Islamic Republic of Iran
Ministry of Economic Affairs and Finance
General Department of Economic Affairs and Finance of North Khorasan

Aluminum Sheets and Coils
Bojnurd Special Economic Zone

Center of Investment Services of North Khorasan

April 2021

Summary of Technical-Economical Pre-Feasibility Study

The name: Aluminum Sheets and Coils

Sector: Industrial

Subsector: Metal Products

ISIC Code: 2720412348

The owner of:
Organization of Economic Affairs and Finance (North Khorasan)

The ADDRESS:
Iran, North Khorasan, Bojnurd

Table of Contents

1 Abstract

1.1 Project Profile

Table 1: Summary Sheet

Project Introduction			
Project Title	The Aluminum Sheets and Coils		
Sector	Industrial		
Sub Sector	Metal Products		
Location	Iran, North khorasan, Bojnurd		
The County	Bojnurd		
Products / Services	Aluminum Sheets and Coils		
Annual Nominal Capacity	5,000		Tons
The Raw Material	Types of Aluminum Slabs		
Employment	40		Person
Land Area	3,656		m^2
Floor Area	2,350		m^2
Energy and Water Consumption	Water Consumption	12,500	m^3 in year
	Electricity Consumption	265	*KW*
	Gas Consumption	853,000	m^3 in year
Fixed Capital	607,079		Million Rial
Working Capital (The First Year)	538,579		Million Rial
Payback Period	3.74		Year
Net Present Value (NPV)	886,778		Million Rial
Internal Rate Of Return (IRR)	44		%
Modified Internal Rate of Return (MIRR)	27		%
Break Even Point	28		%
The Exchange Rate (Dolar)	240,000		Rial
Description	In this project, all the materials related to the study of the aluminum sheets and coils market especially domestic and foreign supply and demand, are examined.		

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	604,133	240,000	2.51	0	2.51
Working Capital	538,579		2.24	0	2.24
Total Investment	**1,142,712**	**240,000**	**4.76**	**0**	**4.76**

- Value of Foreign Equipment / Machinery: 0 Million Euro
- Value of Local Equipment / Machinery: 0.44 Million Euro
- Net Present Value (NPV): 3.69 Million Euro in Years
- Internal Rate of Return (IRR): 44%
- Payback Period:3.74 Years

Table 4: General Information

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	+989153864144
Tel	+985831552
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: **Bojnurd**

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 26 with coordinates (4146949,521568) in Bojnourd Special Economic Zone. Proposed location of project is shown in Figure 1.

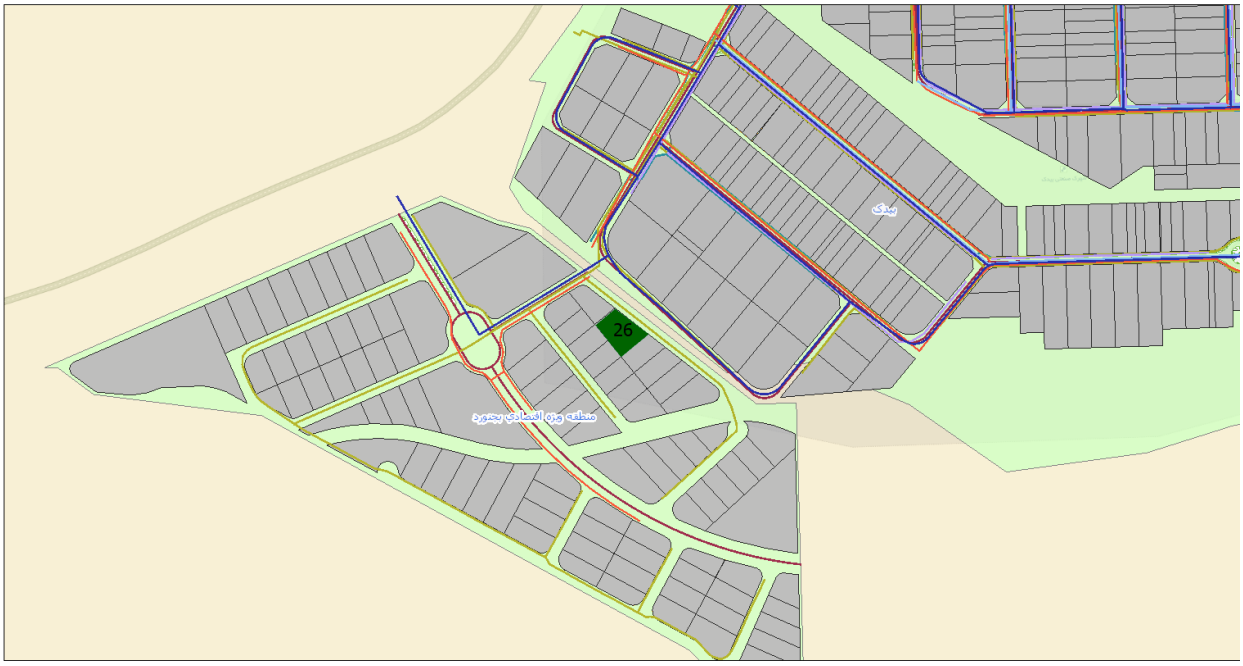

Figure 1: Location of Proposed Land in Bojnurd Special Economic Zone

2.3 The Project: Aluminum Sheets and Coils

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 Product	ISIC Code	Customs Tariff	Environmental Category
Aluminum Sheets and Foils	2720412348	7607 | 7606	3

In this project, all the materials related to the study of the Aluminum sheets and coils market especially domestic and foreign supply and demand, are examined. When aluminum is passed through the rollers under pressure, it becomes thinner and longer in the direction in which it moves. This simple process is the basis for the production of sheets and aluminum foil. This product is sold in the market in the form of rolls and sheets. Today, aluminum sheet is used as a raw material in the production of various parts. Sometimes it is used alone as the final product. These sheets are the most widely used type of industrial aluminum and are used in applications such as aerospace (aircraft shell),

transportation (car body sheet), packaging (objects and cans) and construction (building facade). These sheets are produced in different dimensions and sizes and thicknesses and are used in different cases. The widespread use of this product indicates its high benefits. According to studies, the production of aluminum sheets and coils is expected to increase between 2,021 and 2,025; Which reassures new investors. As the demand for the product shows, from 2,020 to 2,023, about 12,000 tons will be added to the country's needs. Now, if we assume that factories with a percentage of progress (above 75%) will be set up, then we will not have a shortage of demand in the country in 2,023, while there is 8,000 tons of overproduction, but since in 2,023 we will import about 16,000 tons Therefore, with proper planning, imports can be reduced to zero with domestic production, so 8,000 tons of new production is needed for this purpose. It should be noted that the capacity of the factory is 5,000 tons, so the factory can be built without any worries.

3.2 Project's Requirements

Numerous standards for aluminum and its alloys have been developed by various countries and international centers, some of which are as follows:

- Aluminum and workable aluminum alloys - Sheets, belts and plates - Part 1- Technical conditions for inspection and delivery, with standard number (16,588-1)
- Used aluminum and used aluminum alloys - Sheets, belts and plates - Part 2 - Mechanical properties, with standard number (16,588-2)
- Aluminum and Aluminum Alloys - Sheets, Sheets and Sheets - Part 3: Sheets, with standard number (16,588-3)
- Aluminum and Aluminum Alloys - Sheets, Sheets and Plates - Part 4: Sheets and Plates, with Standard Number (16,588-4)
- Aluminum and workable aluminum alloys - Sheets - Belts and plates- Part 5- Chemical composition (16,588-5)
- Aluminum alloy T62 or AL-P2,219-T6 - Sheet and strip, with standard number (14,816)
- Aluminum and workable aluminum alloys - Sheets, belts and plates - Part 1- Technical conditions for inspection and delivery, with standard number (16,588-1)
- Used aluminum and used aluminum alloys - Sheets, belts and plates - Part 2 - Mechanical properties, with standard number (16,588-2)
- Aluminum and workable aluminum alloys - Sheets - Belts and plates - Part 5- Chemical composition, with standard number (16,588-5)

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 Jajarm	8,000	0.5	0	0	4,000

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

Description	Working Capacity	Unit	Unit Price	Paid Cost	Needed Fund	Total
Excavation	3,800	*cm*	0.3	0	0	1,140
Wall Construction and door	940	*Sm*	9	0	0	8,460
street construction (5% of the amount of land)	400	*Sm*	7	0	0	2,800
Green space and Lighting (1% of the amount of land)	80	*No*	8	0	0	640
Total				**0**	0	**13,040**

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	500	30	0	0	15,000
Product warehouse	500	25	0	0	12,500
Laboratory	80	40	0	0	3,200
Office building & services	180	45	0	0	8,100
guardroom	30	45	0	0	1,350
Facilities	60	25	0	0	1,500
Total			**0**	0	**66,650**

Table 10: Infrastructures

No	Description	Unit	Annual Consumption	Unit Cost (Rial)	Total (Million Rial)
1	Water consumption	m^3	12,500	7,000	87
2	Electricity consumption	*Kwh*	5,000,000	1,100	5,500
3	Gas consumption	m^3	853,000	1,200	1,024
4	Gasoline	*Litr*	16,200	30,000	486
Total					**7,097**

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)		
Annealing Furnace	50,000	50,000	240,000	0.2	0	50,000
Strip Caster	57,500	57,500		0.23	0	57,500
Installation Costs	-	200			0	200
Total Cost of Machinery		**107,700**		**0.44**	**0**	**107,700**

- 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
Aluminum slabs	*ton*	5,500	556	3,058,000
Other raw materials (3.5%)	*ton*	-	-	107,030
Total				**3,165,030**

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	skilled production staff	-	-	21	60	22,680
2	unskilled production staff	-	-	10	32	4,800
3	non-productive employees			9	57	7,695
Total				**40**		**35,175**

4 Market Study and Competition

4.1 Examining Supply and Demand Trends

The amount of domestic suplly or production of Aluminum sheets and coils 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 Aluminum sheets and coils

Year	Nominal Capacity (Tons)
2015	168,453
2016	171,198
2017	172,698
2018	188,763
2019	193,663
2020	227,363
Total	**227,363**

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	155,980
2016	158,522
2017	159,911
2018	174,786
2019	179,323
2020	210,528
Total	**210,528**

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

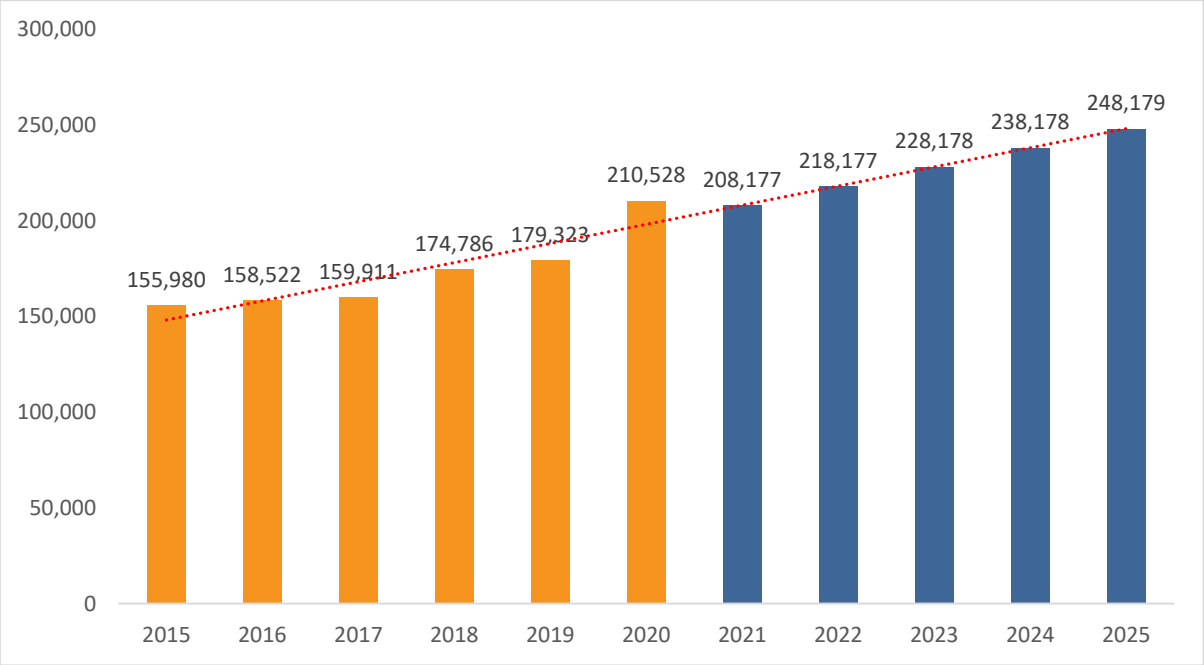

Figure 2: The Prediction of Production Aluminum Sheets and Coils

As Figure 2 shows, the amount of Aluminum sheets and coils 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 following table.

Table 16: The Amount of Imports of Aluminum Sheets and Coils From 2015 to 2020

Year	Weight (ton)	Price (Million Dollar)	Countries
2015	36,233	88	China 55.2% - Japan 8.7% - UAE 4.4%
2016	23,013	63	China 90% - UAE 2.9% - Germany 2.6%
2017	32,064	99	China 85% - Japan 11.1 % - Germany 1.8%
2018	26,271	89	China 72.3% - Japan 19.1% - Germany 3.4%
2020 (9 Month)	23,338	67	UAE 71% - China 24.5% - HongKong 1.7%
Total	**140,919**	**406**	**China 65.8% - UAE 14.2% - Japan 8.3%**

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

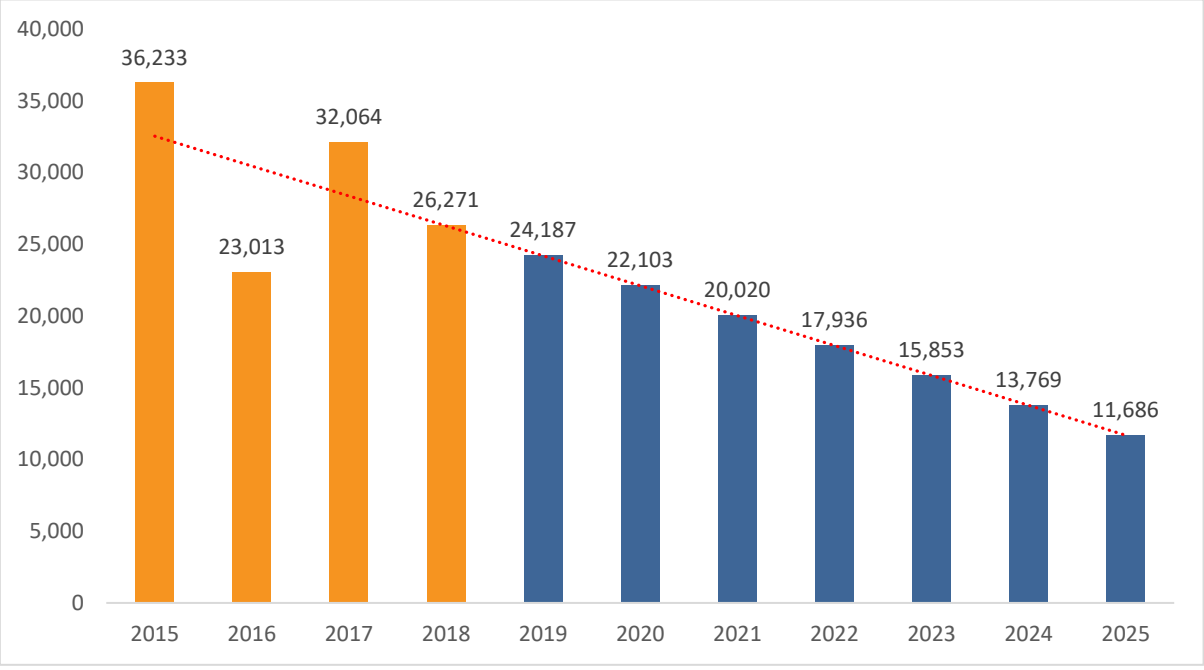

Figure 3: The Prediction of Imports of Aluminum Sheets and Coils

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 following table.

Table 17: The Amount of Exports of Aluminum Sheets and Coils From 2015 to 2020

Year	Weight (ton)	Price (Million Dollar)	Countries
2015	4,185	9	India 57.4% - Iraq 38.5% - Uzbekistan 2.3%
2016	15,943	27	India 47% - Taiwan 34.5% - Iraq 13.7%
2017	2,054	7	Iraq 79.1% - Azerbaijan 12.9% - Afghanistan 2.9%
2018	6,969	14	Iraq 84.6% - Azerbaijan 6% - Afghanistan 2.9%
2020 (9 Month)	4,509	9	Iraq 72% - Afghanistan 15% - Azerbaijan 8%
Total	**33,659**	**66**	**Iraq 43.3% - India 29.4 – Taiwan 16.3%**

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

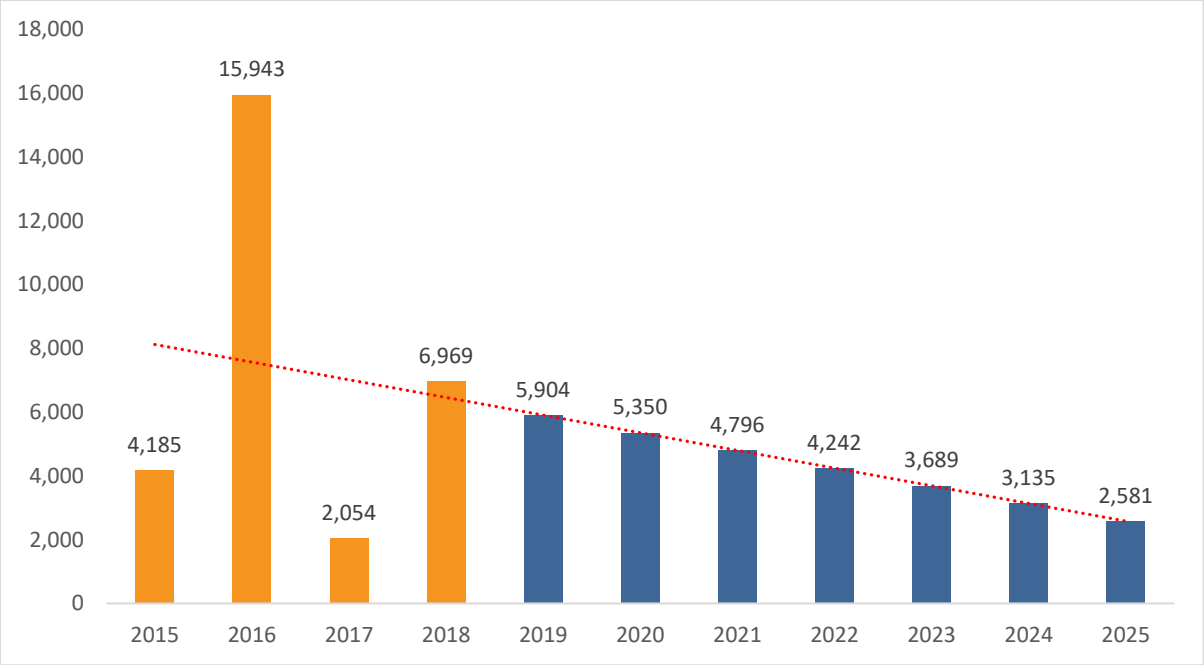

Figure 4: The Prediction of Exports of Aluminum Sheets and Coils

As Figure 4 shows the prediction of exports of aluminum sheets and coils is decreasing.

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 in Table 18.

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

Year	Demand (Tons)
2015	188,028
2016	165,592
2017	189,921
2018	194,088

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

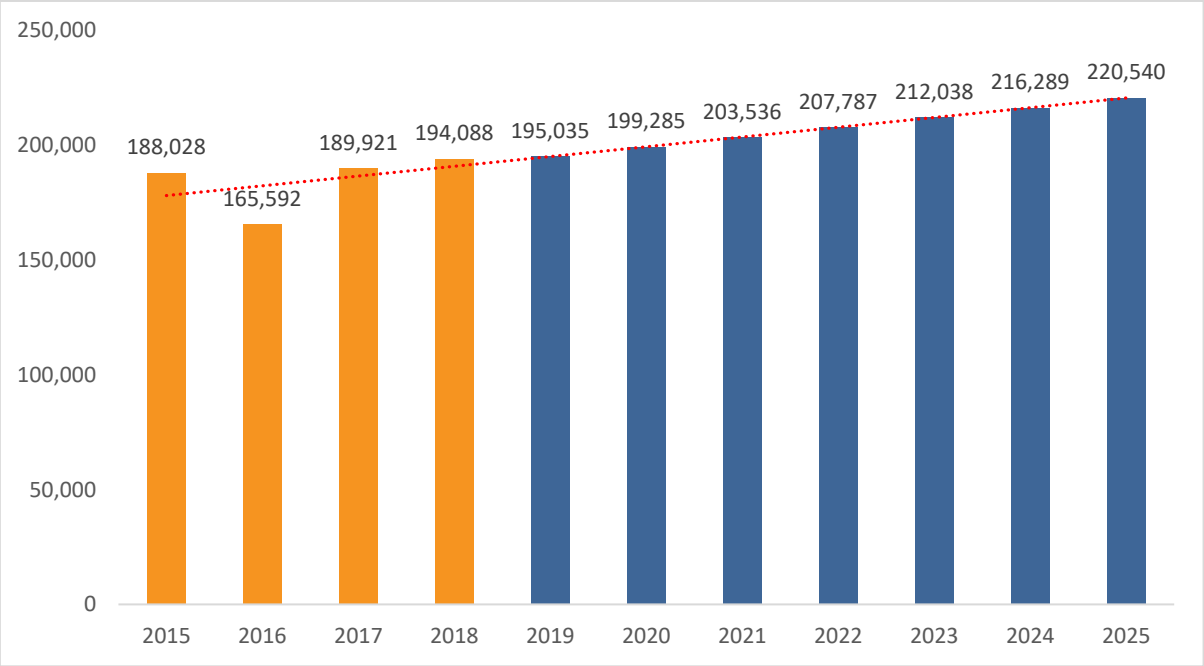

Figure 5: The Prediction of Domestic Demand of Aluminum Sheets and Coils

As Figure 5 and Table 18 shows, the amount of domestic demand of aluminum sheets and coils is increasing. In the 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%	104,900
25% - 50%	3,530
50% - 75%	7,850
75% - 100%	20,000
Total	**136,280**

5 Financial Projection

5.1 The Cost Estimate

Table 20:Total Investment (Million Rial)

No.	Subject	Cost
1	Fixed Capital	604,133
2	Working Capital	538,579
Total Investment		**1,142,712**

Table 21: Fixed Capital (Million Rial)

Subject	Paid Cost	Cost Required				Total cost
		Local Cost	Foreign Exchange Cost		Needed Fund	
			Rate	(€)		
Land Purchase	0	4,000	240,000	0.01	0	4,000
Landscaping	0	13,040		0.05	0	13,040
Building	0	66,650		0.28	0	66,650
Machinery, Equipment and Laboratory Equipment	0	107,700		0.44	0	107,700
Facilities	0	100,000		0.42	0	100,000

Subject	Paid Cost	Cost Required				Total cost
		Local Cost	Foreign Exchange Cost		Needed Fund	
			Rate	(€)		
Transportation	0	43,356		0.18	0	43,356
Office And Services Equipment	0	46,200		0.19	0	46,200
Pre-Operation Costs	0	5,545		0.02	0	5,545
Unforeseen (10% Of The Above Items)	0	162,721		0.67	0	162,721
Total Fixed Investment	**0**	**604,133**		**2.51**	0	**604,133**

Table 22: Working Capital (Million Rial)

Subject	Day	Total
Required raw materials, auxiliary and packaging	60	520,279
salary	60	5,782
Fuel and energy	15	12,518
Total		**538,579**

Table 23: Fixed and Variable Costs

No.	Production Cost	Fixed Cost		Variable Cost	
		%	Cost	%	Cost
1	Raw material	0	0	100	3,165,030
2	Energy & utility	20	1,419	80	5,678
3	Repair & Maintenance	20	13,811	80	55,242
4	Production salary	70	24,623	30	10,553
5	Depreciation	100	58,394	0	0
Total Production Costs			**98,247**		**3,236,503**

5.2 Break-Even Analysis

Table 24: Break-even Analysis

Period	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Break-even ratio (%)	27.99	26.48	25.10	23.85	22.47	19.99	19.21	18.49	17.84	17.25

5.3 Sensitivity Analysis of IRR

Table 25: Sensitivity Analysis of IRR

Variation (%)	Sales Revenue	Increase in Fixed Assets	Operating Costs
-20.00%	-72.11%	51.63%	142.27%
-16.00%	-72.11%	49.86%	122.06%
-12.00%	-44.88%	48.23%	102.06%
-8.00%	0.86%	46.72%	82.34%
-4.00%	23.51%	45.31%	62.96%
0.00%	44.00%	44.00%	44.00%
4.00%	64.79%	42.78%	25.30%
8.00%	86.06%	41.62%	5.28%
12.00%	107.73%	40.54%	-30.81%
16.00%	129.71%	39.52%	-68.01%
20.00%	151.94%	38.56%	-68.01%

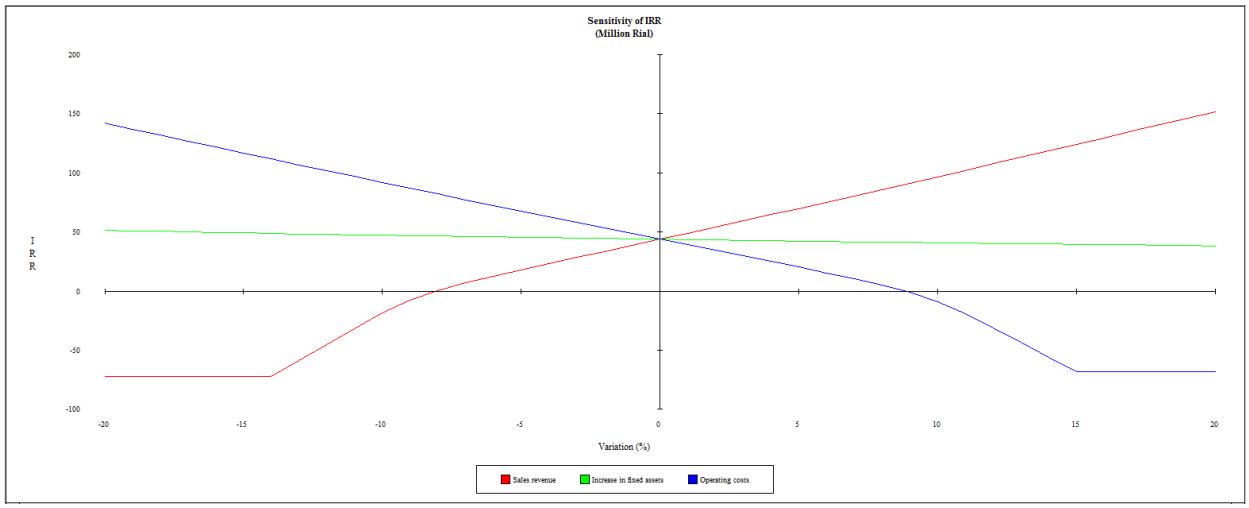

Figure 6: Sensitivity Analysis of IRR

6 Duration of Project Operation

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