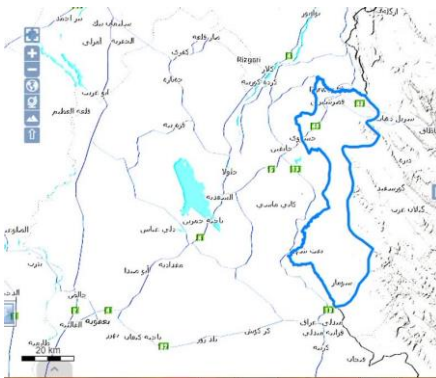
The climatic and ecological conditions of Kermanshah province, characterized by its average annual rainfall and relative humidity, have resulted in its mountains and plains being generally covered with forests and pastures. In some areas, irrigated and rain-fed agricultural lands can also be found. Additionally, this allows for the presence of both irrigated and rain-fed agricultural systems.

Ethnically, Kermanshah is predominantly inhabited by Kurds, encompassing numerous clans and nomadic tribes, such as Zanganeh, Kolahru, Guran, Jaf, Sanjabi, Qolkhani, Koliayi, Bajalan, Zole, and Jamir, alongside Lak tribes comprising Jalalvand, Kakavand, Osmani, Payravand, and Il-e Balavand. While the Lak are recognized within the Kurdish ethnic framework, there is also a Turkish-speaking demographic in Kermanshah, particularly in Sanqur and Koliayi County, where the Koliayi Kurds speak the Sanquri dialect—a transitional form between Azerbaijani Turkish and Khorasani Turkish. Furthermore, a subset of the Lor people has settled

in Kangavar County, primarily speaking the Thalathi dialect of Luri.

Over the last two centuries, Kermanshah has experienced significant internal migration from various Iranian provinces, notably Hamadan, Markazi, Isfahan, and Semnan. Numerous non-Kurdish families have relocated to cultivate Shia Islam, with families like the Al-Agha, Najumi, Meybodi, Faiz Mahdavi, Shahrestani, Sadoughi, Mohammadi Iraqi, Kazazi, Jabari, and Dezfuli contributing to the province's demographic diversity. These migrations have influenced the evolution of the Kermanshahi Persian dialect, reflecting the region's complex socio-linguistic landscape.

Map Showing the Location of the County in Kermanshah

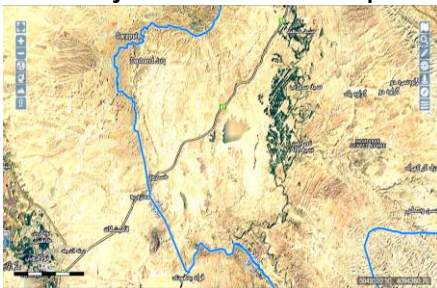


## 2-2- County:

Qasr-e Shirin County covers an area of approximately 1,550.28 square kilometers, accounting for 6.2% of the province's total landmass. Situated in the western part of the province, the county is bordered by Sar-e Pol-e Zahab County to the north, Ilam Province to the south, Gilan-e-Gharb County to the east, and Iraq to the west. The county consists of 2 urban centers, 2 districts, 4 rural districts, and 71 inhabited villages. Qasr-e Shirin city has three main entry and exit routes: Sar-e Pol-e Zahab, Khosravi, and

Gilan-e-Gharb. Other entry and exit points connect the city to population centers such as Sar-e Pol-e Zahab, Islamabad, Kermanshah, and Gilan-e-Gharb. Due to its unique political and economic position and its location on the Tehran-Baghdad highway, Qasr-e Shirin has held significant importance throughout history. Qasr-e Shirin County, with its elongated shape, is situated on the low-lying plains of the western border of Kermanshah Province. The lands within the county's boundaries are the lowest-lying in the province.

**Project Location Map**



### **2-3- Project Location:**

Following the assessments conducted during the initial phase of the study, there is a clear potential for the implementation of the proposed plan across all counties in Kermanshah province. Detailed analyses, factoring in critical considerations such as raw material availability, infrastructure possibilities, transportation accessibility, human resource capabilities, environmental considerations, government incentives, and competitive positioning, indicate that the Qasr-e Shirin Free Trade-Industrial Zone (FTIZ) is particularly well-suited for the plan.

Established in 2021, in accordance with the first clause of the law governing the management of free

trade-industrial zones adjacent to Qasr-e Shirin, this zone has emerged as a key economic hub in western Iran, largely due to its strategic proximity to two significant customs points: Khosravi and Parvizkhan.

The Qasr-e Shirin FTIZ offers a range of legal and governmental incentives designed to facilitate both domestic and foreign investment. Key benefits include guarantees for foreign investments per the provisions of the Free Zones Law, unrestricted capital movement, a 20-year tax exemption for all economic activities from the commencement date, and duty-free entry provisions for machinery, spare parts, capital goods, and raw or construction materials.

Additionally, manufactured goods exported from the FTIZ to international markets enjoy exemptions from general regulatory constraints, allowing firms to employ foreign skilled labor up to a limit of 10% of their workforce. The zone operates under flexible labor regulations, largely determined by mutual agreements, while also permitting transit and re-export of goods without restrictions. Foreign nationals can enter the zone visa-free, with certificates of origin issued for all goods exiting the FTIZ, alongside customs exemptions for manufactured goods entering Iran, relative to the added value and domestic materials used.

Customs advantages within the zone include the ability to register goods orders through long-term letters of credit, unloading cargo by a workforce designated by the goods owner, pre-clearance of goods, a 15% fee refund post-customs clearance, customs clearance facilitated through bank guarantees, issuance of negotiable warehouse receipts as requested by goods owners, and the generation of certificates of origin.

Furthermore, the zone provides the benefit of transit and re-export of foreign goods with minimal bureaucratic overhead, unrestricted entry for nearly all goods (excluding those incompatible with Islamic law), protection of foreign investors' legal rights against expropriation and nationalization, and the allowance of diverse economic activities for foreign investors. Company registrations can be facilitated by the Free Zone Organization, and the FTIZ permits up to 100% foreign investment without the necessity for Iranian participation, thereby streamlining the investment process significantly.

#### **2-4- Infrastructure Accessibility:**

The location of this project is considered to be the Qasr-Shirin Free Trade-Industrial Zone. A general review of access to infrastructure in the Qasr-Shirin Free Trade-Industrial Zone is as follows:

No.	Required Infrastructures	Distance to the Project	Infrastructure Supply Source
1	Water	0	Qasr-e-Shirin Free Trade and Industrial Zone
2	Electricity	0	Qasr-e-Shirin Free Trade and

			Industrial Zone
3	Gas	0	Qasr-e-Shirin Free Trade and Industrial Zone
4	Telecommunications	0	Qasr-e-Shirin Free Trade and Industrial Zone
5	High way	Not Assessed	
6	Sub way	Not Assessed	
7	airport	186 Km	
8	Port	650 Km	
9	Rail way	180 Km	

### 3- Plan Technical Specifications:

#### 3-1– Product:

Product and Sample Image



The target product of this plan falls within the manufacturing group for other non-metallic mineral products (Code 26), specifically under the sub-category for cement, lime, and plaster manufacturing (Code 2696), with a focus on micronized lime (Code 2694412303). These products are classified under Iranian customs tariff heading 2522, titled “Quicklime, slaked lime (hydrated lime), and hydraulic lime, excluding calcium oxide and hydroxide classified under Code 2825,” with import and export operations conducted under subheading (25223000).

### 3-2-Plan requirements:

#### 3-2-1-Space and Infrastructure Required:

This plan is designed for an annual production capacity of 100,000 tons. Following the acquisition of the necessary permits, the construction phase will commence, leading to the issuance of an operational license, after which production activities will begin. Annual revenue will be generated from the sale of hydrated lime and micronized lime, which is expected to cover operational expenses and yield annual income. According to current standards for the production of hydrated and micronized lime, the establishment of a production facility with a capacity of 100,000 tons per year requires a total of 25,000 square meters of land. This includes 8,000 square meters of covered space, 17,000 square meters of open space, and additional area allocated for the industrial unit's open premises. A total land area of 25,000 square meters has been allocated for this plan, with surplus land designated for green spaces and open areas.

The required power capacity, including a transformer, has been allocated for this facility, sourced from the Qasr-e Shirin Free Trade-Industrial Zone. Additionally, water supply rights have been arranged through the same free trade zone. Piping for the premises, inside the production sheds, and in other parts of the production unit will be installed by qualified contractors.

**Investment Plan for Land, Landscaping, and Construction**

No.	Description / Name of Facilities	Details	Required Investment		Total Cost (Million IRR)
			Required Quantity/Area	Price per Unit (IRR)	
1	Land	25,000 square meters of land in the Qasr-e Shirin Free Trade- Industrial Zone	25,000	7,000,000	175.000
2	Landscaping Operations	As per detailed specifications	25,000	2,990,000	74.750



3	Construction	Industrial Hall	7,500	93,400,000	700,500
		Administrative Building	250	150,000,000	37,500
		Other Buildings	250	150,000,000	37,500
Total			-	-	1,025,250

### 3-2-2-Equipment and Machinery:

#### Main Machinery and Equipment Required

No.	Machine/Equipment Name	Total Quantity	Required Investment for the Plan		Total Cost (Million IRR)
			Purchase Price	Currency Unit	
1	Various Hammer and Jaw Crushers	2	72,500	Million IRR	145,000
2	Vibrating Feeder	1	55,750	Million IRR	55,750
3	Belt and Screw Conveyors	4	5,750	Million IRR	23,000
4	Elevator	4	7,000	Million IRR	28,000
5	Rotary or Vertical Kiln	1	95,500	Million IRR	95,500
6	Rotary Cooler	1	55,000	Million IRR	55,000
7	Separator and Hydrator	1	31,250	Million IRR	31,250
8	Fine Grinding Mill and Separator	1	8,500	Million IRR	8,500
9	Raw Material and Hydrated Lime Silos	2	11,250	Million IRR	22,500
10	Filtration System (Bag Filter)	1	47,500	Million IRR	47,500
11	Exhaust Fan	1	8,500	Million IRR	8,500
12	Boiler, Pump, and Packaging Line	1	15,250	Million IRR	15,250



Total	535,750
-------	---------

#### Machinery and Auxiliary Equipment

No.	Items	Details	Total Cost (Million IRR)
1	Electrification	1 MW electrical connection, purchase of panels, related equipment, and cabling	45,000
2	Heating System	Heating system for ancillary and production buildings	4,000
4	Cooling System	Cooling system for ancillary and production buildings	3,000
5	Exhaust Fans and Ventilation	Ventilation system for the production building	4,500
6	Ventilation Fans and Installation	Ventilation system for ancillary buildings	700
7	F.B Implementation	For ancillary and production buildings	110
8	Compressed Air Distribution Network	Distribution of compressed air in the production building	2,000
9	Purchase and Installation of Telephone Line	-	100
10	Water Connection and Piping	-	5,500
11	Purchase and Installation of Water Purification and Softening Equipment	-	1,500
12	Fire Extinguishing System	Includes central system, fire extinguishers, fireproof clothing, etc.	2,100
13	Forklift	One 5-ton forklift	25,000
14	Pickup Truck	One pickup truck	24,000
15	Spare Parts Cost (5% of Machinery Cost)	-	26,780
Total			144,290

### 3-2-3- Raw Materials and Intermediate Components:

Raw Materials Utilization Cost					
No.	Description	Unit	Purchase Cost (IRR)	Annual Consumption	Annual Cost (Million IRR)
1	Limestone	Ton	9,800,000	200,000	1,960,000
Total					1,960,000

### 3-2-4-Management and Human Resources:

The production of micronized hydrated lime will require a workforce of 120 personnel in production, management, and support roles, as detailed in the following table.

Row	Skill level	number	Salaries (wages) (IRR)
1	Expert	24	200/000
2	Skilled	36	150/000
3	Non-Skilled	60	125/000

- Number of skilled personnel required: 24
- Number of non- skilled personnel required: 36
- Number of expert personnel required: 60

#### **4- Ownership and Legal Licenses:**

##### **4-1- Land Ownership:**

Free Trade-Industrial Zones operate in accordance with their specific laws and regulations.

One of the unique features of free zones is the possibility of 100% foreign ownership of properties and assets.

According to Article 2 of the Regulations on Land Use and National Resources in Free Trade Zones, all lands within the boundaries of each Free Trade-Industrial Zone that are owned or controlled by the government are subject to these regulations.

Per Article 5 of the same regulations, all rights pertaining to lands governed by the Urban Land Law, the Law on Nationalization of Forests and Rangelands, the Law on Forest and Rangeland Conservation and Exploitation, and the Law on Coastal and Created Lands, located within the boundaries of each zone, are administered by the Free Zone Organization under this regulation.

Article 6 stipulates that for all such lands, the relevant Real Estate and Deeds Registration Office must officially register government-owned lands in the name of the government, as represented by the relevant Free Zone Organization. Any previously issued deeds will be revised accordingly.

According to Article 7, from the date of approval of these regulations, all debts, rights, and responsibilities of the National Land and Housing Organization and the Forests, Rangelands, and Watershed Management Organization concerning natural resources within each Free Trade Zone will be transferred to the respective Free Zone Organization.

Any land use within the zone is only permissible within the framework of the approved master plan and the internal regulations of each Free Trade Zone Organization.

#### **4-2- Intellectual Property and Incentives:**

The production of hydrated lime does not require the use of highly advanced technical knowledge, as the necessary technical expertise is available within the country. Today, the production of high-quality lime is of fundamental importance in various industries. The production of hydrated lime through the hydration method has placed Iran among the countries that produce and possess the technology for hydrated lime production. However, production must comply with domestic standards.

#### **4-3- Legal Licenses:**

Individuals and entities engaging in any production or industrial activities are required to obtain an industrial unit establishment permit. In free trade and special economic zones, this permit is issued under the supervision of the Free Zone Organization. The establishment of an industrial unit is a prerequisite for all production and industrial investment activities. Following the completion of the establishment phase and trial production, and upon meeting the conditions specified in the establishment permit, an operating license is issued, with the establishment permit being a prerequisite for its issuance.

A commission comprised of representatives from the Ministries of Industry and Mines, Commerce, Agriculture, the Central Bank, the Customs Administration of Iran, the High Council Secretariat, and the Free Zone representative determines the allowable domestic content (i.e., the portion of goods produced in the industrial unit that may be imported into the mainland as domestic goods without registration) and the percentage of added value (determining customs duty discounts) based on the production unit's feasibility study and required domestic and foreign raw materials.

Each industrial unit requires a production certificate for every product segment, listing the produced items and specifying domestic and foreign raw materials. The output from industrial units in free trade and special economic zones may serve four purposes:

- 1- Local consumption within the zone,
- 2- Dispatch to the mainland,
- 3- Export to foreign countries,
- 4- Shipment to other zones.

For producing this product, specific legal permits are required, such as an establishment permit and an operating license from the Kermanshah Province Organization of Industry, Mining, and Trade, along with environmental permits.

Given that the type and amount of pollution generated by industries vary depending on the type of materials used and produced, as well as the stage of the processes, this means that different processes may cause pollution at three stages: the collection of raw materials, the production and conversion of intermediate materials, and the collection and storage of produced materials. Among the recommended environmental activities is obtaining certifications such as ISO 14000 from accredited institutions approved by the Environmental Protection Organization and the Standards Institute through the following activities:

#### 1- Industrial and Sanitary Wastewater Treatment:

A precise identification of wastewater sources is conducted, along with quantitative and qualitative measurements of pollutants in all units. Wastewater treatment systems are installed accordingly.

#### 2- Efforts to Prevent Pollution:

To mitigate air pollution resulting from industrial activities, comprehensive quantitative and qualitative assessments of pollutants have been carried out. Necessary measures will be implemented to control pollution, including the installation of advanced atmospheric pollutant monitoring devices and CCTV cameras that continuously and line-on monitor emissions on a daily basis.

### 3- Solid Waste Management:

4- Environmental Research and Studies: Research activities are focused on process optimization, waste reduction, water and wastewater treatment, air pollution control, and waste recycling.

5- Green Space Development: Integrating industry with green spaces is a fundamental goal for both upstream and downstream industries. According to environmental standards, at least 10% of industrial spaces must be allocated to green areas. In this complex, a larger portion has been dedicated to green spaces. Additionally, these areas are irrigated using treated industrial wastewater, significantly reducing water consumption.

6- Utilization of Modern Technology and Avoidance of Inefficient Technologies: When a new environmental standard is introduced, industries face significant environmental pressures, requiring substantial financial and human resources to reduce pollution levels. Calculations have shown that if new technologies implemented in a given industry comply with the relevant standards, they not only reduce pollution but also enhance production efficiency. In this regard, the company, by employing cutting-edge technology and adhering to all global environmental and quality standards, can demonstrate its commitment to this principle. Environmental protection can also drive technological advancements. This approach has been adopted in European countries, where outdated technologies that no longer comply with environmental standards are phased out. In some cases, these obsolete technologies are exported to

developing countries, and Iran has not been exempt from this trend. Environmental experts believe that if an industry is unable to produce a product while maintaining environmental standards and does not possess the capability to acquire the necessary technology, it should not pursue production of that product. In certain industrial units, the use of outdated and inefficient technologies results in such excessive waste of raw materials and energy that the argument for prioritizing economic efficiency over environmental preservation becomes meaningless. A comparison of the costs associated with acquiring more expensive yet modern technologies versus the costs incurred due to the inefficient consumption of raw materials, energy, and environmental restoration clearly indicates that investing in up-to-date technology is not only more cost-effective but also more beneficial for industrial growth and technological development.

## **5- Market Analysis and Competition:**

Lime production is a relatively complex process, yet it does not require a high volume of capital investment. Consequently, numerous companies operate in this sector worldwide. Since the production and consumption of hydrated lime depend on quicklime, global market studies focus primarily on quicklime. The global production of lime has shown a consistent upward trend, growing from 120,000 tons in 1997 to 330 million tons in 2004, 350,000 tons in 2011, and 425,000 tons in 2020. A significant portion of global lime production is concentrated in China. The applications of lime are diverse, including:

**Steel Industry:** Before 1960, lime was widely used as a flux in open-hearth steel furnaces alongside other materials. Approximately 12 kg of lime is required per ton of steel.

**Metallurgy:** Lime is employed in the smelting of certain metal ores, such as copper.

**Water Treatment:** Lime reduces water hardness by precipitating bicarbonates present in the water.

**Chemical Industry:** Lime is essential in producing sodium carbonate, sodium bicarbonate, calcium carbide, ethylene, propylene compounds, glycols, calcium-based organic salts, as well as in refining and concentrating citric acid and glucose.

**Paper Manufacturing:** In the pulp and paper industry, lime is used for sulfate pulp production, sodium carbonate recycling, and calcium hypochlorite production for bleaching.

**Construction and Ceramics:** Lime is used as mortar, interior plaster, and as a flux in glass manufacturing.

**Pharmaceuticals:** Calcium carbonate, with its antacid properties, is used to treat kidney issues and osteoporosis and serves as a calcium supplement.

**Fillers:** Ground calcium carbonate and precipitated calcium carbonate are used extensively in paper, plastic, and paint industries.

**Sugar Refining:** Lime aids in purifying sugar by removing phosphate compounds and organic acids.

**Petroleum Industry:** Lime neutralizes sulfur compounds, renders SO<sub>2</sub> gas inert, and is used in specialized grease production.

**Paint Manufacturing:** Lime serves as a filler material.

**Leather Tanning:** In leather processing, lime is used to remove hair or wool from hides.

**Agriculture:** Lime is applied to regulate water pH.

In Iran, as in other Middle Eastern countries, the demand for lime is not predominantly industrial. Due to increasing urbanization and expanding construction activities, the building sector consumes the largest share of lime.



Demand for lime is expected to grow with population increases and the need for more buildings and roads. In construction, lime is widely used as mortar and can also be processed into building materials such as cement, bricks, and blocks. Currently, 89 production units in Iran hold operating licenses for micronized lime, and an additional 566 establishment permits have been issued, reflecting substantial domestic demand for this product.

### **5-1. Target Market Introduction:**

The lime market can be segmented into chemical, construction, metallurgical, and service industries based on its applications. Metallurgical and metal production industries consume roughly 50% of the world's lime, positioning them as primary market drivers. Estimations indicate that the metallurgical industry will continue to maintain the largest share of lime consumption in the coming years. However, the construction industry remains the most profitable lime market segment, anticipated to increase its share by up to 5% of future production due to rapid urbanization in Asia, the Middle East, and Africa.

With the primary use of lime in steel production, concrete, and mortar, and a smaller proportion used in chemical industries, this plan is positioned to satisfy domestic demand while also serving markets in the Middle East, thereby generating foreign exchange revenue. Data on exports and imports of micronized hydrated lime for 2023 is presented in the following table.

<b>No.</b>	<b>Tariff Code</b>	<b>Tariff Description</b>	<b>Country</b>	<b>Weight (kg)</b>	<b>Value (USD)</b>
1	25223000	Hydrated Lime	Iraq	1,230,078	41,768
2	25223000	Hydrated Lime	Turkmenistan	254,380	8,790
3	25223000	Hydrated Lime	Pakistan	24,900	844
4	25223000	Hydrated Lime	Turkey	2,500	85
<b>Total</b>				<b>1,511,858</b>	<b>51,487</b>

**6- Physical Progress of the Plan to Date :**      Yes ☐      No ☒

This project is a new initiative intended to meet domestic needs and facilitate the export of a portion of the product. There has been no progress in the project implementation stages to date.

**7- Operational Program and Plan Implementation Schedule:**

The implementation of this project, from initiation to full operational status, is scheduled to take 18 month

**Plan Implementation Schedule**

		Mth. 1	Mt h. 2	Mt h. 3	Mt h. 4	Mt h. 5	Mt h. 6	Mt h. 7	Mt h. 8	Mt h. 9	Mt h. 10	Mt h. 11	Mt h. 12	Mt h. 13	Mt h. 14	Mt h. 15	Mt h. 16	Mt h. 17	M th. 18
<b>Micronized Hydrated Lime Production Plan</b>	Feasibility Study																		
	Obtaining Licenses																		
	Constructi on																		
	Equipment Installation																		
	Training																		
	Operation																		

**8- Project Financial Estimates:**

**8-1- Cost Estimates:**

**Cost Estimates**

No.	Subject	Cost (Million IRR)
1	Fixed Investments	1,802,490
2	Operating Costs (Working Capital)	404,960
3	Financial Costs	2,207,450

### Fixed Investment Estimates (Capital Expenditures)

No.	Category		Cost (Million IRR)
1	Land Acquisition Cost		175,000
2	Landscaping and Land Improvement		74,750
3	Civil Projects and Construction of Buildings		775,500
4	Plant Machinery and Equipment		535,750
5	Service and Auxiliary Equipment		144,290
6	Safety and Environmental Equipment		0
7	Overhead Costs		0
8	Preproduction Expenditures	Preinvestment Studies	3,410
		Project Management and Organization	8,530
		Technology Acquisition	0
9	Contingency Costs		85,260
Total			1,802,490

**Table: Working Capital Estimates (Production Costs)**

No.	Subject		Cost (Million IRR)
Variable cost			2,502,790
1	Material		1960,000
2	Human Resources		243,830
3	Marketing (excluding human resources)		50,400
4	Other Variable Cost	Fuel and Energy	36,230
		Maintenance	93,150
		Contingency	119,180
Fixed cost			257,780
5	Raw Materials		0
6	Human Resources		60,960
7	Marketing (excluding human resources)		0
8	Depreciation Cost		145,550
9	Other Fixed Costs	Fuel and Energy	12,280
		Maintenance	23,290
		Contingency	12,100
		Insurance	3,600
Total			2,760,570

## 8-2- Revenues Estimates:

Project Revenues in the First 5 Years Post-Operation

No.	Subject	Season 1	Season 2	Season 3	Season 4	Year 1	Year 2	Year 3	Year 4	Year 5
1	Micronized Hydrated Lime	672,000	672,000	672,000	672,000	2688,000	2856,000	3024,000	3192,000	336,000
<b>Total</b>		672,000	672,000	672,000	672,000	2688,000	2856,000	3024,000	3192,000	336,000

## 8-3- Project Operation Period:

In production projects, there are generally three types of project life cycles:

- Project Life Cycle or Construction Phase
- Operational or Production Life Cycle
- Product Life Cycle

The project life cycle refers to the construction phase, where significant expenses are typically incurred. A successful project is one that completes this phase within or under the planned time and budget. To achieve this, project management techniques should be applied effectively and in real-time, allowing for adjustments in the planning phase if any issues arise.

The operational life cycle corresponds to the production phase, which includes the effective operational or production lifespan. For micronized hydrated lime production plans, this phase is generally designed for a 10-year period. During the operational phase, revenue is generated through product sales, typically exceeding costs; otherwise, the project would lack economic viability.

Unlike the construction phase, project management techniques are no longer required in the operational phase. Instead, production scheduling and process operations planning are more suitable for managing industrial projects over the operation period. During this time, effective maintenance management is critical to ensure continuous operation.

#### 8-4-Break-Even Analysis:

Fixed Capital = Fixed Costs + Pre-operational Costs

Fixed Capital = 1790550 + 11940 = 1802490

##### A. Product Unit Cost (IRR)

Unit Cost of Product (Rials)=Total Annual Production Costs/Total Product Output

Unit Cost of Product (Rials)= 2,706,570,000 / 70,000,000= 38,665

##### B. Annual Break-Even Percentage

Break-Even Percentage= Total Sales (P) - Variable Costs (V)/Total Fixed Costs (TFC)

Break-Even Percentage= 257,780 / 3,360,000 – 2,502,790= 30%

The difference between P and V is referred to as the unit contribution margin, representing the profit per unit or the portion of each sale that covers fixed costs. The break-even point occurs when the total contribution margin equals total fixed costs. In this case, sales beyond the break-even point cover more than 30% of fixed costs.

The relationship between total sales revenue and total costs shows that this plan will operate at an annual break-even point exceeding 30%, ensuring profitability over three production cycles and creating a margin of safety for continued production. The margin of safety in break-even analysis indicates that actual or estimated sales exceed break-even sales by more than 30%.

##### C. Gross Added Value per Period (Million IRR)

Gross Added Value = Total Sales – (Raw Materials and Packaging + Fuel and Energy + Maintenance)

Gross Added Value = 3,360,000–(1,960,000+48,510+116,440) = 1,235,050 Million IRR

##### D. Net Added Value per Period (Million IRR)

Net Added Value= Gross Added Value–(Depreciation Before Operation+Annual Depreciation)

Net Added Value= 1,235,050–(145,550 + 2,390)= 1,087,110 Million IRR

E. Gross and Net Profit (Million IRR)

Gross Profit=Total Sales–Cost of Goods Sold

Gross Profit=3,360,000–2,706,570=653,430 Million IRR

Net Profit=Gross Profit–(Administrative, Sales, Marketing, and Other Expenses)

Net Profit=653,430–54,000=599,430 Million IRR

F. Per Capita Fixed Investment (Million IRR)

Per Capita Fixed Investment= Fixed Investment / Number of Personnel

Per Capita Fixed Investment= 1,802,490 / 120= 15,020 Million IRR

G. Total Per Capita Investment (Million IRR)

Total Per Capita Investment= Total Investment/Number of Personnel

Total Per Capita Investment= 2,207,450 / 120= 18,395 Million IRR

H. Annual Return on Investment (ROI)

Annual ROI= Total Investment/ Total Costs – Total Revenue

Annual ROI= 3,360,000 – 2,760,570 / 2,207,450 = 28%

I. Payback Period (Years)

$$\text{Payback Period} = \frac{1}{\text{IRR}} + \text{The duration of the construction period}$$

Payback Period= 4 years and 8 months

**8-5- Cost-Benefit Analysis**

**Table: Project Profitability Indicators**

Total Fixed Investment Present Value	2760570
Total Net Revenue Present Value	3360000
Net Present Value (NPV)	372243
Benefit - Cost Ratio B/C	1.2
Internal Rate of Return (IIR)	29%

## 8-6- IRR Sensitivity Analysis

### IRR Sensitivity

Discount Rate (%)	Net Present Value (NPV) (Million IRR)
10	2,149,563
20	624,778
30	-29,491
40	-341,825
50	-500,869
60	-583,804
70	-625,937
80	-644,939
90	-650,307
100	-647,442

## 8-7- Summary

**Table: Project Economic Aspects Summary**

Activity	Detailed activity description with code (ISIC )	Manufactured Products	Nominal Capacity (Unit)
Micronized Hydrated Lime Production Plan	2694412303	Micronized Lime	70,000 tons
Implementation Period	Total Fixed Investment (Million IRR)	Annual Working Capital (Million IRR)	Required Workforce
15 years	1,802,490	404,960	120 employees
Internal Rate of Return (IRR)	Net Present Value (NPV) (IRR)	Applicant Contribution (IRR)	Benefit-Cost Ratio (B/C)
29%	372,243 Million IRR	441,490 Million IRR	1.2

## 8-8- Estimated Exchange Rate Variations During Project Implementation

Regarding the acquisition of machinery and equipment, a portion of the required items will be sourced internationally. Consequently, any increase in the exchange rate will raise the initial capital investment costs, whereas a decrease in the exchange rate would reduce these initial costs.

As for the raw materials needed for this plan, all required materials will be sourced from domestic mines within Kermanshah Province. Therefore, fluctuations in the exchange rate will not affect the production cost of the final product.

In terms of product sales, part of the plan's revenue is expected from exports. An increase in the exchange rate would enhance the revenue from exports, while a decrease in the rate would allow for greater competitiveness in the domestic market.

## **9- Capital Requirements, Funding Methods, and Guarantees**

### **9-1- Required Foreign Currency:**

A significant portion of the plan's fixed capital investment is in local currency (IRR). The total estimated investment for the plan is 3 million euros, of which 1 million euros is expected to be in foreign currency. This foreign currency investment is planned to be disbursed over a period of 18 months, aligned with the plan's physical progress.

**Required Foreign Currency Investment (Euro)**

<b>No.</b>	<b>Year</b>	<b>Required Foreign Currency</b>
1	First Year	750,000
2	Second Year	250,000
3	Third Year	0
4	Fourth Year	0
5	Fifth Year	0

### **9-2- Participation and Funding Method**

Participation in and financing of the plan is planned through the establishment of a domestic company. The entire financial requirement is expected to be covered by the investor's contribution, and no loans or credit facilities from domestic banks have been considered for plan implementation.



### **9-3- Capital Payback Period**

The capital payback period for the ferrosilicomanganese production project, based on the amount of fixed and variable investment and annual production sales, is approximately 4 years and 8 months. This means the initial investment will be recovered within this timeframe.

### **10- Incentives, Features, and Benefits of the Plan**

#### **Advantages of Implementing This Plan in the Qasr-e Shirin Free Trade-Industrial Zone:**

- Trade transactions between the free trade-industrial zones and foreign countries, as well as with other special economic and free trade-industrial zones, are exempt from customs duties, commercial profit taxes, and all import/export levies after registration with customs. These transactions are not subject to import and export regulations, except for legal and religious restrictions. However, trade with other parts of the country follows general import and export regulations.
- Importing goods from abroad or from other free trade-industrial zones into this zone involves minimal customs formalities, and the domestic transit of imported goods to the zone is conducted in accordance with relevant regulations.
- Goods imported from abroad, other free trade-industrial zones, or other special economic zones can be re-exported without any formalities.
- The zone's management has the authority to classify, evaluate, and allocate land use rights to eligible individuals or legal entities.
- Owners of goods imported into the zone can declare part or all of their goods for temporary import into the domestic market, subject to customs regulations.

- Products manufactured or processed within the zone, upon entry into other parts of the country, are considered domestic production to the extent of their total value-added, including the value of domestic raw materials and locally produced components. These goods are exempt from import duties.
- Foreign raw materials and components used in production or processing are considered equivalent to domestic raw materials and components, provided that import duties are paid.
- The zone's management, upon the applicant's request and with the approval of Iran's Customs Authority, is authorized to issue Certificates of Origin for goods exported from the zone. Domestic banks are required to recognize and accept these certificates.
- Customs authorities are obligated to accept requests from traders for transit and direct shipment of goods from other entry points to the zone and to provide the necessary facilities for this process.
- The country's Deeds and Property Registration Organization is responsible for registering companies or branches of foreign companies intending to operate in the zone, regardless of the proportion of domestic and foreign shareholding. The organization is also responsible for registering intellectual property rights in the zone.
- All goods required for production or service provision within the zone are exempt from general import-export regulations.