Cutting marble stones into slabs
In Bojnourd Special Economic Zone

Center of Investment Services of North Khorasan

2021 April

Summary of Technical-Economical Pre-Feasibility Study

The Name: Cutting Marble Stones into Slabs

Sector: Industrial

Subsector: Metal Products

ISIC Code: 2696512306-2696512307

The owner of:

Organization of Economic Affairs and Finance (North Khorasan)

The ADDRESS:

Iran, North Khorasan, Bojnourd

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1 Abstract

1.1 Project Profile - Summary Sheet

Table 1: Summary Sheet

Project Introduction			
Project Title	The Marmarite Cutting		
Sector	Industrial		
Sub Sector	Mineral Products		
Location	Iran, North khorasan, Bojnourd		
The County	Bojnourd		
Products / Services	Marble		
Annual Nominal Capacity	90,000		m^2
The Raw Material	Cutting Marble Stones Into Slabs		
Employment	15		Person
Land Area	4,518		m^2
Floor Area	3,010		m^2
Energy and Water Consumption	Water Consumption	6,000	m^3 in year
	Electricity Consumption	240	KW
	Gas Consumption	70,000	m^3 in year
Fixed Capital	450,517		Million Rial
Working Capital (The First Year)	35,753		Million Rial
Payback Period	5.21		Year
Net Present Value (NPV)	250,914		Million Rial
Internal Rate Of Return (IRR)	33		%
Modified Internal Rate of Return (MIRR)	23		%
Break Even Point	34		%
The Exchange Rate (Dolar)	240,000		Rial
Description	In this project, all the materials related to the study of the Marble market especially domestic and foreign supply and demand, are examined.		

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Table 2: Legal Authorizations

Licensure Status	
Descriptions	Issuance Status
Principal Agreement (Establishment licensure)	☒
Land Allocation	☒
Environmental Inquiry	☒
Possibility of Water Supply	☒
Possibility of Electricity Supply	☒
Possibility of Electricity Supply	☒
Possibility of Gas Supply	☒

Table 3: Total Investment

Descriptions	Local Currency Required			Foreign Currency Required (Million Euro)	Total (Million Euro)
	(Million Rial)	Rate	Equivalent in (Million Euro)		
Fixed Capital	450,517	240,000	1.87	1.87	1.87
Working Capital	35,753.6		0.15	0.15	0.15
Total Investment	**486,270.6**		**2.026**	**2.026**	**2.026**

- Value of foreign equipment / machinery: 0 Million Euro

- Value of local equipment / machinery: 1.18 Million Euro

- Net present value (NPV): 1.04 Million Euro in 15 years

- Internal Rate of Return (IRR) (for 10 years): 33%

- Payback period: 5.21 years

Company Profile	
Project Type	Establishment ☒
Company Name	North Khorasan Organzation of Industry, Mine and Trade
Contact Person (Name and Position)	Morteza HoseyniMasoom
Email	smt.nkh1383@gmail.com
Mobile	09153864144
Tel	05831552
Website	nkh.mimt.gov.ir
Address	North Khorasan Province, Bojnurd, North Khorasan Organzation of Industry, Mine and Trade
Company's Legal Structure	Government ☒

2 Project Location

2.1 Province: **North khorasan**

2.2 The County: **Bojnourd**

Bojnourd is the capital city of North Khorasan Province, Iran. It is about 701 km from Tehran. Bojnourd is located in the plains enjoying a mild and mountainous weather. There are several reason for investing in bojnourd, such as:

2.2.1 Agriculture Section Advantages

- Suitable and diverse climatic conditions and having relatively suitable rainfall
- Having far more livestock per capita than the national average
- Having a considerable supply of diverse fruits
- The Possibility of establishing agricultural conversion industries in industrial parks

2.2.2 Tourism Section Advantages

- Having the presence of different ethnicities and producing handicrafts related to the culture of each ethnic group
- Being in a special geographical position and traveling 24 million passengers annually (ten percent of the total number of traveling passengers in the country) through North Khorasan

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2.2.3 Mine and Industry Section Advantages

- Having large industries of alumina, steel, piping, petrochemical, cement and the availability of the development of industrial activities in downstream industries and creating a value chain.
- Conducting mineral exploration studies in Bojnourd, and valuable minerals for processing
- The existence of the Bojnord special economic zone has distinct advantages, including the shortest distance to the provincial capital among all special economic zones in the country, as well as its proximity to the Bidak industrial town.

2.2.4 Urban Development Section Advantages

- Appropriate and significant justification of urban and commercial projects and plans according to the characteristics and advantages of tourism, agriculture and industrial areas.
- The existence of transferable lands with suitable location.
- The need for commercial and tourism spaces in Bojnord due to the low per capita of these spaces.

This project will be construct in part 44 with coordinates (521749,4146400) in Bojnourd Special Economic Zone. Proposed location of project is shown in **Error! Reference source not found.**.
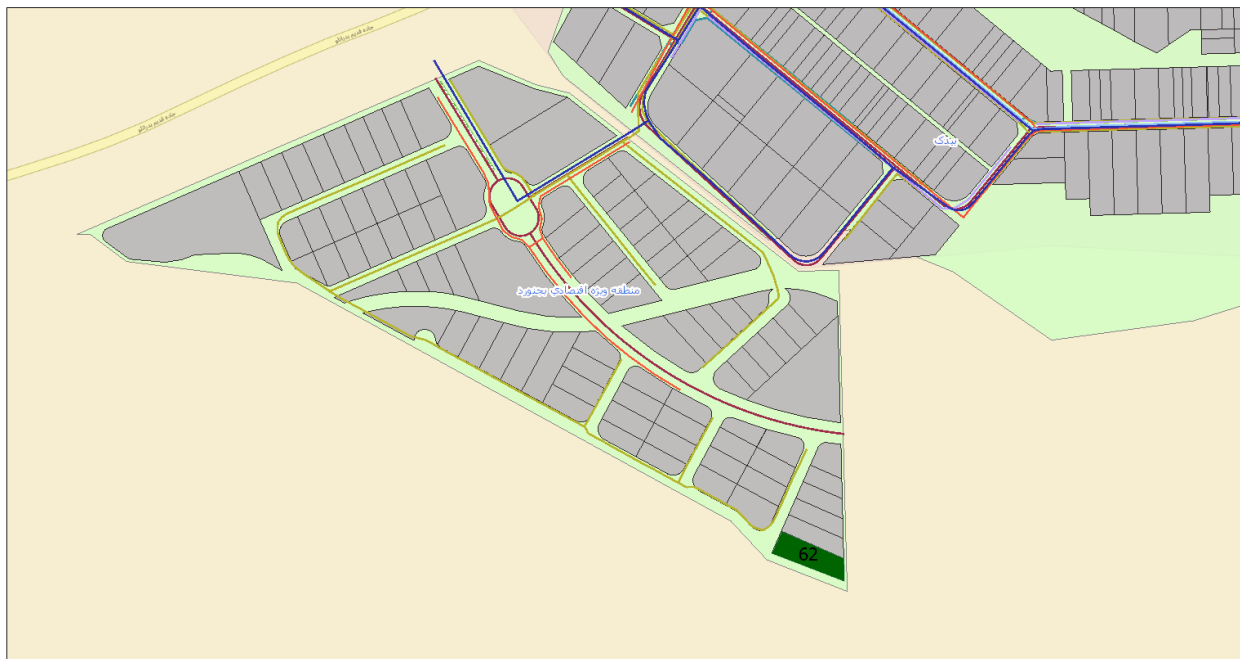

Figure 1: Location of Proposed Land in Bojnourd Special Economic Zone

2.3   The Project: **The Marmarite cutting**

2.4   Access to the Infrastructures

Table 5: Access to Infrastructures

No	Needed Infrastructures	Distance to the Project	The Supply Infrastructures
1	Water	0	is provided
2	Electricity	0	is provided
3	Gas	0	is provided
4	Telecommunications	0	is provided
5	High way	<1 km	is provided
6	Sub way	0	is provided
7	Airport	8	is provided
8	Amirabad Port (Behshahr)	417	is provided
9	Bandar Abbas Port	1,493	is provided
10	Rail way station of Joveyn	170	is provided
11	Rail way station of Jajarm	192	is provided

3   Technical Specifications of Plan

3.1   Product

Table 6: Project Specifications Based on ISIC Code

The Project	ISIC Code	Customs Tariff	Environmental Category
Cutting marble stones into slabs	2696512306	25151110	3
Cutting marble stones into tiles	2696512307	68022100	3

In this project, all the materials related to the study of the Marble market especially domestic and foreign supply and demand, are examined.

Pure marble has a bright white color. Light gray to black color is produced by carbonaceous materials. Green colors are usually produced by chlorite or other silicates. The pink and red colors are due to the presence of very fine particles of hematite or manganese carbonate, and the yellow and cream colors are due to the presence of limonite. This stone is a valuable stone because of its beauty, strength and resistance to fire and erosion. Compared to travertine, marble is more suitable for use on floors and stairs due to its higher hardness.

The term marble includes materials that are composed of minerals that do not exceed 4 to 5, regardless of how they are formed. The stone industry distinguishes between crystalline marbles and limestones. Crystal marbles are geologically metamorphic marbles that are practically characterized by their crystalline appearance, but the crystal structure of limestone marbles is not visible to the naked eye. The mineral in question is chemically calcium carbonate with the chemical formula $CaCO_3$, which is commonly called lime. However, due to the type of mineral crystallization, it has been given the scientific name of aragonite. Beautiful texture and color, suitable cutting, the possibility of using small pieces of this stone in different industries, the existence of domestic and foreign customers, and the relatively high price of marble cutting stone have made it possible to extract and extract it as a valuable mineral. The color of this mineral, depending on the type of crystal lattice and ions in the network, can be seen in white, milk, green, orange, brown, cream, and even gray. Small pieces of aragonite are used to make stone products such as sugar bowls, vases, glasses, etc. Also, the rubble of this stone is granulated and used for mosaic making and its soil for producing stone powder. Therefore, this mineral has no waste, and all its components will be used to prepare various products. The main use of marble is in construction. Marble is used for the exterior of buildings, the interior of buildings, the walls, etc. At present, with the expansion of construction in cities and the increase of construction projects, the consumption of marble is increasing day by day. In the use of marble, parameters such as water absorption and the amount of uniaxial compressive strength in wet conditions, uniaxial compressive strength in Dry state, density, color, etc. are important. Marble is the best and most expensive building and decorative stone in the world, which is available in various colors and natural designs in Iranian mines.

3.2   Project's Requirements

Building stones extracted from the country's mines have always been of interest to many exporters, and marble stones, which are used for interior facades, paving and stairs, are among the stones of interest for export. Marble stones of North Khorasan province usually have a great variety of colors and textures and can be seen in white, brown, gray, dark and other colors, and its quality type has export value. This stone is mostly used indoors as paving of residential units, stair stones, stair walls and interior decoration. Since climate change can affect the strength and appearance of this stone, it is better not to use it in the exterior. These stones have a high ability to be polished and are especially used in building facades, interior facades, decorations, stairs, columns and floors. Significant properties in marble include color, texture, hardness, and toughness. Marble processing product includes slabs in different dimensions in width between one and a half to two meters and in length between two and a half to three meters, and the dimensions that enter the market should be large because it doubles the appearance of the stone. The large dimensions of the slab stone caused the use of this stone in the floors of luxury buildings and the life of villa houses, the floors of halls, as well as in the walls and various parts of conference halls, etc. The type of stone processing plays a decisive role in the price of marble.

It is necessary to check the unit quality control system and observe the necessary standards. Presenting inspection steps in different sections such as raw materials, product, wastewater, etc. by mentioning the control parameters of each step and the results obtained from it and how to apply the results in material processing is of great importance and its explanation is necessary. The quality control of the stone is done during the processing operation and after the production of the product. According to the customer's orders, the following items should be inspected by the QC team: Polishing or non-polishing of the stone surface, tolerance in length and width, tolerance in thickness, bevel, packing inside the box and pallet.

3.3 Space and Infrastructure Required

Table 7: Land Purchase Costs (Million Rial)

Specifications	Area (m^2)	Price per m^2	Cost		
			Paid Cost	Needed Fund	Total
A piece of land in Bojnourd	4,518	1.9	0	8,584.2	8,584.2

Table 8: Site Preparation and Development Costs (Million Rial)

Description	Working Capacity	Unit	Unit Price	Paid Cost	Needed Fund	Total
Excavation	1,200	cm	0.3	0	360	360
Wall Construction and door	2*(113+40) =254	Sm	9	0	2,754	2,754
street construction (5% of the amount of land)	226	Sm	7	0	1,582	1,582
Green space and Lighting (1% of the amount of land)	45	No	8	0	360	360
Total				**0**	**5,056**	**5,056**

Table 9: Civil Works, Structures and Buildings Costs (Million Rial)

Description	Area (m^2)	Unit Price	Paid Cost	Needed Fund	Total
Production Hall	1,700	25	0	42,500	42,500
Raw material warehouse	700	30	0	21,000	21,000
Product warehouse	550	30	0	16,500	16,500
Office building	48	45	0	2,160	2,160
Welfare & guardroom	12	45	0	540	540
Total			**0**	**82,700**	**82,700**

Table 10: Infrastructures

No	Description	Unit	Annual Consumption	Unit cost (Rial)	Total (Million Rial)
1	Water consumption	m³	6,000	7,000	42
2	Electricity consumption	Kwh	800,000	1,100	880
3	Gas consumption	m³	70,000	1,200	84
4	Gasoline	Litr	70,000	6,000	420
5	Petrol	Litr	5,000	30,000	150
Total					**1,576**

3.3.1 Equipment and Machinery

Table 11: Plant Machinery and Equipment Costs (Million Rial)

Description	Unit Cost	Costs Required				Total
		Local Costs	Costs of Currency		Cost to Complete	
			Rate	(Million Euro)		
Saw	51,000	51,000		0.21	51,000	51,000
Rubstone machine (16 heads)	48,000	48,000		0.2	48,000	48,000
Pre-rubstone machine (10 heads)	38,000	38,000		0.15	38,000	38,000
Finger - Jack Slab	5,000	15,000		0.06	15,000	15,000
Furnace	6,000	6,000		0.02	6,000	6,000
Cutting machine (6 razors)	700	3,400		0.01	3,400	3,400
Marble Cross-Cutting machine	8,500	8,500		0.03	8,500	8,500
Electric table	350	2,100	240,000	0	2,100	2,100
UV	4,000	4,000		0.01	4,000	4,000
Wagon carrying	2,500	2,500		0	2,500	2,500
Trapezoidal table	700	700		0	700	700
Peak cutter machine (Multi-disc)	19,000	19,000		0.08	19,000	19,000
Peak cutter machine	14,500	14,500		0.06	14,500	14,500
Floor cutter machine (Four legs)	9,000	9,000		0.03	9,000	9,000
Rubstone machine (16 heads)	22,000	22,000		0.09	22,000	22,000

| Description | Unit Cost | Costs Required | | | | Total |
| | | Local Costs | Costs of Currency | | Cost to Complete | |
			Rate	(Million Euro)		
Rubstone machine (with 3+6 caliber)	18,500	18,500		0.07	18,500	18,500
Head cutter machine	700	3,400		0.01	3,400	3,400
Cutting machine (3 razors)	4,500	4,500		0.01	4,500	4,500
Electric table	200	1,000		0	1,000	1,000
Gate crane	5,000	5,000		0.02	5,000	5,000
Fee for installation, commissioning and presentation of the foundation plan	3,000	3,000		0.01	3,000	3,000
Total cost of machinery		**279,100**		**1.16**	**279,100**	**279,100**

The exchange rate is: 1 € = 240,000 Rial

3.3.2 Raw Material and Intermediate Components

Table 12: Raw Material and Intermediate Components (Million Rial)

Description	Unit	Total Consumption of the Raw Material	Price per Unit of Raw Material	Annual Cost of Providing Material
Raw material & Packaging	*ton*	-	-	33,333.3
Salary	*Rial*	-	-	1,680
Energy costs (fuel, electricity and water)	*L/KW/CM*	-	-	1,576
Repair and maintenance	*Rial*	-	-	15,949.1
Total				**36,589.3**

3.3.3   Management and Human Resources

Table 13: Salary of Administrative Staff (Million Rial)

No	Position	Number of Shifts	Personnel per Shift (No)	Total Staff (People)	Monthly Salary (per Person)	Annual Salary
1	manpower (in Administrative sector)	-	-	4	67.5	3,240
2	manpower (in Production sector)	-	-	11	51.82	6,840
Total				**15**		**10,080**

- Number of skilled personnel required: 9
- Number of non- skilled personnel required: 6
- Total number of personnel required: 15

4   Market Study and Competition

4.1   Examining Supply And Demand Trends

The amount of domestic suplly or production cutting marble stones based on production licenses (according to the information of the ministry of industry, mine and trade) from 2015 to 2020 is as follows.

*Table 14: The Amount of marble stones Domestic Supply*

Year	Nominal Capacity (Tons)
2015	24,925
2016	35,020
2017	43,620
2018	54,390
2019	72,116
2020	102,016

The real production capacity of active units in 2015 up to 2019 is shown in Table 15.

Table 15: The Real Production Capacity of Active Units in 2015 up to 2020

Year	Nominal Capacity (Tons)
2015	22,626
2016	31,790
2017	39,596
2018	49,373
2019	65,373
2020	92,606

The following chart shows the prediction of production according to the Table 15 based on linear regression.
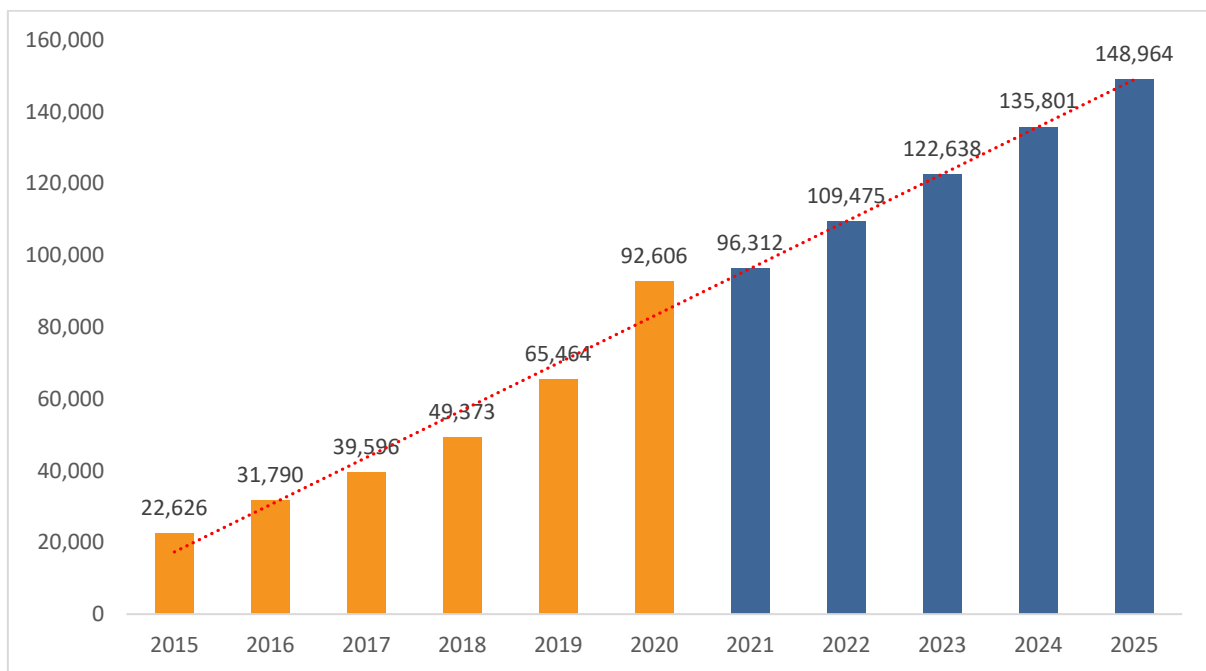
Figure 2: The Prediction of Production

As the Figure 2 shows, the amount of marble stones production is increasing. The amount of imports to the country is based on the information of the Tehran Chamber of Commerce, Industries, Mines and Agriculture at http://www.tccim.ir according to the (There is no data for 2019 and 2020 so the information is considered as the initial data for the forcast for the coming years from 2015 to 2018) following table.

Table 16: The Amount of Imports From 2015 to 2018

Year	Customs Tariff	Imports (ton)		Countries
2015	25151110	0	193.7	Afghanistan, China, India, Spain, Turkey, UAE, Italy
	68022100	1937		
2016	25151110	0	105.2	China, Turkey, Italy, Spain, Greece, India
	68022100	1052		
2017	25151110	3268	375.4	Afghanistan, Turkey, Italy, Greece, India, Spain, UAE
	68022100	486		
2018	25151110	49	4.9	Italy
	68022100	0		

Due to there are other stones in imports, the numbers are divided by 10. The following chart shows the prediction of production according to the Table 16 based on linear regression.
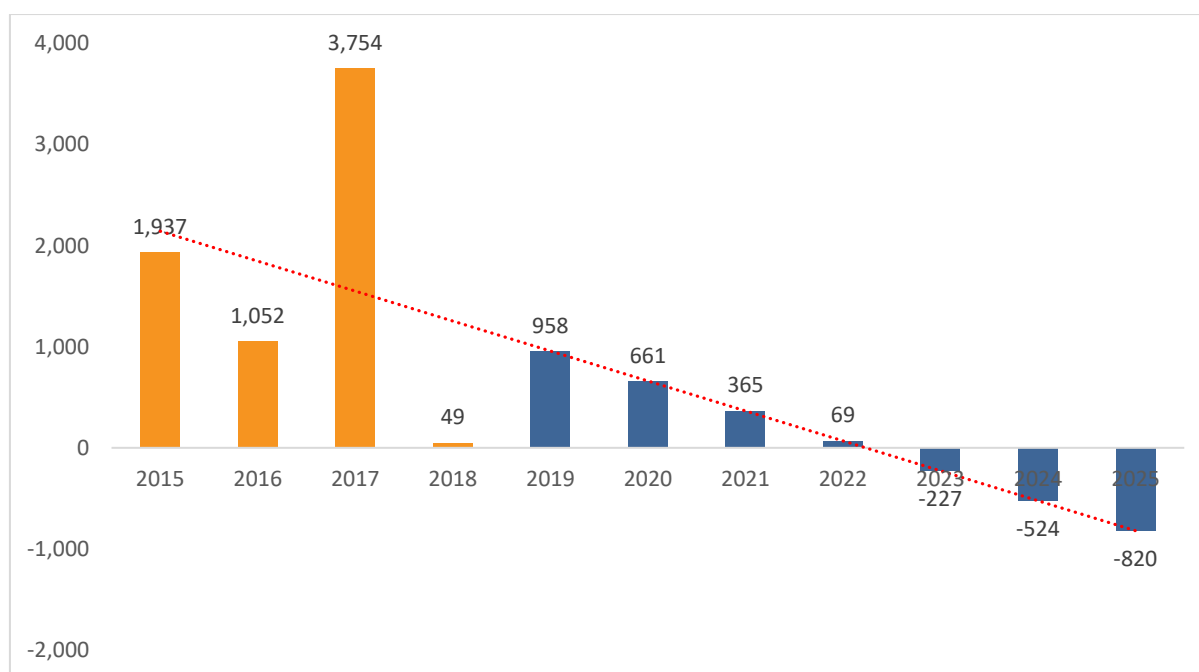

Figure 3: The Prediction of Imports

As the Figure 3 shows the prediction of imports is decreasing. The amount of exports to the country is based on the information of the Tehran Chamber of Commerce, Industries, Mines and Agriculture at http://www.tccim.ir according to the (There is no data for 2019 and 2020 so the information is considered as the initial data for the forcast for the coming years from 2015 to 2018) following table.

Table 17: The Amount of Exports

Year	Customs Tariff	Exports (Tons)		Countries
2015	25151110		7061	Iraq, UAE, Australia, Kuwait, Qazaqstan, Georgia, Turkey, Romania, Italy, Saudi arabia, Oman, China, Bahrain, Qatar, Azerbaijan, Swiss, Pakistan, South Africa, Russia, Lebanon
	68022100	7061		
2016	25151110		10098	Iraq, UAE, Azerbaijan, Kuwait, Qazaqstan, Georgia, Turkey, Saudi arabia, Oman, China, Romania, Bahrain, Qatar, Azerbaijan, Swiss, Pakistan, , South Africa, Russia, Lebanon
	68022100	10098		
2017	25151110	22650	30558	China, India, Egypt, Italy, Korean, Swiss, UK, Singapore, France, Russia, Japan, Austria, Denmark, Pakistan, Ukraine, Scotland, Australia, Irland, Hongkong
	68022100	7908		
2018	25151110	6844	20859	China, India, Italy, Korean, Swiss, UK, Russia, Japan, Austria, Pakistan, Ukraine, Australia, Irland, Hongkong, Georgia, Philippines, Ecuador, Vietnam, Netherlands
	68022100	14015		

Due to there are other stones in exports and most of stones exported in raw matrial form, the numbers are divided by 10.

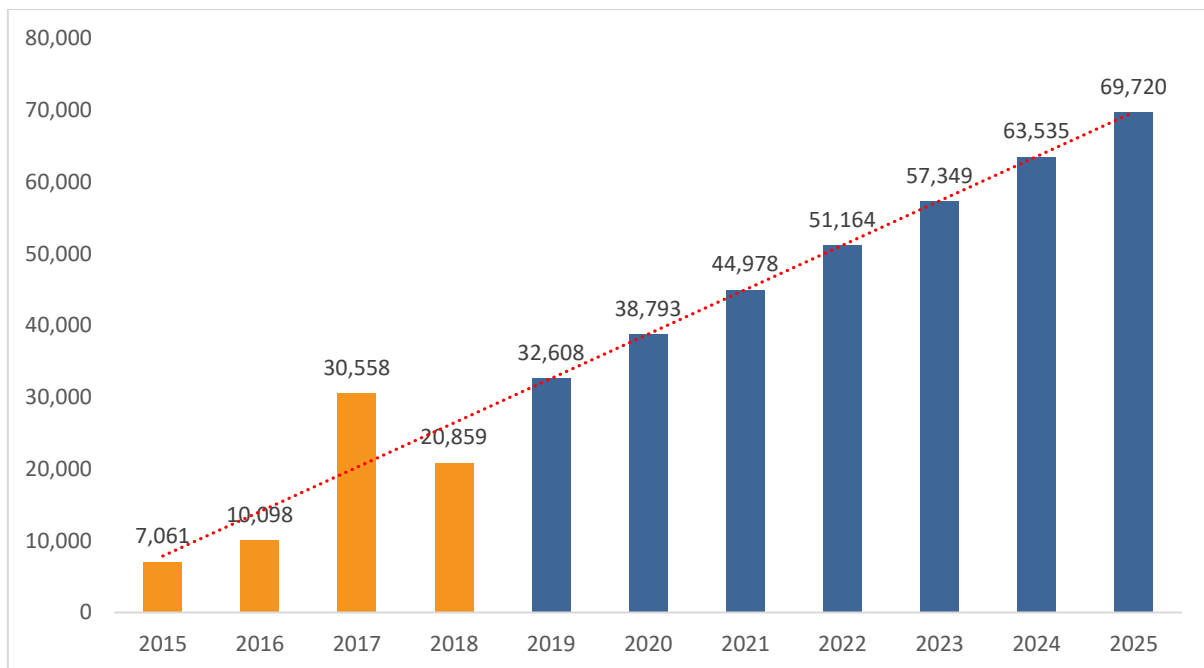The following chart shows the prediction of exports based on linear regression.

*Figure 4: The Prediction of Exports*

As Figure 4 shows the prediction of exports is increasing.

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The amount of domestic demand that is equal to the amount of domestic production plus the amount of imports mines the amount of exports is presented in Table 18.

Table 18: The Amount of Domestic Demand

Year	Demand (Tons)
2015	22,114
2016	30,885
2017	36,916
2018	47,292

The following chart shows the amount of domestic demand based on linear regression.
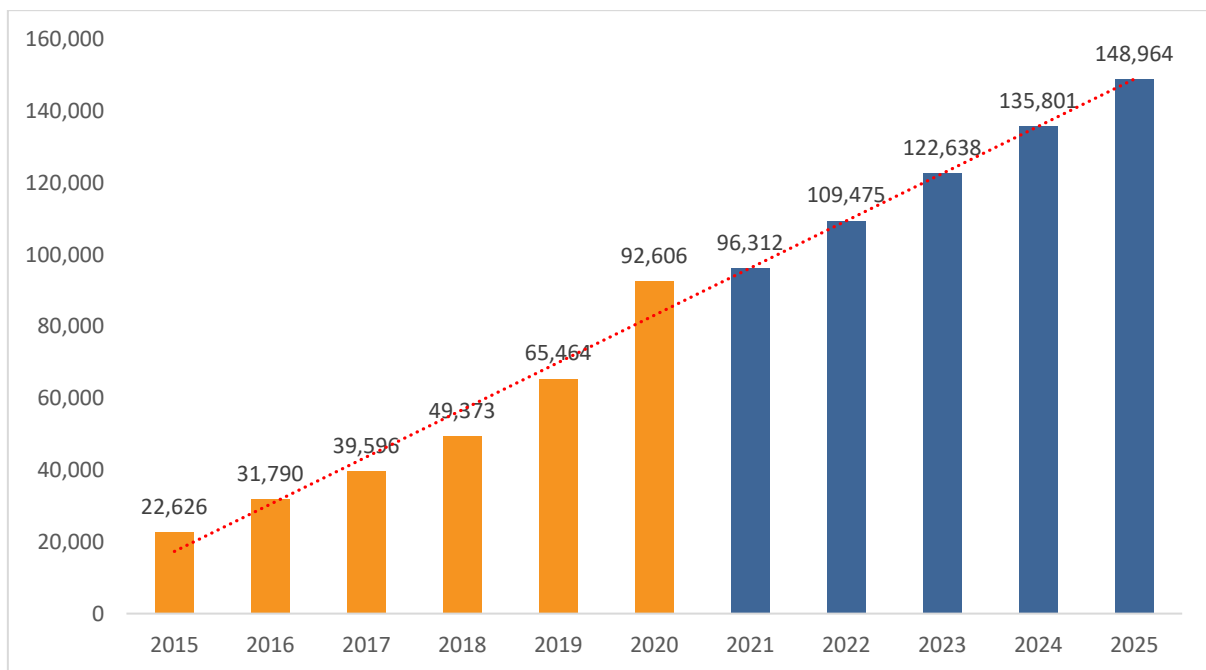
Figure 5: The Prediction on Domestic Demand

As Figure 5 shows the prediction of domestic demand of marble stones is increasing.

In Table 19, the information of the units that have obtained a lisence is provided based on the amount of progress according to the information of the ministry of Industry, Mine and Trade.

Table 19: The Amount of Progress of Units that have Lisence

Progress Persent	Capacity (Ton)
0% - 25%	645,100
25% - 50%	5,000
50% - 75%	9,000
75% - 100%	5,500

5 Financial Projection

5.1 The Cost Estimate

Table 20:Total Investment (Million Rial)

No	Subject	Cost
1	Fixed Capital	450,517
2	Working Capital	35,753.6
Total investment		**486,270.6**

Table 21: Fixed Capital (Million Rial)

Subject	Paid Cost	Cost Required			Needed Fund	Total Cost
		Local Cost	Foreign Exchange Cost			
			Rate	(€)		
Land Purchase	0	8,584.2		0.03	0	8,584.2
Landscaping	0	5,056		0.02	0	5,056
Building	0	82,700		0.34	0	82,700
Equipment and Machinery	0	283,600		1.18	0	283,600
Laboratory & Workshop Supplies	0	-		0	0	-
Facilities	0	11,000	240,000	0.04	0	11,000
Transportation	0	8.5		0	0	8.5
Office and Services Equipment	0	500		0	0	500
Pre-Operation Costs	0	9,620.6		0.04	0	9,620.6
Unforeseen (10% Of The above Items)	0	40,956		0.17	0	40,956
Total Fixed investment	**0**	**450,517**		**1.87**	**0**	**450,517**

Table 22: Working Capital (Million Rial)

Subject	Day	Total
Packaging material (2 months raw materials and packaging)	60	33,333.3
Salary (2months salary)	60	1,680
Imprest fund (15 days of water, electricity, fuel and repair costs)	15	740.2
Total		**35,753.5**

Table 23: Fixed and Variable Costs

No	Production Cost	Fixed Cost		Variable Cost	
		%	Cost	%	Cost
1	Raw material	0	0	100	200,000
2	Energy & utility	20	315	80	1,261
3	Repair & Maintenance	20	3,190	80	12,759
4	Production salary	70	7,056	30	3,024
5	Depreciation	100	38,333	0	0
Total production costs			**48,894**		**217,044**

5.2 Break-Even Analysis

Table 24: Break-even Analysis

Period	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Break-even ratio (%)	34.20	31.76	29.55	27.53	25.65	23.32	21.88	20.56	19.36	18.27

5.3 Sensitivity Analysis of IRR

Table 25: 5.3 Sensitivity Analysis of IRR

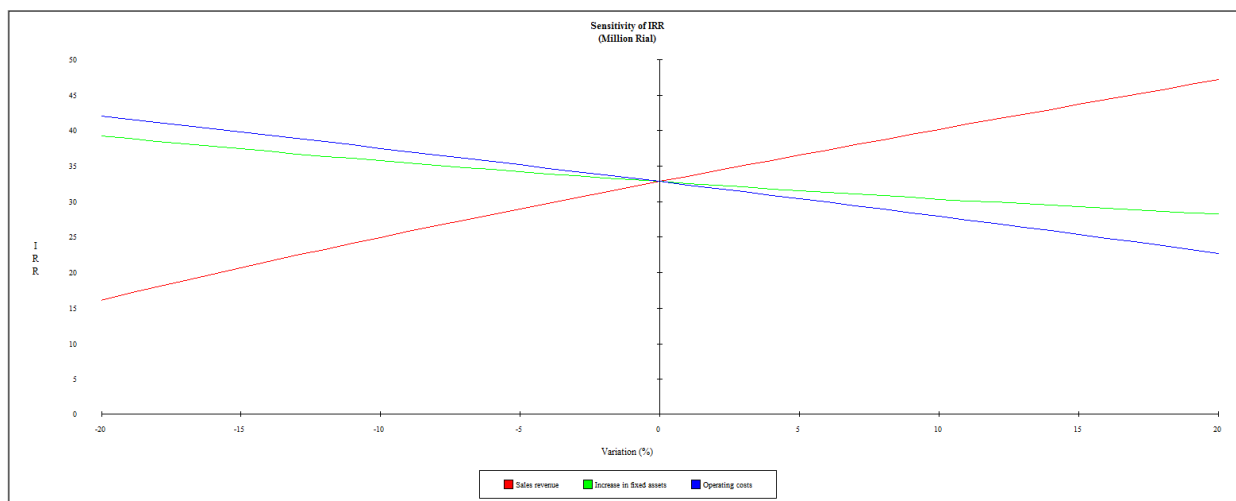| Variation (%)	Sales Revenue	Increase in Fixed Assets	Operating Costs
-20.00%	16.11%	39.30%	42.05%
-16.00%	19.83%	37.79%	40.26%
-12.00%	23.30%	36.41%	38.44%
-8.00%	26.60%	35.13%	36.59%
-4.00%	29.77%	33.94%	34.73%
0.00%	32.83%	32.83%	32.83%
4.00%	35.82%	31.80%	30.90%
8.00%	38.73%	30.83%	28.94%
12.00%	41.60%	29.92%	26.93%
16.00%	44.41%	29.07%	24.87%
20.00%	47.18%	28.26%	22.76%

Figure 6: 5.3 Sensitivity Analysis of IRR

6   Duration of Project Operation

The time of doing early stages and completing its process is about 21 months.

Table 26: Action Plan and Implementaion Schedule

Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Land Purchase	■	■																						
Constructing Buildings		■	■	■	■	■	■	■																
Execution of Facilities							■	■	■	■	■	■												
Order, Purchase of Machinery											■	■	■	■	■	■								
Landscaping															■	■	■	■						
Machinery Strat-up and Trial Production																		■	■	■	■			

7   Incentives, Features And Advantages of Project

North Khorasan Province is a province located in northeastern Iran. Bojnord is the capital of the province.This province contains many historical and natural attractions, such as mineral water springs, small lakes, recreational areas, caves and protected regions, and various hiking areas. Advantages of the agriculture of this province involves favorable and diverse climatic conditions and other parameters affecting growth.