Report No: TDAP-Mining
Series : 05/2022

Pre-feasibility Study of Ferrochrome Plant

Researchers: Yasir Nawaz Farooqui
Yusra Sadiq
Research Head: Dr. Khalid Mustafa

Research Wing

Trade Development Authority of Pakistan.
December – 2022

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For any queries or feedback regarding this publication, please contact at yasir.farooqui@tdap.gov.pk.

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List of Abbreviations

Alphabets	Abbreviation	Explanation
B	Bn	Billion
F	FY	Fiscal Year
	Ft	Feet
	FTA	Free Trade Agreement
G	GCC	Gulf Cooperation Council
H	HS Codes	Harmonized System Codes
I	ITC	International Trade Center
K	KG	Kilogram
	Km	Kilometer
M	MMT	Million Metric Tons
	Mn	Million
	MT	Metric Tons
P	PKR/Rs	Pakistani Rupee
U	UN	United Nations
	USD	United States Dollar
T	TPD	Tons Per Day

Executive Summary

Pakistan has blessed with abundance of precious metallic and non-metallic minerals. Around 92 minerals are found of which commercial exploitation of 52 minerals is currently being carried out. Pakistan export its minerals mainly in raw form and no substantive value-addition is done to date. Owing to current trend of raw material exports of minerals, TDAP and EFP joined hands to contribute in exporting of value-added minerals. This report is a step towards creating awareness among the exporters of mineral sector and consists feasibility study on production of ferrochrome plant.

There are a number of small deposits and occurrences of chromite in various parts of Pakistan, but commercial production has been almost entirely restricted to Balochistan. Pakistan has belts of the highest grade of chromite ore deposits in Balochistan, where the Chromite ores deposits are estimated at around 500 million tones available with an annual production of 115,000 tons per year. In Balochistan chromite is being produced from Muslim Bagh, Khanozai (Pishin District), Nasai (Kila Saifullah), Gawal, Wadh (Lasbela), Sonaro (Khuzdar), and Zhob District. Pakistan's chromite grade ranges between 28%-56% and it produces both metrological and refractory grades of chromite.

However, despite huge reserves and production, Currently, the raw ore is transported to Karachi and it is refined in the beneficiation plants located there due to lack of modern processing and value addition activities in the province.

In the face of the everlasting demand for stainless steel production, there is no ferrochrome production unit in the country. Ferrochrome is an alloy comprised of iron and chromium used primarily in the manufacturing of stainless steel. The presence of huge deposits of Chrome could be utilized to establish Ferro Chrome Industry.

Significant investment opportunities in the Chromite sector are; Chromite processing plant for the production of upgraded chrome and state of the art Ferrochrome production plant. Ferrochrome production will allow the steel industry to get the raw material from indigenous local resources and at a lower cost and larger quantity and will also reduce steel manufacturer's dependence on imports of ferrochrome.

Chapter 1 Introduction

1.1. Background of Study

Pakistan is a country which is rich in crops and other valuable minerals. To date, almost all of the minerals are being exported in raw form and no attention is being paid to the processing or upgradation of those minerals, which results as a loss to Pakistan in terms of Employment Opportunities, GDP Growth and development of different cottage industries.

Considering the situation, TDAP and EFP with the goal of making Pakistan prosper, joined hands and decided to form a team and start working on different minerals present in vast deposits as a gift by the mother Nature to Pakistan.

After initial screenings, from many different mineral options to start with, "Chromite (Cr)" was selected as suitable and viable mineral to work with. Also, it was not being processed or upgraded, which itself is an industrial job and very beneficial in terms of earning proficiencies.

1.2. Scope of Study

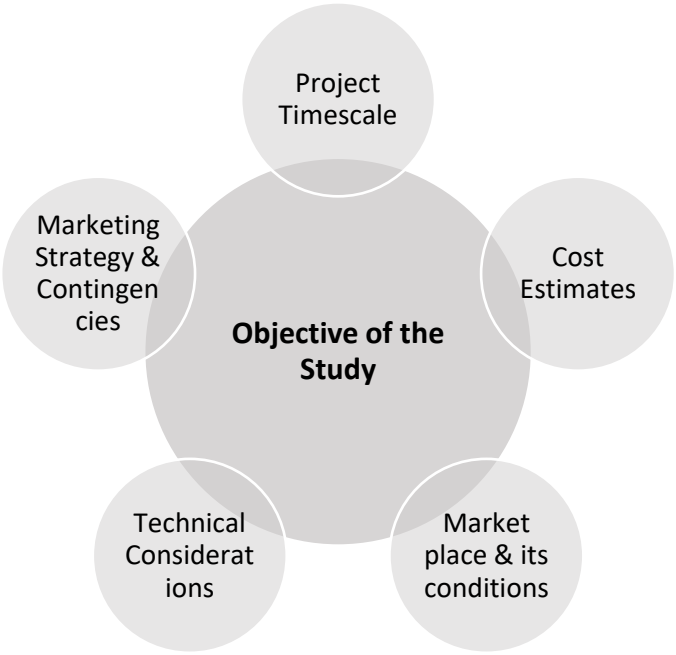
This study is focused towards the production of "Ferrochrome" from the upgraded Chromite Ore and the successful launch of the product in the market locally and internationally.

Phase 1 - Upgradation of Chromite ore – Covered in the previous report titled "Analysis of Chromite Potential and its Value-added Products in Pakistan".

Phase 2 - The conversion of upgraded Chromite Ore into "Ferrochrome".

1.3. Objective of the Study

The objective of the study is to identify the equipment need in installation of ferrochrome plant, cost of the plant, potential markets and possible impediments in execution of the project.



1.4. Significance of the Study

This project will be for the betterment of Pakistan as a whole, the study focuses on the processes, cost & methods of how to convert a mineral into a completely different line of business.

The study will be beneficial for the following stakeholders:

1. Potential Investors.

2. Indenting Agents.

3. Government Agencies

Chapter 2 Description of the Project

Chromite is available in abundance in Pakistan, but the purity of the ore varies according to the geographic location of the mines and formation of the rocks within those mines.

To work out with the erratic supply of Chromite, an Ore Upgradation plant is required to limit off the contingencies and have a better reliable supply of raw material for ferrochrome production.

2.1. SWOT Analysis

Project SWOT analysis further highlights the prominence of project liability considering the strengths and weakness of Pakistan in providing incentives to the new establishing industries while taking advantage of the strategic location to enhance trade relations with neighboring countries.

Table 1 SWOT Analysis

Internal factors				
Strengths (+)		**Importance**	**Weaknesses (–)**	**Importance**
1	Availability of raw material	High	Expensive utility cost	High
2	Strategic geographic positioning for trading	High	High staff turnover	High
3	Developed mines infrastructure	High	Current financial crunch	Medium
4	Convenient location of factory (near mines)	Medium	Inconsistent purity of raw material	Low
5	Cheap labor	Medium	High inventory holding cost	Medium

6	Qualified consultant on board	High	-	-
7	Availability of technical expertise	High	-	-

External factors				
	Opportunities (+)	**Importance**	**Threats (–)**	**Importance**
1	Already established demand of high carbon ferrochrome	High	Chinese controlling mines	Medium
2	Unstable relations between india and china creating a trade gap	Medium	Chinese businesses entring pakistani markets	High
3	Potential investors	High	Unstable political situation of balochistan	Medium
4	No competitor in current market	High	-	-

2.2. Proposed Project - Phase I (Upgradation of Chromite Ore)

Chromite is an oxide mineral of iron chromium oxide with formula FeCr2O4. It is the main source for chromium metal, chemicals, and refractory.

Metallurgical usability of these ores depends on the Cr: Fe ratio besides the Cr content. chromite reserves suitable for metallurgical use should have the Cr/Fe>2.8, for refractory making it should vary between Cr/Fe of 1.8-2.8 and for chemical industries Cr/Fe <1.8 is acceptable.

2.2.1. Physical Properties

Table 2 Physical Properties of Chromite

Crystal habit	Octahedral rare; massive to granular
Color	Black to brownish black; brown to brownish black on thin edges in transmitted light
Streak	Brown
Luster	Resinous, Greasy, Metallic, Sub-Metallic, Dull
Cleavage	None Observed
Diaphaneity	Translucent, Opaque
Mohs Hardness	5.5
Crystal System	Isometric

Tenacity	Brittle
Density	4.5 – 4.8 g/cm^3 (Measured) 5.12 g/cm^3 (Calculated)
Fracture	Irregular/Uneven, Hackly, Sub-Conchoidal
Other characteristics	Weakly magnetic

2.2.2. Mineralogical Characterization

The ROM ore samples appears grey in color with white spots at some places. Chromite usually contains oxides of iron and chromium (Cr2O3 and Fe2O3). XRD analysis of chromite ore reveals the following compounds associated with the ore

1. Chromium Oxide (Cr2O3)
2. Silica (SiO2)
3. Alumina (Al2O3)
4. Magnesium Oxide (MgO)
5. Total Iron as (Fe2O3)
6. Phosphorus (P)
7. Sulphur (S)

With further mineralogical studies through wet analysis performed by SGS revealed the following percentage composition of the ore.

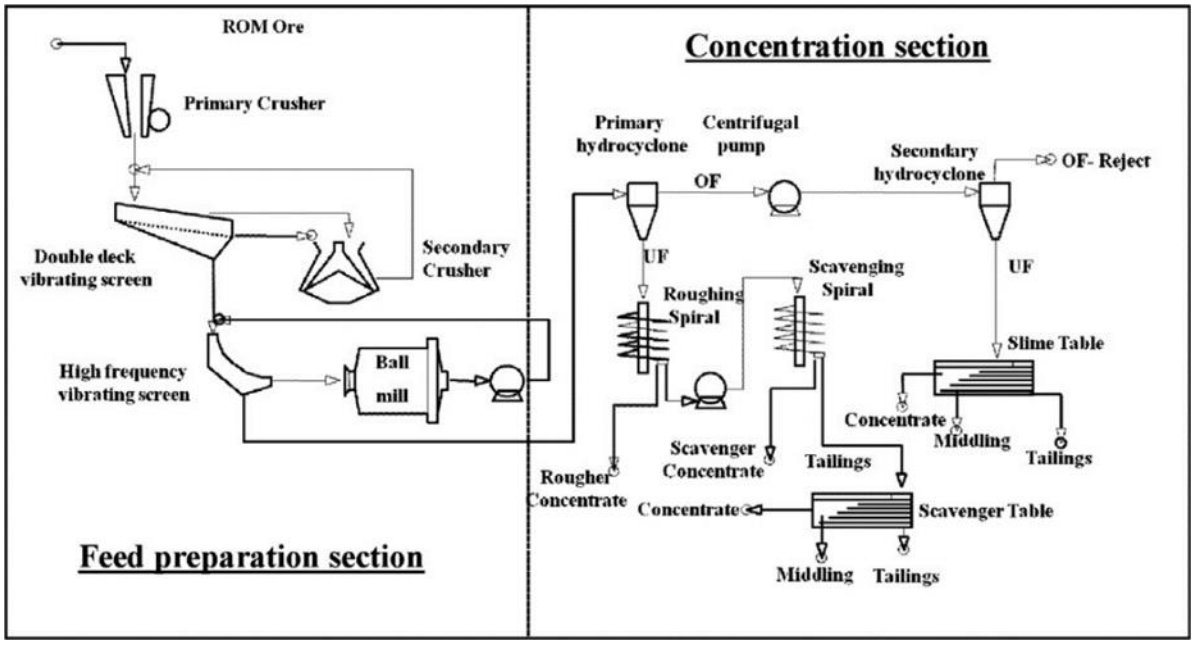
Table 3 SGS Testing Results

Test Item	Unit	Test Results
Chromium Oxide (Cr2o3)	%	51.82
Silica (Sio2)	%	2.93
Alumina (Al2o3)	%	11.56
Magnesium Oxide (Mgo)	%	15.70
Total Iron As (Fe2o3)	%	15.89
Phosphorus (P)	%	0.007
Sulphur (S)	%	<0.020
Cr/Fe	-	3.19:1

2.2.3. Processing

There is heavy demand for metallurgical grade chromite ore due to rapid growth of steel industry and limited availability of such high-grade ore resources. Hence, it has become imperative to improve the Cr/Fe ratio along with Cr content of low to medium grade ore resources.

Figure 1 Chrome Beneficiation Plant



The purpose of beneficiation is to render the ore concentrate physically and chemically suitable for subsequent treatments. Beneficiation practices depend on the mineral characteristics of the ore deposits, gangue mineral assemblage and the degree of dissemination of constituent minerals.

In general chromite beneficiation flow sheet has two major sections comminution (for preparing the material to the subsequent unit operations) and concentration. The feed preparation unit incorporates screening of the ROM ore to 75 mm from 220 mm followed by two stage crushing (primary and secondary crusher) and screening to produce less than 3 mm size fraction. This fraction is further ground to less than 1 mm and then upgraded utilizing conventional gravity techniques like spiral concentrator and shaking table in the concentration section.

2.3. Phase II (Ferrochrome Production)

Chromium is an important and expensive alloying element which is intentionally added to steel to increase its corrosion-resistance, hardness, and strength. During steelmaking process, chromium is added to the steel bath mainly in the form of ferrochrome (FeCr).

Ferrochrome mainly contains 50-70% Cr, 20-30% Fe and 0.015-13.3% C, which is produced by smelting the metallurgical chromite ore using submerged arc furnace.

2.3.1. Processing

Ferrochrome is manufactured by conducting carbothermic reduction of iron magnesium chromium oxide under high temperatures. Iron-chromium alloy is produced by the reduction of Chromium

Ore by the application of coal and coke. This reduction process requires heat which comes from the electric arc of the furnace. The arc can create temperatures around 2800°C. The following metallurgical reaction takes place in an EAF.

$$FeCr2O4 + 4C = Fe + 2Cr + 4CO$$

Ferrochrome is collected from the furnace at regular intervals. Once a considerable amount of the iron-chromium alloy is produced in the furnace, the slag and the molten metal is extracted from the tap hole which passes through a trough and is collected on a ladle or chill. The molten ferrochrome is then solidified in large castings and then processed further according to requirements.

2.4. Market Overview

Ferrochrome global market is estimated at $ 11Bn which makes it highly demanding alloy in making of stainless steel.

2.4.1. Top Importing Markets and Price Analysis of Ferrochrome

The demand of high carbon ferrochrome is more than the low carbon ferrochrome. China is the leading importer of ferrochrome importing $ 3.3Bn in 2021 followed by Indonesia $ 2Bn, Japan $ 1Bn, Korea and USA each $ 600Mn. The price of high carbon ferrochrome varies between $1200-$1400 per Ton. (Trade Map, 2021)

Indonesia and Japan has applied 0% tariff on importing high carbon ferrochrome which makes them more competitive markets among the importers.

Table 4 Top Importing Markets of Ferrochrome - HS 720241

Ferro-chromium, containing by weight > 4% of carbon - HS Code 720241				
Top Markets	**Value imported in 2021 ($ Mn)**	**Quantity imported in 2021**	**Unit value (USD/Ton)**	**Average tariff (estimated) applied by**
World	10,164	7,644,061	1,330	-
China	3,318	2,627,569	1,212	2.1
Indonesia	2,003	1,500,720	1,334	0
Japan	1,009	644,965	1,565	0
Korea	662	509,036	1,301	1.2
USA	634	449,255	1,410	0.7

UAE	632	528,331	1,196	4.6
TDAP Research Wing, Trade Map				

Whereas, low carbon ferrochrome has a global market of around $ 1Bn.

The top importers are USA, Korea, Japan and Germany imported value amounting to $ 226Mn, $107Mn, $106Mn and $83Mn respectively.

The price of low carbon ferrochrome is high compared with high carbon ferrochrome. Its price ranges between $2500-$3500 per ton. (Trade Map, 2021)

Table 5 Top Importing Countries of Ferrochrome - HS 720249

Ferro chromium, containing by weight <= 4% of carbon - HS Code 720249				
Top Markets	**Value imported in 2021 ($ Mn)**	**Quantity imported in 2021**	**Unit value (USD/Ton)**	**Average tariff (estimated) applied by Country**
World	**895**	**0**	**-**	**-**
USA	226	66263	3412	1.2
Korea	107	43896	2441	1.2
Japan	106	33054	3203	3.3
Germany	83	28496	2919	2
India	43	16162	2685	4
TDAP Research Wing, Trade Map				

2.4.2. Top Exporting Countries and Price Analysis of Ferrochrome

South Africa is the leading exporter of high carbon ferrochrome, exported $ 3.6Bn in 2021.

Kazakhstan, India and Finland are also the top exporters. The price comparison shows that South African ferrochrome is more competitive in terms of price as it offers average price of $886 per ton which is lower than Kazakhstan price of 1,699 per ton and India's price of $ 1,287 per ton. (Trade Map, 2021)

Table 6 Top Exporters of Ferrochrome - HS Code 720241

Product: 720241 Ferro-chromium, containing by weight > 4% of carbon			
	Value in $ Mn in 2021	**Quantity in Tons**	**Unit value/Ton**
World	8,738	NA	NA
South Africa	3,652	4,121,568	886
Kazakhstan	2,118	1,246,884	1,699
India	981	762,221	1,287
Finland	323	NA	NA
Zimbabwe	296	316,572	934
TDAP Research Wing, Trade Map			

On the other hand, Russia, Kazakhstan, Turkiye, Germany are the top exporters of low carbon ferrochrome. Russia offers more competitive price of $ 2,461 per ton compared with Turkiye $ 3,324 per ton and Germany $ 3,691 per ton. (Trade Map, 2021)

Table 7 Top Exporters of Ferrochrome - HS Code 720249

Product: 720249 Ferro-chromium, containing by weight <= 4% of carbon			
	Value in $ Mn in 2021	**Quantity in Tons**	**Unit value/Ton**
World	670	NA	NA
Russia	178	72,236	2,461
Kazakhstan	152	NA	NA
Türkiye	104	31,194	3,324
Germany	45	12,213	3,691
Netherlands	35	12,289	2,869
TDAP Research Wing, Trade Map			

2.4.3. Pakistan's Import of Ferrochrome and its Price Analysis

Pakistan is not the leading importer of ferrochromium, as the country imports finished product of stainless steel. However, few quantities of high and low carbon ferrochromium still imported by limited importers.

In 2021, around $ 263,000 of high carbon ferrochrome imported from South Africa, Vietnam and Europe.

Table 8 Pakistan's Import of Ferrochrome – HS Code 720241

Product: 720241 Ferro-chromium, containing by weight > 4% of carbon				
	Value imported in 2021 ($ '000)	**Quantity in Tons**	**Unit value/Ton**	Average tariff applied by Pakistan (%)
World	263	176	1,494	-
South Africa	63	51	1,235	3
Viet Nam	63	32	1,969	3
European Union Nes	52	28	1,857	-
Germany	36	23	1,565	3
Oman	29	27	1,074	3
Türkiye	20	15	1,333	3

Whereas, low carbon ferrochrome imported value around $ 304,000 from China, Russia and Turkey.

Table 9 Pakistan's Import of Ferrochrome – HS Code 720249

Product: 720249 Ferro-chromium, containing by weight <= 4% of carbon				
	Value imported in 2021 ($ '000)	**Quantity in Tons**	**Unit value/Ton**	**Average tariff applied by Pakistan (%)**
World	304	247	1,231	-
China	184	182	1,011	0
Russian Federation	48	32	1,500	3
Türkiye	27	10	2,700	3
European Union Nes	24	13	1,846	
Germany	20	9	2,222	3
Afghanistan	1	1	1,000	3

2.4.4. Global Aspect

The worldwide market for Ferrochrome is expected to grow at a **CAGR of roughly 10.1%** over the next five years, will reach **21100 million USD in 2024**, **from 11900 million USD in 2019.** (Gate, 2020)

The market is mainly driven by demand from booming stainless-steel industry, especially in Asia. Stainless steel industry accounts for roughly more than 75% of the FeCr consumption in the globe. China, being the largest stainless-steel producer is therefore also the biggest consumer of FeCr. Highlights of global market conditions are briefly described below.[1]

- High carbon ferrochrome dominated market in 2018 with a volume share of 85.7% in 2018. It is expected to maintain its dominance over the forecast period owing to abundant reserves available of high carbon chromite ore as compared to other products.
- Stainless steel application is predicted to grow the fastest with a CAGR of 4.9% from 2019 to 2030, in terms of revenue. As ferrochrome currently has no substitute for stainless steel, it is poised to witness lucrative growth.
- In terms of volume, Asia Pacific acquired the highest share of 78.5% in 2018. This is mainly attributed to the dominant position of China in terms of stainless-steel production.
- North America is projected to grow at a CAGR of 2.1% from 2019 to 2025, in terms of volume. The protectionist policies currently implemented by the U.S. government are expected to propel domestic steel production and thereby propel ferrochrome demand.
- In August 2019, Glencore, one of the major FeCr manufacturers of South Africa announced a cut in its ferrochrome production by 10% for 2019. This decision was taken owing to the electricity concerns in South Africa.
- Currently China is importing high carbon ferrochrome from India at a rate of 0.7$/lb which is equivalent to 1400$/ton.[2]

2.4.5. Marketing Strategy

To be successful, effective marketing strategies must be considered company must differentiate itself from competitors to appeal to customers in the marketplace. Stated below are some proposed marketing strategies to help the product standout in this competitive environment.

[1] grand view research industry-analysis ferrochrome-market
[2] Indian mart

2.4.6. Product

High carbon ferrochrome, 6-8% carbon grade, 65-70% chromium, for many years remained the standard of the industry. Through the selectivity of parameters and raw material for phase II such grade is achievable which is widely accepted in steel industries.

2.4.7. Packaging

Depending on the user requirements custom packaging can be designed although ferrochrome or chromite are widely supplied in plastic woven bag 1,000 kgs and in 25 Kgs PP Bags.

2.4.8. Place and Promotion

Company will implement a customer e-mailing list to send product promotions for marketing, several marketing strategies that could be applied for better promotion are stated below:

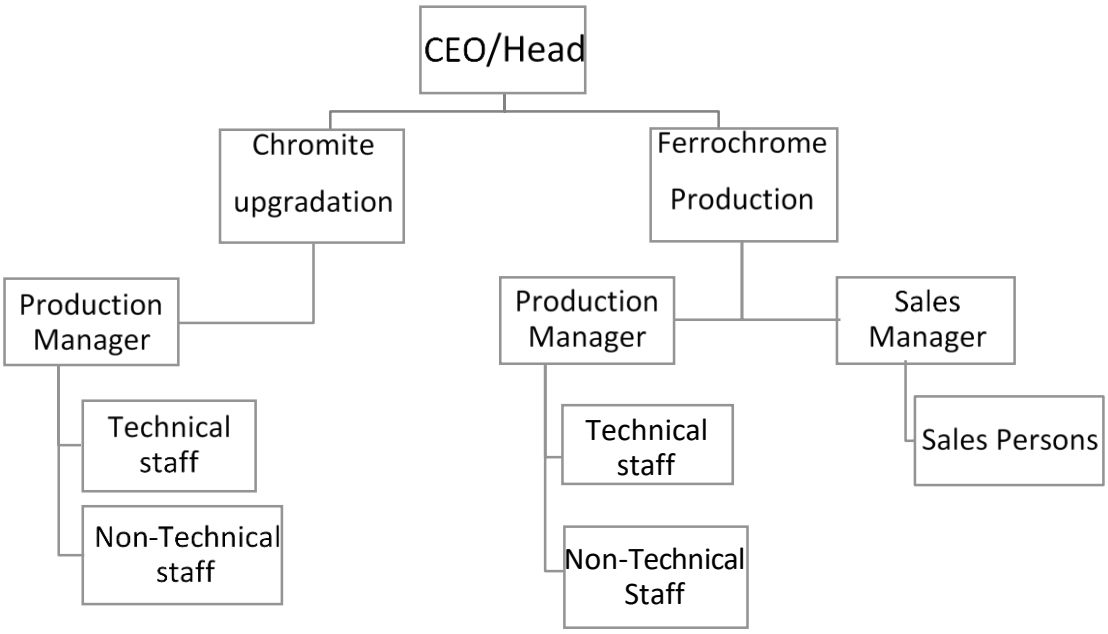
1. Promote product over internet and through different portals like Alibaba, Trade ford etc.
2. Marketing through company website.
3. Direct marketing to potential customers through emails
4. Product display on trade fairs and trade shows conferences.
5. Promoting through an external indenting commission agent.

2.4.9. Price

Our suggested strategy is to be low cost suppliers and to adopt price penetration strategies to conquer the existing ferrochrome market in Pakistan as well as outside this region.

2.5. Organization and Staffing

Figure 2 Organizational Chart



Phase I of the project may not require much of the technical staff than phase II, however, several staffing additions are required to implement the work smoothly. All these positions will work within existing departments and report to department managers.

Staffing Position I: Ore Upgradation – An ore upgradation plant of 100TPD require 15 technical staff to ensure smooth running of operation along with 5 non-technical staff to look after raw material loading to crushing line to packaging of final product.

Staffing Position II: Ferrochrome Production – Phase II however requires much more trained technical staff to handle an electric arc furnace along with the cooled molded product. This staffing generally depends upon scale of the project. Non-technical staff include security staff and warehouse personnel.

2.6. Project Schedule

The following is a high-level schedule of some significant milestones for this initiative:

March 2023: Initiate Project

July 2023: Processing lab development for phase I & II November 2020: Complete Lab testing

February 2024: Completion of ore upgradation pilot testing

April 2024: Startup of Small-scale ferrochrome upgradation plant October 2021: Enhancing scale of the project

This timeline may vary in accordance with the current economic situation.

Chapter 3 Feasibility of Ferro-chrome Plant – 10 Tons Per Day (TPD)

3.1. Equipment Breakdown

The quotation for the plant is has been acquired from "**Shaanxi Yuanhang Machinery Equipment Import & Export Corp. Ltd".** The quotation is subject to change owing to current global inflationary pressure and is valid as of December 2022**.**

Table 10 Equipment Required in Ferrochrome Plant

Part I Main Equipment of Furnace	**USD**
Furnace Body	**94,800**
Water Cooling Smoke Hood	**46,500**
Sealed Device and Guide Wheel Group	**8,500**
Holding System	**106,710**
Short Net	**87,285**
Hydraulic System	**23,500**
Circulating Water System in Furnace	**21,000**
Iron and Slag Tapping System	**28,570**
Smoke Exhaust of Furnace Mouth	**8,100**
Low Voltage Electrical Controlling	**59,285**
High Voltage Electrical Controlling	**85,720**
Total Equipment Cost	**569,970**
Fob Tianjin China	**100,000**
Total Price	**669,970**
Part II Furnace Auxiliary Equipment	
Batching and Feeding System	22,000
Crane	145,000
Pump and Pipe Net, Valve	29,500
Chemical Examination	63,000
Total Price (Fob Tianjin, China)	**259,500**
Total Cost Part I & II	
Total Phase 2 Equipment Cost	**929,470**

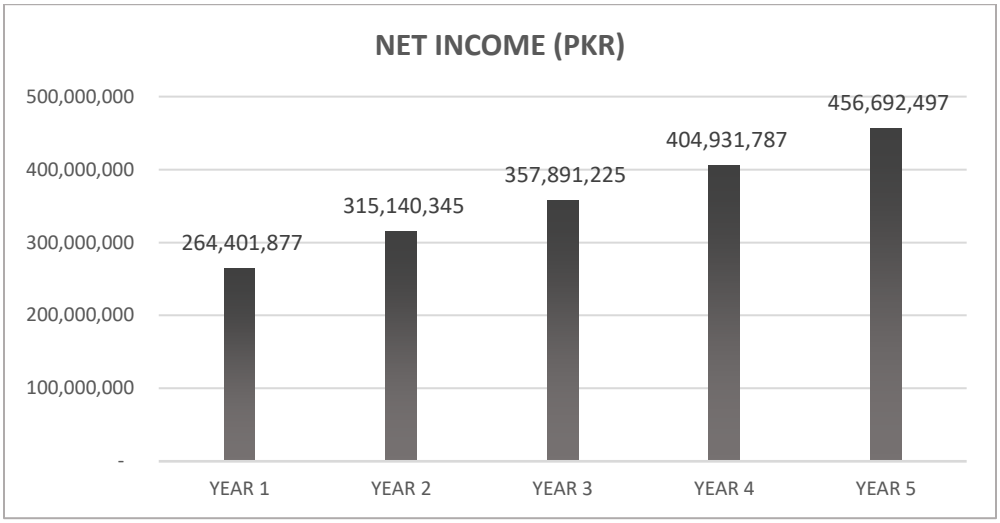
The total cost of setting-up sub-merged arc furnace plant (10 TPD) is estimated at USD 929,470. (Yuanhang, 2022)

3.2. Feasibility

The raw chromite ore price is around 280 USD per ton. By converting this to its value-added product, we can generate huge revenue as the final product, i.e. Ferrochrome can be sold for up to 4145 USD per ton.

From the feasibility analysis of 10 TPD Ferrochrome production plant, the estimated net income per year is shown below. The investment will be recovered within one and a half year and IRR is estimated as 30% for the period of 2 years.

Figure 3 Projected Net Income After Setting-up Ferrochrome Plant



Source: TDAP and EFP Research Wing

3.3. Five-year projections

Below are the five-year financial projections of ferrochrome plant.

Table 11 Five-year Projections of Revenues and Expenses

	MONTHLY	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
	AMOUNT - PKR	AMOUNT - PKR	AMOUNT - PKR	AMOUNT - PKR	AMOUNT - PKR	AMOUNT - PKR
REVENUES						
FeCr	102,570,512	1,230,846,144	1,353,930,758	1,489,323,834	1,638,256,218	1,802,081,839
Slag	1,771,560	21,258,720	23,384,592	25,723,051	28,295,356	31,124,892
TOTAL REVENUE	**104,342,072**	**1,252,104,864**	**1,377,315,350**	**1,515,046,885**	**1,666,551,574**	**1,833,206,731**
DIRECT COSTS						
ELECTRICITY	34,560,000	414,720,000	456,192,000	501,811,200	551,992,320	607,191,552
WATER	3,523	42,275	46,502	51,152	56,268	61,894
RAW MATERIAL (PHASE-1)	18,896,640	226,759,680	249,435,648	274,379,213	301,817,134	331,998,847

COKE	809,856	9,718,272	10,690,099	11,759,109	12,935,020	14,228,522
LIMESTONE	33,744	404,928	445,421	489,963	538,959	592,855
REFRACTORY	26,995	323,942	356,337	391,970	431,167	474,284
ELECTRODE	1,349,760	16,197,120	17,816,832	19,598,515	21,558,367	23,714,203
LABOR	2,390,000	28,680,000	31,548,000	34,702,800	38,173,080	41,990,388
HANDLING	694,901	8,338,817	9,172,699	10,089,969	11,098,966	12,208,862
PACKAGING	750,000	9,000,000	9,900,000	10,890,000	11,979,000	13,176,900
REPAIR & MAINTAINENCE	3,190,021	38,280,254	42,108,279	46,319,107	50,951,017	56,046,119
INDIRECT COSTS						
DEPRECIATION	3,190,021	38,280,254	38,280,254	38,280,254	38,280,254	38,280,254
SHIPPING COST	1,687,500	20,250,000	22,275,000	24,502,500	26,952,750	29,648,025
INTEREST EXPENSE	5,282,696	46,412,260	38,847,787	30,507,955	21,313,290	11,176,172
TOTAL COST	**72,865,658**	**857,407,801**	**927,114,857**	**1,003,773,707**	**1,088,077,592**	**1,180,788,879**
PBT	31,476,414	394,697,063	450,200,494	511,273,179	578,473,982	652,417,852
TAX (30%)	9,442,924	118,409,119	135,060,148	153,381,954	173,542,195	195,725,356
PAT	22,033,490	264,401,877	315,140,345	357,891,225	404,931,787	456,692,497

Chapter 4 Conclusion

Based on the information presented in this feasibility study, this project seems to be viable. The findings of this feasibility study show that setting-up ferrochrome plant will be highly beneficial and has a high probability of success.

4.1. Recommendations

Below are the recommendations based on the feasibility and are as follows:

4.1.1. Technology

- Locally manufactured machines for ore upgradation will be utilized which will lower the investment cost of phase 1.
- 10TPD electric arc furnace must be purchased from Chinese vendors for better functionality.
- Once in place this technology is simple to operate and maintain for a relatively low cost.

4.1.2. Market

- There is an established demand of high carbon ferrochrome from China which can be capitalized in the near future.

- Shutting down of few ferrochrome plants in south Africa created a void to penetrate in US market.
- No potential competitor in Pakistan.

4.1.3. Organizational

- Minimal increases to staffing are required with no changes to organizational structure.
- Easy loan approval conditions with low KIBOR.
- Availability of federations and associations to improve and initiate new businesses.

4.1.4. Capital Budgeting:

- Payback Period is nearly around first quarter of the second year of operations.
- Five-year projections show IRR of 40%.
- Installation of ferrochrome plant will give return at a swift pace.

4.1.5. Location

- Boston and Lasbela Special Economic Zone (SEZ) are preferred two locations for establishing a Ferrochrome production plant as these locations are not only close to chromite producing districts of Muslim Bagh, Khanozai (Pishin District), Nasai (Kila Saifullah), Gawal, Wadh (Lasbela), and Sonaro (Khuzdar) but also close to CPEC routs which will give it easy access while transporting finished goods to steel industry located in various parts of the country.

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