



Islamic Republic of Iran

Ministry of Economic Affairs and Finance

General Department of Economic Affairs and Finance of North Khorasan

The Pellets of Steel And Alloy

Esfarayen Industrial Park

Center of Investment Services of North Khorasan

2021 April

Summary of Technical-Economical Pre-Feasibility Study

The name: The Pellets of steel and alloy

Sector: Industrial

Subsector: Metal Products

ISIC Code: 2710512486 , 2710512487 , 2710512488

The owner of:

Organization of Economic Affairs and Finance (North Khorasan)



The ADDRESS

Iran, North Khorasan, Esfarayen

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1 Abstract

1.1 Project Profile - Summary Sheet

Table 1: Summary Sheet

Project Introduction			
Project Title	The Pellets of steel and alloy		
Sector	Industrial		
Sub Sector	Metal Products		
Location	Iran, North khorasan, Esfarayen		
The County	Esfarayen		
Products / Services	Pellets of steel (simple carbonic and low alloy), alloy steel and cast iron		
Annual Nominal Capacity	2,050		Ton
The Raw Material	2Cr70 Steel		
Employment	20		Person
Land Area	3,779		m ²
Floor Area	1,730		m ²
Energy and Water Consumption	Water Consumption	10,000	m ³ in year
	Electricity Consumption	250	KW
	Gas Consumption	720,000	m ³ in year
Fixed Capital	245,825		Million Rial
Working Capital (The First Year)	66,606		Million Rial
Payback Period	4.21		Year
Net Present Value (NPV)	336,227		Million Rial
Internal Rate Of Return (IRR)	48		%
Modified Internal Rate of Return (MIRR)	27		%
Break Even Point	26		%
The Exchange Rate (Dolar)	240,000		Rial
Description	Steel and alloy pellets are used as mills in the cement, steel, and copper industries and their role in crushing materials and granulation is desirable. It is also required as a production agent in metal and non-metallic mineral processing industries, including cement factories, ironstone mines, and copper mines.		

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	245,825	240,000	1.02	0	1.02
Working Capital	66,606		0.27	0	0.27
Total Investment	312,431		1.3	0	1.3

- Value of Foreign Equipment / Machinery: 0 Million Euro
- Value of Local Equipment / Machinery: 0.49 Million Euro
- Net Present Value (NPV): 1.4 Million Euro in Years
- Internal Rate of Return (IRR):48 %
- Payback Period: 4.21Years

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	+989153864144
Tel	+ 985831552
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: Esfarayen

Esfarayen is a city and capital of Esfarayen County, North Khorasan Province in Iran. This project will be construct in part 123 with coordinates (532585,4109076) in Esfarayen Industrial Park. Location of project is shown in Figure 1.



Figure 1: Location of Proposed Land in Esfarayen Industrial Park

2.3 The Project: The Pellets of Steel And Alloy

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	62	is provided
8	Amirabad Port (Behshahr)	420	is provided
9	Bandar Abbas Port	1,435	is provided
10	Rail way station of Joveyn	124	is provided
11	Rail way station of Jajarm	154	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
Pellet of not alloyed steel	2710512486	72051000	4
Pellet of alloyed steel	2710512487	72051000	4
Pellet of cast iron	2710512488	72051000	4

In this project, the production line is designed to make various types of steel and alloy pellets, which include three products: simple carbon and low alloy steel pellets, alloy steel pellets, and cast-iron pellets. Therefore, the market study is based on three types of pellets, but due to the abundant use of alloy steel pellets, all calculations, including cost and revenue, have been performed based on this type of pellet. Steel and alloy pellets are used as mills in the cement, steel, and copper industries and their role in crushing materials and granulation is desirable. It is also required as a production agent in metal and non-metallic mineral processing industries, including cement factories, ironstone mines, and copper mines. On the other hand, the pellets of steel and alloy are used in a limited way in some defense industries, construction of rails, bearings, curtain weights, and heavy metal mines. These steel and alloy balls are produced by the roll forging method, which according to the available variety, the factory production line is designed to produce 20 to 60 mm balls. Undoubtedly, the most important reasons for justifying a project are based on its economic considerations. Gaining a suitable share of the domestic or foreign market, expanding the target market, and having appropriate financial and economic indicators (NPVR, IRR), and so on are among the most important goals of an economic enterprise to create or develop an industrial plan. In addition, the national and macroeconomic aspects of the project should be considered. Also, the study of the effect of project implementation on social and cultural indicators at the national and regional levels such as unemployment, labor migration, cultural effects, and finally the political considerations of the feasibility study, both nationally and internationally, can justify the necessity of implementing a project. Getting out of dependence on the outside, increasing domestic production, etc. can be studied and analyzed in this section.

3.2 Project's Requirements

In general, the most important controller factors include volumetric hardness and surface hardness, and dimensional control.

The national standard is not defined for pellets; however, based on the application of the pellets used in the different places, the producers examine the extent of its physical condition by the necessary software.

In this regard, a summary of the selection of pellets used is presented as follows.

The choice of pellet dimensions is directly related to the hardness of the mineral and the grain size distribution to the mill. Softer and finer minerals usually require smaller pellets than harder minerals. As the size of the bullets increases, the number of bullets and consequently the number of collisions decreases, which has a negative effect on efficiency (crushing operations).

In this research, first, the dimensions of the largest pellet for the optimal operation of the mill are calculated using experimental relationships, then with several steps of sampling of mill input and output materials and using software (NGOTC), the selection function of the semi-finished mill is calculated, this software The software has the ability to predict the selection function based on the dimensions of the pellet. In this research, the effect of different pellet dimensions is investigated on the selection function and based on the obtained results, the optimal size of the largest pellet and the dimensional distribution of the pellets are obtained. The results obtained from the effect of pellet dimensions on the selection function show that in the diameter of 90 mm pellet, the particle crushing rate is higher.

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
land	3,779	0.6	0	2,268	2,268

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

Description	Working Capacity	Unit	Unit Price	Paid Cost	Needed Fund	Total
Excavation	1,000	cm	0.3	0	0	300
Wall Construction and door	2*(45+84) =258				0	
street construction (5% of the amount of land)	190	m	9	0	0	2,322
Green space and Lighting (1% of the amount of land)	38	Sm	7	0	0	1,330
Total				0	0	4,256

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

Description	Area (m ²)	Unit Price	Paid Cost	Needed Fund	Total
Production Hall	1,000	25	0	0	25,000
Raw material warehouse	300	30	0	0	9,000
Product warehouse	200	25	0	0	5,000
office building	200	45	0	0	9,000
Guardroom	30	45	0	0	1,350
Total	-	-	0	0	39,350

Table 10: Infrastructures

No	Description	Unit	Annual Consumption	Unit Cost (Rial)	Total (Million Rial)
1	Water consumption	m ³	10,000	7,000	70
2	Electricity consumption	Kwh	200,000	1,100	2,200
3	Gas consumption	m ³	720,000	1,200	864
4	Gasoline	Litr	3,600	30,000	110
5	Unforeseen	5% of the above		-	30.5
Total					640.5

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)		
Roll Forging	100,000	100,000	240,000	0.42	0	100,000
Electric furnace						
Automatic feeders						
overhead crane	4,000	8,000	240,000	0.03	0	8000
Gantry Crane	4,500	4,500		0.01	0	8,000
Lathe machine	2,630	2,630		0.01	0	4,500
Miscellaneous tools	2,000	2,000		0.008	0	2,630
Total Cost of Machinery		117,130		0.49	0	117,130

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
Steel 70Cr2	ton	-	-	382,200
Total		-	-	382,200

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 Production sector)	-	-	13	54.81	8,550
2	manpower (in Administrative sector)	-	-	7	63.21	5,310
Total				20	-	13,860

- Number of skilled personnel required: 18
- Number of non- skilled personnel required: 2
- Total number: 20

4 Market Study and Competition

4.1 Examining Supply And Demand Trends

The amount of domestic supply or production of pellets of steel and alloy 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 Pellets of Steel and Alloy

Year	Nominal Capacity (Tons)
2015	182,640
2016	196,460
2017	219,460
2018	324,960
2019	418,460
2020	515,460

The real production capacity of active units in 2015 up to 2020 is shown in Table 15.

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

Year	Nominal Capacity (Tons)
2015	91,320
2016	98,230
2017	109,730
2018	162,480
2019	209,230
2020	257,730

The following chart shows the prediction of production according to the Table 15 based on linear regression.

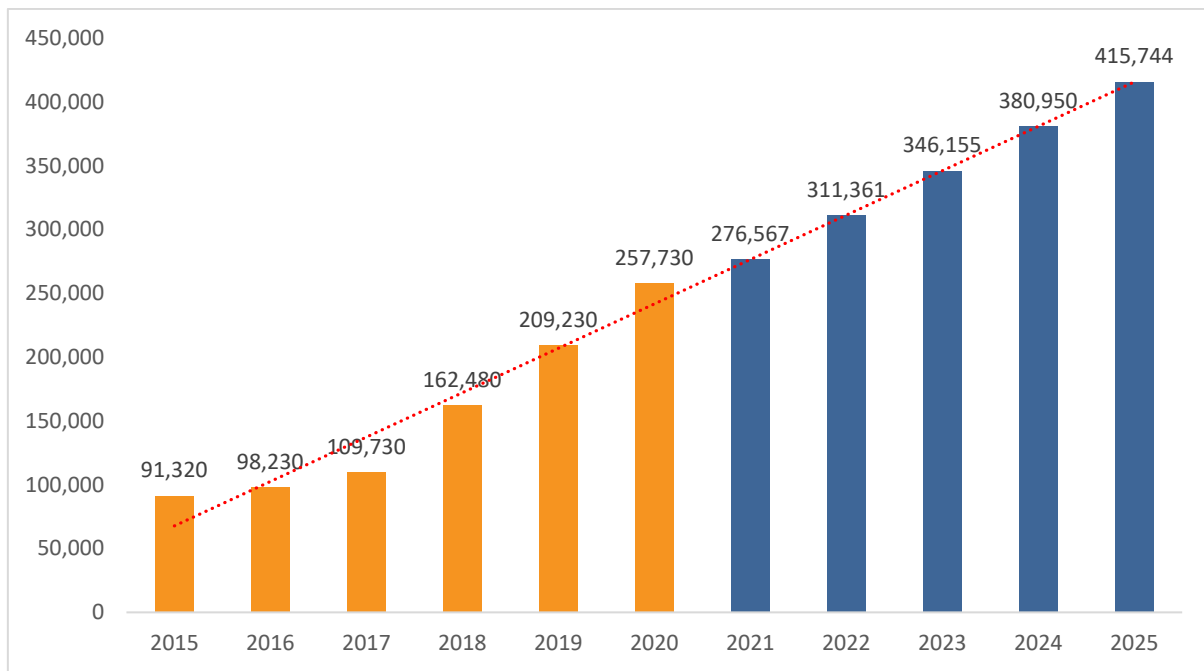


Figure 2: The Prediction of Production

As Figure 2 shows, the amount of pellets of steel and alloy production is increasing, so there is the capacity to create new factories.

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 forecast 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	72051000	1,280	China, Turkey, Germany, Korea, India
2016	72051000	977	Turkey, Germany, China, Romania, Taiwan, England, UAE, Spain
2017	72051000	1,126	China, Korea, Turkey, Germany, Romania, UAE
2018	72051000	454	UAE, Turkey, China, Romania, Germany, UK

The following chart predicts the amount of imports according to the Table 16 by 2025, It shows based on linear regression.

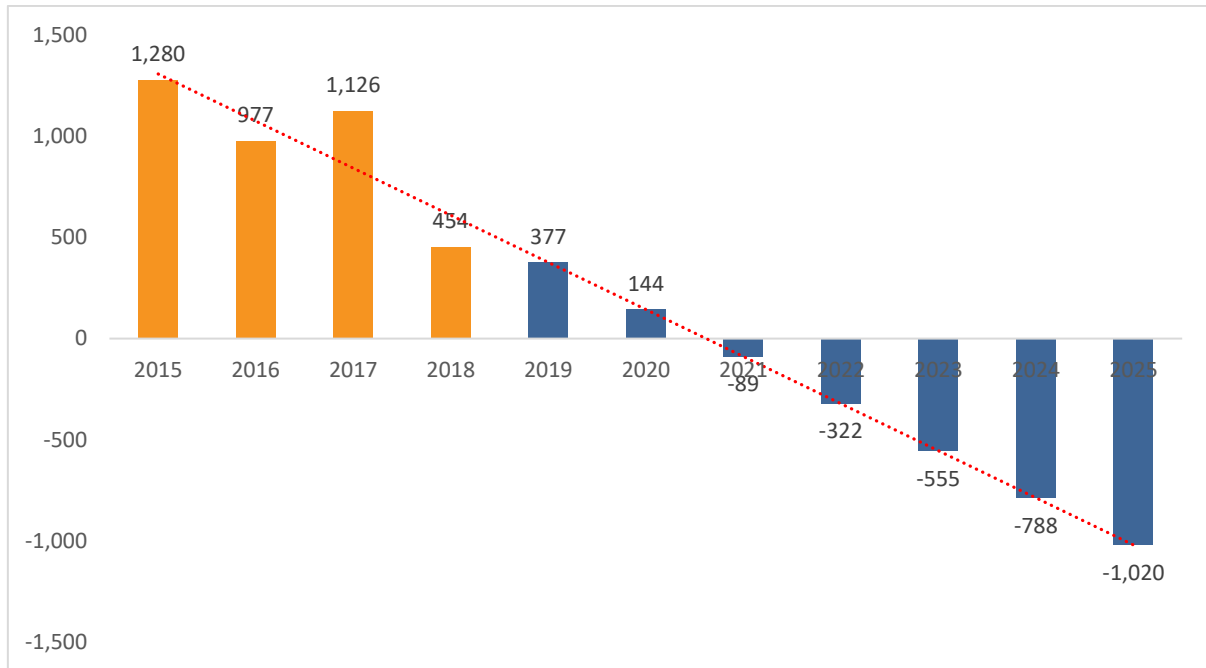


Figure 3: The Prediction of Imports

As 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 forecast for the coming years from 2015 to 2018) following table.

Table 17: The Amount of Exports

Year	Customs Tariff	Exports (Tons)	Countries
2015	72051000	32	Indonesia
2016	72051000	191	Indonesia, China
2017	72051000	807	Indonesia, China, Ireland, Taiwan, Azerbaijan
2018	72051000	1,034	Indonesia, Taiwan, Portugal, Azerbaijan, Kuwait, Ireland

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

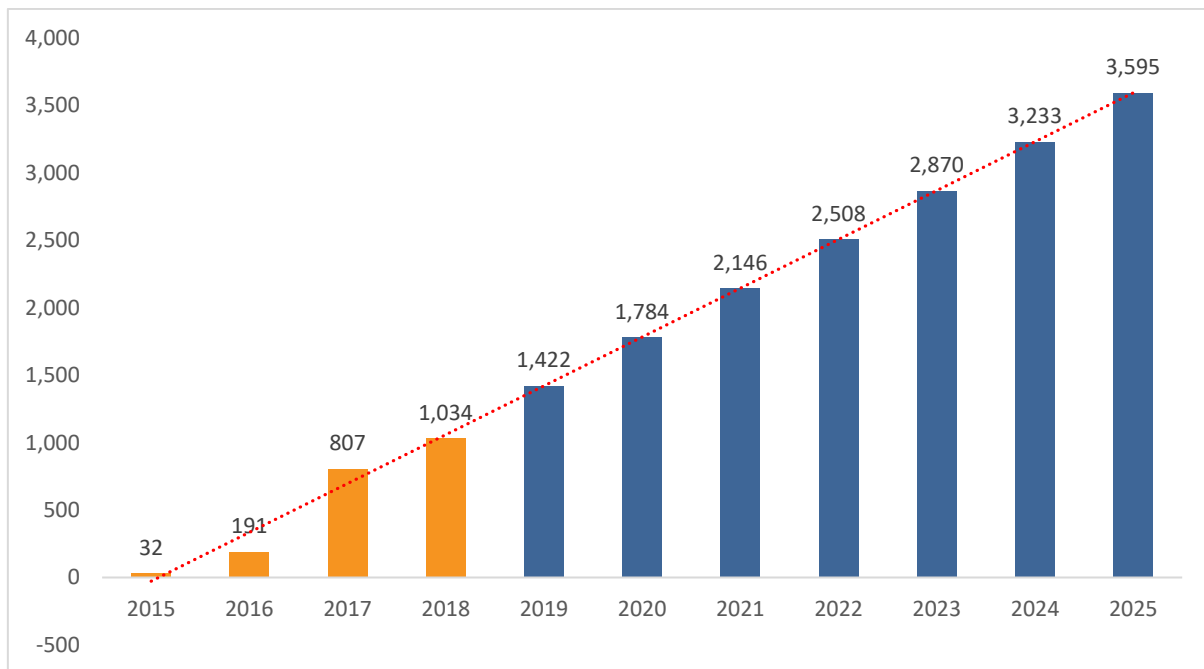


Figure 4: The Prediction of Exports

The Figure 4 shows the prediction of exports is increasing and this is an opportunity to further produce and export the product.

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

Table 18: The Amount of Domestic Demand form 2015 to 2018

Year	Demand (Tons)
2015	92,567
2016	99,016
2017	110,049
2018	162,060

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

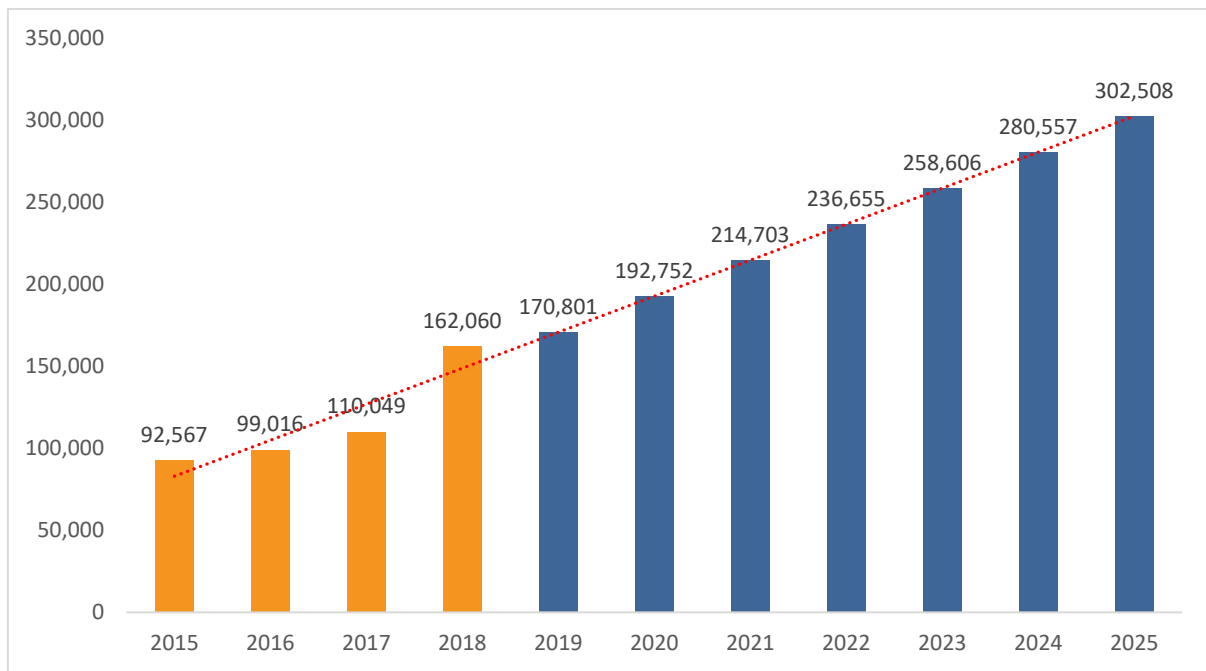


Figure 5: The Prediction of Domestic Demand

As Figure 5 and Table 18 shows, the amount of domestic demand is increased. In the Table 19, the information of the units that have obtained a license 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 License

Progress Percent	Capacity (Ton)
0% - 25%	1,711,650
25% - 50%	1,275
50% - 75%	214,300
75% - 100%	40,000

5 Financial Projection

5.1 The Cost Estimate

Table 20: Total Investment (Million Rial)

No.	Subject	Cost
1	Fixed Capital	245,825
2	Working Capital	66,606
Total Investment		312,431

Table 21: Fixed Capital (Million Rial)

Subject	Paid Cost	Cost Required			Total cost	
		Local Cost	Foreign Exchange Cost			Needed Fund
			Rate	(€)		
land purchase	0	2,268	240,000	0.009	0	2,268
Landscaping	0	4,256		0.01	0	4,256
Building	0	39,350		0.16	0	39,350
equipment and machinery	0	117,130		0.49	0	117,130
Laboratory and workshop supplies and equipment	0	1,910		0.007	0	1,910
Facilities	0	27,449		0.11	0	27,449
Transportation	0	11,900		0.04	0	11,900
Office and services equipment	0	1,297		0.005	0	1,297
Pre-operation costs	0	17,917		0.07	0	17,917
Unforeseen (10% of the above items)	0	22,348		0.09	0	22,348
Total		245,825		1.02	0	245,825

Table 22: Working Capital(Million Rial)

Subject	Day	Total
Packaging material (2 months raw materials and packaging)	60	63,700
Salary (2months salary)	60	2,310
Imprest fund (15 days of water, electricity, fuel and repair costs)	15	596
Total		66,606

Table 23: Fixed and Variable Costs

No	Production Cost	Fixed Cost		Variable Cost	
		%	Cost	%	Cost
1	Raw material	0	0	100	382,200
2	Energy & utility	20	662	80	2,648
3	Repair & Maintenance	20	2,184	80	8,734
4	Production salary	70	9,702	30	4,158
5	Depreciation	100	22,168	0	0
Total production costs			34,716		10,609
Per Unit Cost			16.93		194.02

5.2 Break-Even Analysis

Table 24: Break-even Analysis

Period	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Break-even ratio (%)	25.67	24.18	22.82	21.59	20.32	18.34	17.51	16.76	16.08	15.46

5.3 Sensitivity Analysis of IRR

Table 25: Sensitivity Analysis of IRR

Variation (%)	Sales Revenue	Increase in Fixed Assets	Operating Costs
-20.00%	5.47%	56.34%	73.35%
-16.00%	16.15%	54.29%	68.38%
-12.00%	24.92%	52.40%	63.32%
-8.00%	32.86%	50.66%	58.17%
-4.00%	40.35%	49.04%	52.91%
0.00%	47.53%	47.53%	47.53%
4.00%	54.49%	46.13%	42.03%
8.00%	61.26%	44.81%	36.35%
12.00%	67.87%	43.58%	30.47%
16.00%	74.32%	42.42%	24.26%
20.00%	80.63%	41.32%	17.55%

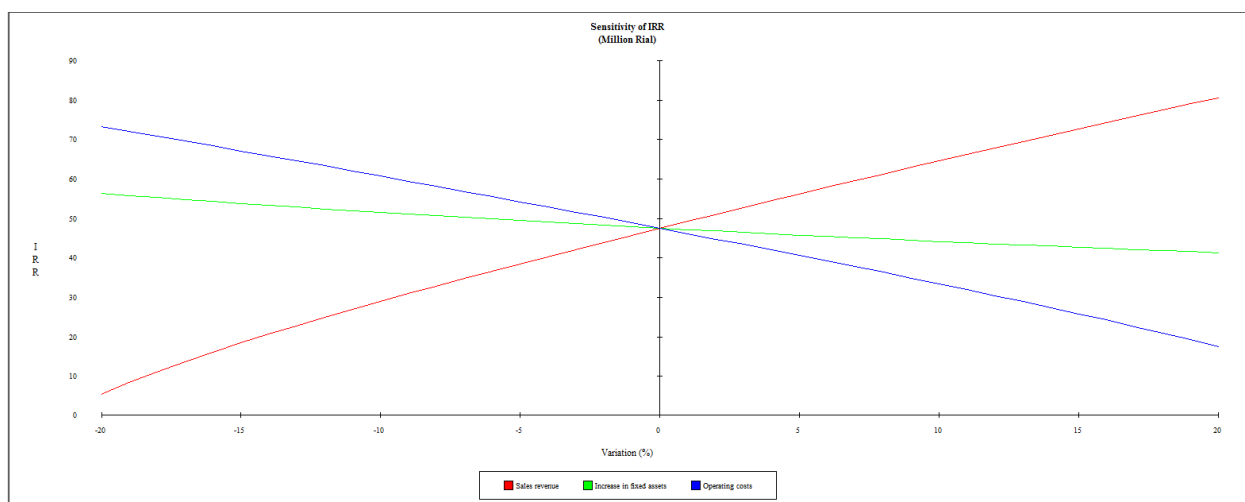


Figure 6: Sensitivity Analysis of IRR

6 Duration of Project Operation

The time of doing early stages and completing its process is about 24 month.

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.