



Islamic Republic of Iran

Ministry of Economic Affairs and Finance

General Department of Economic Affairs and Finance of North Khorasan

The Cyanuric acid In Bojnourd Industrial Park No. 3

Center of Investment Services of North Khorasan

2021 April

Summary of Technical-Economical Pre-Feasibility Study

The Name: The Cyanuric Acid

Sector: Industrial

Subsector: Chemical Products

ISIC Code: 2411413030, 2411413029, 2411413028, 2412612327

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 Cyanuric Acid		
Sector	Industrial		
Sub Sector	Mineral Products		
Location	Iran, North Khorasan, Bojnourd		
The County	Bojnourd		
Products / Services	Cyanuric acid, Trichloroisocyanuric acid, Sodium dichloroisocyanurate, Ammonium sulfate		
Annual Nominal Capacity	2,000	Tons	
The Raw Material	OAT, Sulfuric Acid(95% -98%), Liquid Chlorine Capsules		
Employment	46	Person	
Land Area	6,725	m^2	
Floor Area	2,230	m^2	
Energy and Water Consumption	Water Consumption	10,000	m^3 in year
	Electricity Consumption	240	KW
	Gas Consumption	300,000	m^3 in year
Fixed Capital	268,399	Million Rial	
Working Capital (The First Year)	15,406	Million Rial	
Payback Period	2	Year	
Net Present Value (NPV)	5,983,413	Million Rial	
Internal Rate Of Return (IRR)	127	%	
Modified Internal Rate of Return (MIRR)	44	%	
Break Even Point	8	%	
The Exchange Rate (Dolar)	240,000	Rial	
Description	In this project, all the materials related to the study of the Cyanuric acid, Trichloroisocyanuric acid, Sodium dichloroisocyanurate, and Ammonium sulfate market especially domestic and foreign supply and demand, are examined.		

Table 2: Legal Authorizations

Licensure Status:	
Issuance status	Descriptions
Principal Agreement (Establishment licensure)	<input checked="" type="checkbox"/>
Land Allocation	<input checked="" type="checkbox"/>
Environmental Inquiry	<input checked="" type="checkbox"/>
Possibility of Water Supply	<input checked="" type="checkbox"/>
Possibility of Electricity Supply	<input checked="" type="checkbox"/>
Possibility of Electricity Supply	<input checked="" type="checkbox"/>
Possibility of Gas Supply	<input checked="" type="checkbox"/>

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	268,399.7	240,000	1.1183	0	1.1183
Working Capital	15,406		0.0641	0	0.0641
Total Investment	283,805.7	240,000	1.1824	0	1.1824

- Value of Foreign Equipment / Machinery: 0 Million Euro
- Value of Local Equipment / Machinery: 0.4979 Million Euro
- Net Present Value (NPV): 5,983,413 Million Euro in 15 Years
- Internal Rate of Return (IRR): 127%
- Payback Period: 2 Years

Table 4: General Information

Company Profile	
Project Type	Establishment <input checked="" type="checkbox"/>
Company Name	North Khorasan Organization 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 Organization of Industry, Mine and Trade
Company's Legal Structure	Government <input checked="" type="checkbox"/>

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

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 222 with coordinates (4148090,556135) in Bojnourd Industrial Park No. 3. Proposed location of project is shown in Figure 1.

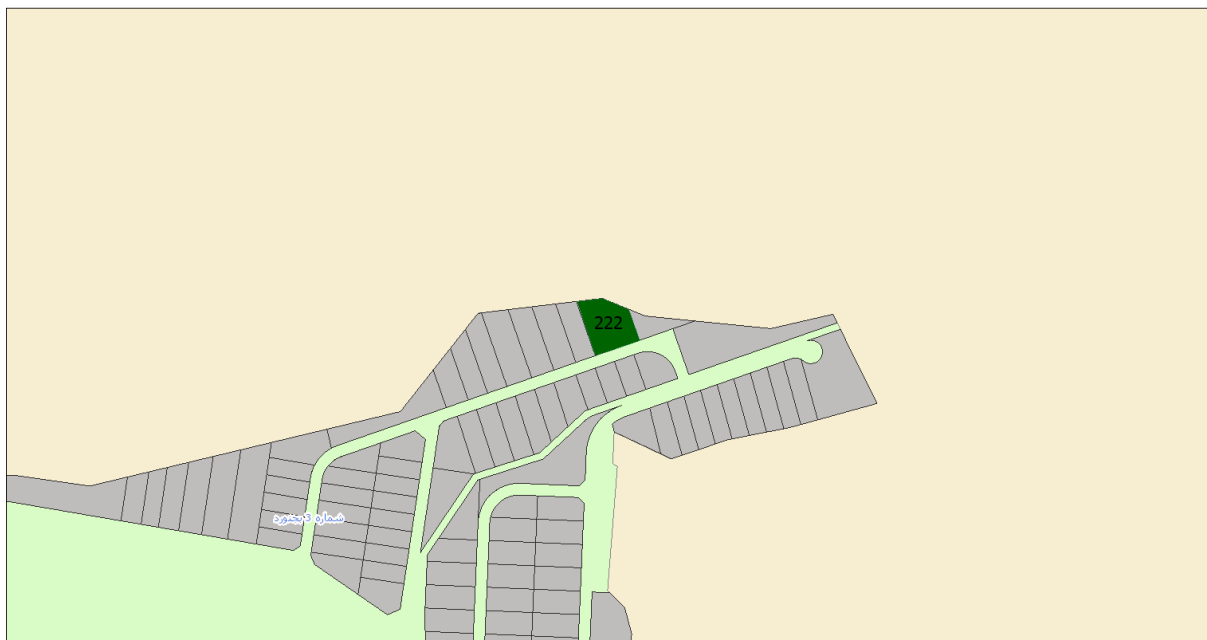


Figure 1: Location of Proposed Land in Bojnourd Industrial Park No. 3

2.3 The Project: The Cyanuric acid

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	155	is provided
8	Amirabad Port (Behshahr)	340	is provided
9	Bandar Abbas Port	1,473	is provided
10	Rail way station of Joveyn	106	is provided
11	Rail way station of Jajarm	35	is provided

3 Technical Specifications of Plan

3.1 Product

Table 6: Project Specifications Based on ISIC Code

The Product	ISIC Code	Customs Tariff	Environmental Category
Cyanuric acid	2411413030	28371100	4
Trichloroisocyanuric acid	2411413029	28371900	4
Sodium dichloroisocyanurate	2411413028	31021100	4
Ammonium sulfate	2412612327	31022100	6

In this project, all the materials related to the study of the Cyanuric acid, Trichloroisocyanuric acid, Sodium dichloroisocyanurate, and Ammonium sulfate market especially domestic and foreign supply and demand, are examined.

One of the unique features of these products is the amazing reduction in consumption compared to other similar products and their solubility in water without the formation of mineral deposits.

Because they are stabilized, these powders are resistant to the destructive effects of the sun's ultraviolet rays and have a long shelf life in water. These powders, by eliminating resistant viruses and harmful bacteria, as well as a variety of algae and fungi, in addition to disinfecting the water, prevent it from becoming cloudy and make the water transparent and clear. These powders have many uses that can be mentioned as follows:

- Cleaning and disinfection of swimming pools, Jacuzzis, water complexes, and water wells
- Water and wastewater treatment systems for disinfection, removal of unpleasant odors, and water transparency
- It Prevents the growth of algae and sludge in cooling towers, and tanks of industrial units
- Effective control of bacterial growth in poultry farms and disinfection of grain containers, egg collection plates, water channels, and other equipment
- Eliminate harmful bacteria and prevent the growth of fungi in aquaculture ponds
- Disinfection and removal of microbial contamination in industrial units such as beverage, canning, dairy, industrial slaughterhouses, sugar factories, and other industries.

Among their advantages are the following:

- Significant and amazing reduction in consumption compared to other similar products (4 to 7 times less in a month).
- Unlike other chlorinated powders, they dissolve in water without creating mineral deposits (so they do not leave sediment in pumps, converters, and chillers of water complexes and pools).
- Eliminates all viruses, bacteria, and their spores, fungi, and algae green, brown, and black completely.
- Much higher shelf life than other chlorinated powders (so there is no need to add powder daily and every 4 days to a week, adding technochlorine powders is enough).
- Unlike other powders, they have no allergenic effects and are completely harmless to the skin.
- No need to use floats and feeders in swimming pools and water complexes (can be added directly to the water).
- Green chlorine powders can be stored for at least 5 years without changing the properties.

According to studies on the production of cyanuric acid and its derivatives, there is no factory in the country, so the production of this product is a necessity of the country and the sale of products is a guarantee for new investors.

Since the demand for this product is projected to be around 9000 tons by 2023; taking into account the capacity of factories with progress (above 75%), the country's need for production in 2023 is about 9000 tons. It should be noted that the capacity of this factory is 2000 tons, so from the perspective of the country's needs, there is no worry about the construction of this factory. Given the zero amount of exports of this product, you can have a strong plan along with a marketing team to think about exporting the product.

In short, the reasons for the justification of the project can be considered as follows:

- Absence of domestic and regional producers
- Importing products
- Production of products from petrochemical waste
- Cheaper price compared to foreign samples
- High profitability and income generation
- Employment
- Suitable market in the country and the Middle East
- Various applications of products

3.2 Project's Requirements

The device (Cyanuric Acid Portable Photometer) can be used to analyze cyanuric acid as well as the percentage of purity, and also the classical methods can be used to determine the amount of purity, which will be used for ease of work as well as accuracy. Also, to measure the amount of trichlorocyanuric acid, sodium dichloroisocyanurate, the amount of chlorine can be measured to obtain the purity of these products, and also classical methods can be used to determine the purity. Also, liquid chromatography (HPLC) device can be used to measure the purity of products. Due to the high cost of this device, the central laboratory of Bojnourd University can be used to reduce costs.

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	6,725	0.5	0	0	3,362.5

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

Description	Working Capacity	Unit	Unit Price	Paid Cost	Needed Fund	Total
Excavation	2,000	cm	0.3	0	0	600
Wall Construction and door	2*(55+123) =356	Sm	9	0	0	3,204
street construction (5% of the amount of land)	337	Sm	7	0	0	2,359
Green space and Lighting (1% of the amount of land)	68	No	8	0	0	544
Total				0	0	6,707

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

Description	Area (m ²)	Unit Price	Paid Cost	Needed Fund	Total
Production Hall	1,500	25	0	0	37,500
Raw material warehouse	250	30	0	0	7,500
Product warehouse	300	30	0	0	9,000
Office building	150	45	0	0	6,750
Welfare & guardroom	30	45	0	0	1,350
Total			0	0	62,100

Table 10: Infrastructures

No	Description	Unit	Annual Consumption	Unit Cost (Rial)	Total (Million Rial)
1	Water	m ³	10,000	7,000	70
2	Electricity	Kwh	800,000	1,110	880
3	Gas	m ³	300,000	1,200	360
4	Petrol	Litr	3,600	30,000	108
5	Unforeseen	5% of above items			71
					1,489

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)		
Cyanuric acid reactor	6,500	26,000	240,000	0.104	0	26,000
Chlorination reactor	6,000	24,000		0.096	0	24,000
Prechlorination reactor	6,000	18,000		0.072	0	18,000
Hot oil boiler and oil pump	1,000	4,000		0.016	0	4,000
Automatic cyanuric acid press filter	2,500	5,000		0.02	0	5,000
Automatic chlorination press filter	4,000	8,000		0.032	0	8,000
Cyanuric acid plate dryer	2,600	2,600		0.0104	0	2,600
Chlorine products plate dryer	2,600	2,600		0.0104	0	2,600
(OAT) mill shredder	200	400		0.0016	0	400
Screw compressor	450	900		0.0036	0	900
Tablet press machine	1,800	1,800		0.0072	0	1,800
Chlorine capsules	380	5,700		0.0228	0	5,700
Packaging machine	3,500	3,500		0.014	0	3,500
Stirring tanks	250	3,000		0.012	0	3,000

Description	Unit Cost	Costs Required				Total
		Local Costs	Costs Of Currency		Cost To Complete	
			Rate	(Million Euro)		
Diaphragm pumps	350	21,00		0.0084	0	21,00
Centrifugal pumps	150	1,500		0.006	0	1,500
water pump	60	240		0.001	0	240
Chemical storage tanks	100	400		0.0016	0	400
Sulfuric acid tank	400	400		0.0016	0	400
Steel valves and fittings	70	1,400		0.0056	0	1,400
cooling system	2,000	2,000		0.008	0	2,000
NaCl electrolysis system	4,500	4,500		0.018	0	4,500
Measuring equipment and instruments	400	400		0.0016	0	400
Weighing scales	50	100		0.0004	0	100
Installation and commissioning costs (5% of machinery costs)	-	5,927		0.0237	0	5,927
Total Cost of Machinery		124467	240,000	0.4979	0	124,467

- 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
OAT (melamine crystal unit lesion)	ton	2,000	0.25	500
Sulfuric acid (98% -95% industrial)	ton	1,000	20	20,000
Sodium hydroxide	ton	400	65	26,000
Liquid chlorine capsules (one ton)	ton	1,500	2.5	3,750
Product packaging cost (10% of the above items)	-	-	-	5,025
Total				55,275

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)	-	-	8	60.9375	5,850
2	manpower (in Production sector)	-	-	38	56.0526	25,560
Total				46		31,410

- Number of skilled personnel required: 22
- Number of non- skilled personnel required: 24
- Total number of personnel required: 46

4 Market Study and Competition

4.1 Examining Supply And Demand Trends

The amount of domestic supply or production of cyanuric acid and its derivatives Trichloroacetic acid and sodium dichloroisocyanurate 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 Domestic Supply of The Cyanuric Acid and its Derivatives

Year	Nominal Capacity (Tons)
2015	0
2016	0
2017	0
2018	0
2019	20
2020	20

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	0
2016	0
2017	0
2018	0
2019	20
2020	20

The amount of imports is based on the information of the Tehran Chamber of Commerce, Industries, Mines and Agriculture at <http://www.tccim.ir> according to following table.

Table 16: The Amount of Imports From 2015 to 2018

Year	Customs Tariff	Imports (ton)	Countries
2015	28371100 28371900 31021100	346	India, China
2016	28371100 28371900 31021100	1,335	India, China, Korea, Czech Republic, Turkey, Germany, Georgia
2017	28371100 28371900 31021100	2,424	India, China, Koream Czech Republic, Georgia, UAE
2018	28371100 28371900 31021100	3,640	Korea, Turkey, China, Czech Republic, UAE, India

The following chart shows the prediction of production according to the Table 16 based on linear regression.

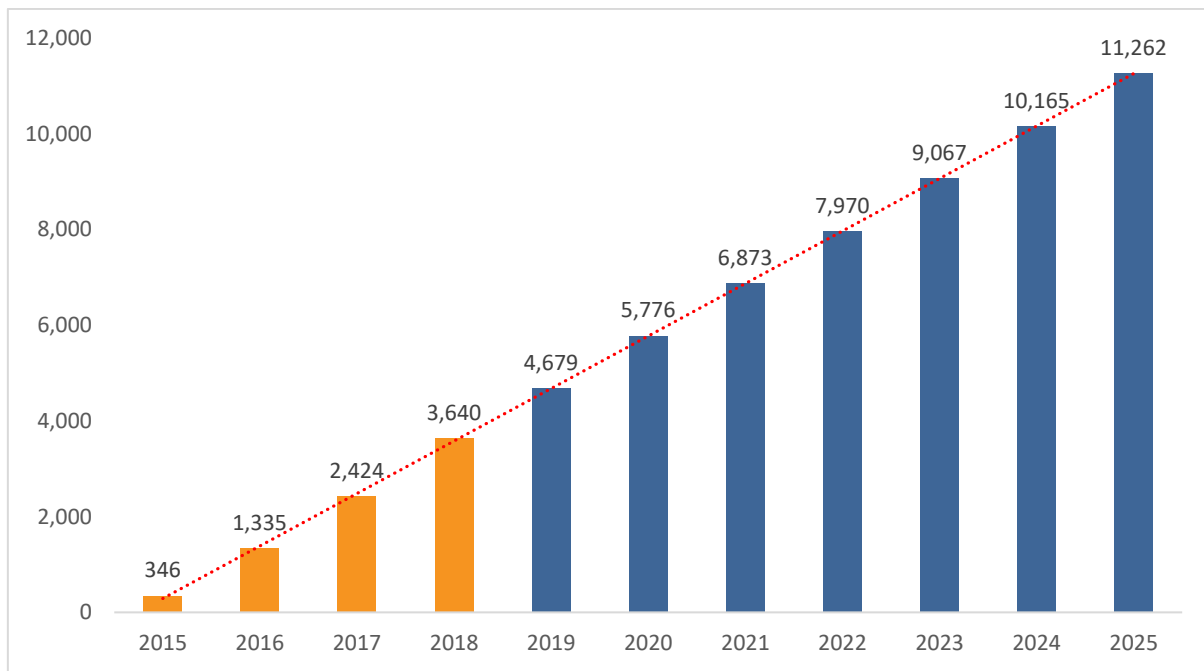


Figure 2: The Prediction of Imports

As Figure 2 shows the prediction of imports is decreasing.

The amount of exports 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 forecast for the coming years from 2015 to 2018) following table.

Table 17: The Amount of Exports From 2015 to 2018

Year	Customs Tariff	Imports (ton)	Countries
2015	31054000	0	-
2016	31054000	0	-
2017	31054000	0	-
2018	31054000	0	-

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	346
2016	1,335
2017	2,424
2018	3,640

The following chart shows the amount of domestic demand based on linear regression.

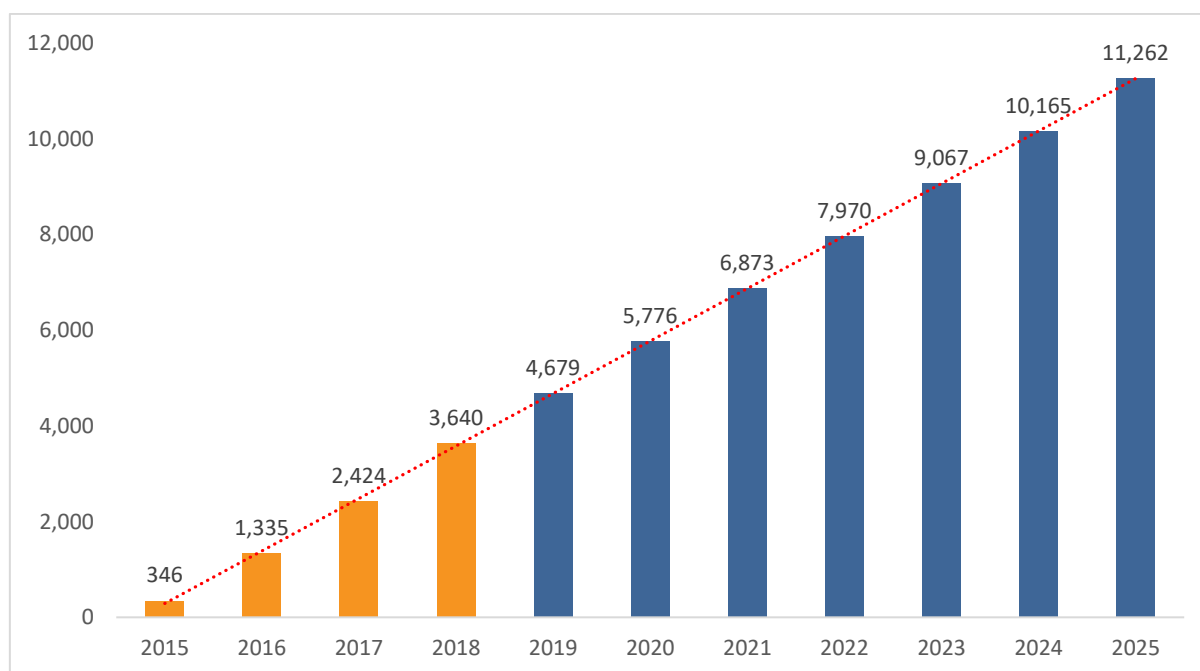


Figure 3: Prediction on Domestic Demand

As Figure 3 shows the prediction of domestic demand of the cyanuric acid and its derivatives Trichloroacetic acid and sodium dichloroisocyanurate is increasing.

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

Progress Percent	Capacity (Ton)
0% - 25%	0
25% - 50%	0
50% - 75%	0
75% - 100%	0

5 Financial Projection

5.1 The Cost Estimate

Table 20: Total Investment (Million Rial)

No.	Subject	Cost
1	Fixed investments	268,399.7
2	Working Capital	15,406
Total Investment		283,805.7

Table 21: Fixed Capital (Million Rial)

Subject	Paid Cost	Cost Required			Total Cost	
		Local Cost	Foreign Exchange Cost			Needed Fund
			Rate	(€)		
Land Purchase	0	3362.5	240,000	0.06725	0	3362.5
Landscaping	0	6707		0.1341	0	6,707
Building	0	62100		1.242	0	62,100
Equipment And Machinery	0	124467		2.4893	0	124,467
Laboratory And Workshop Supplies And Equipment	0	1270		0.0254	0	1,270
Facilities	0	27594		0.5519	0	27,594
Transportation	0	11900		0.238	0	11,900
Office And Services Equipment	0	1297		0.0259	0	1,297
Pre-Operation Costs	0	5302.2		0.106	0	5,302.2
Unforeseen (10% Of The Above Items)	0	24400		0.488	0	24,400
Total Fixed Investment	0	268,399.7	240,000	5.3678	0	268,399.7

Table 22: Working Capital (Million Rial)

Subject	Day	Total
Packaging material (2 months raw materials and packaging)	60	9,621
Salary (2months salary)	60	5,235
Imprest fund (15 days of water, electricity, fuel and repair costs)	15	550
Total		15,406

Table 23: Fixed and Variable Costs

No.	Production Cost	Fixed Cost		Variable Cost	
		%	Cost	%	Cost
1	Raw material	0	0	100	55,275
2	Energy & utility	20	298	80	1,191
3	Repair & Maintenance	20	2,339	80	9,354
4	Production salary	70	21,987	30	9,423
5	Depreciation	100	23,295	0	0
Total Production Costs			47,919		75,243

5.2 Break-Even Analysis

Table 24: Break-even Analysis

Period	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Break-even ratio (%)	9.26	7.87	6.79	6.52	6.24	5.81	5.63	5.46	5.31	5.18

5.3 Sensitivity Analysis of IRR

Table 25: Sensitivity Analysis of IRR

Variation (%)	Sales revenue	Increase in fixed assets	Operating costs
-20.00%	91.07%	122.60%	109.41%
-16.00%	94.47%	119.09%	108.98%
-12.00%	97.78%	115.82%	108.55%
-8.00%	101.01%	112.77%	108.11%
-4.00%	104.16%	109.92%	107.68%
0.00%	107.24%	107.24%	107.24%
4.00%	110.26%	104.73%	106.81%
8.00%	113.22%	102.36%	106.37%
12.00%	116.12%	100.12%	105.93%
16.00%	118.97%	98.00%	105.49%
20.00%	121.76%	95.99%	105.05%

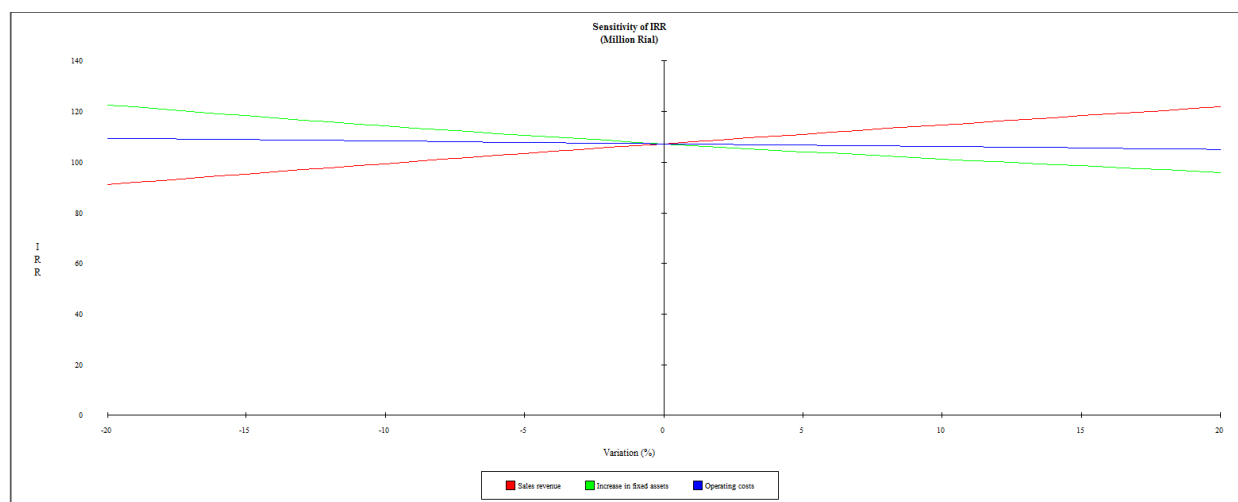


Figure 4: Sensitivity Analysis of IRR

6 Duration of Project Operation

The time of doing early stages and completing its process is about 20 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.