An Outlook to Iran Pelletizing and Steel Industries

Plants, Projects, Technology Selection, Technologies

(Version 1)

By:

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Date:

May 2016

Contents

RESUME

Elham Kordzadeh

Education: 2001-2004
M. Sc. Corrosion Science and Engineering
Shahid Bahonar University of Kerman, Iran, GPA: 3.42 of 4

Thesis: The Evaluation of Corrosion and Mechanical Properties of Aluminum Heat Resistant Alloys for Replacing to Converter Openings of Copper Complex Industries
Grade: 4 of 4

1998-2001
B. Sc. Material science and Engineering
Shahid Bahonar University of Kerman, Iran, GPA: 3.09 of 4

B.Sc. Thesis: Completion, Calibration, Operation of Salt Spray Apparatus and Evaluation of Resistance of Galvanized Coatings/ST12 Steel in Salt Spray Test
Grade: 3.9 of 4

Grants and Awards:
First rank in M.Sc., 2004, Iran
Second rank in B. Sc., 2001, Iran

Current Title and Position:

ü An Enginering Company
May 2016-Present
Technology and Innovation

June 2014-May 2016
ü Fakoor Sanat Tehran (Namad Sanat Pars Holding)
Head of Metallurgy Department

- Technology and Know how
- Engineering of pelletizing and steel making plants
- Se Chahun pelletizing plant(Kobe Steel)
- Sangan pelletizing plant (NETC)
- Bonab steel making tender
- Ghadir steel making tender (Danieli)
- Hosco pelletizing tender
- Gol-e-Gohar steel making tender
- Sephid Dasht Thin slab tender

January 2013-June 2014
ü TIV Energy (Namad Sanat Pars Holding)
Head of Mines and Metals -Business Development Department

- Consultant of Ghadir steel making plant (Danieli & Fakoor Sanat)
- Head of technical and commercial team, Kordistan Steel Making plant (FAIM)
- Coordinator of Gohar Zamin Pelletizing plant (Outotec)
- Head of technical and commercial team Sungun smelting plant tender(Outotec)
- Consultant of Sirjan steel making plant (Danieli & TIV energy)
- Coordinator of Persian Gulf alumina (NFC)
- Coordinator of Persian Gulf pipelines
- Head of technical team and coordinator of Shahrood coke making plant(CIMM)

ü Independent Author and Translator
Mines and Metals Journals

- Comparison between Allis Chalmers and Lurgi Method of pelletizing
- An outlook in steel making and pelletizing projects in Iran
- Pelletizing- Technical and commercial outlook

- Iran pelletizing plants
- Comparison between different methods of pelletizing
- An Outlook to Iran Copper projects
- Translation-Lead and Zinc, tightening up slowly
- Translation-Sentiments and fundamentals drive copper market
- Steel making contractors, consultants and clients of Iran

ü Independent Researcher

Since 2011 till now

- Developing Simulator and Designer of Induration Machine (Lurgi Pelletizing Method)
- Technology Selection and Process know how
- Comparison between Lurgi and Allis Chalmers Technology
- Direct reduction and pelletizing in one plant.
- Simulation of direct reduction
- Optimizing Lurgi process using simulation

September 2011-January 2013

ü Pamidco

- Commercial Department
- Senior Commercial Expert, Consultant of Chadormalou steel making
- Chadormalou steel making plant (Tenova) -Khorasan pelletizing plant

December 2007-March 2011

ü ITOK

- Senior project manager of Bafgh steel project and Senior process engineer
- Senior project manager and process engineer of direct reduction & steel making plant of Bafgh (Fuchs)
- Coordinator of Shahid Kharazi tender (Tenova)
- Coordinator of Mahneshan steel making plant tender (MCC)

December 2001-May 2006

ü Samangan Steel Industries

Engineering office

Senior project engineer

- Steel making plant (SMS Demag, Danieli, VAI, …)
- Process engineer of Bafgh steel making plant

January 2003-May 2004

ü Sarcheshmeh Copper Complex Industries

- R & D Researcher, M.Sc. Thesis

July 2003-September 2003

ü Shahid Bahonar Copper Industries Co.

- B. Sc. Project. An Investigation between Electrical Conduction and Mechanical Properties of Copper and Brass Products

Technical Experiences:

- Mining and metals industries specially steel making plants, direct reduction, pelletizing, copper industries, coke making plant, Alumina, …
- Project engineering
- Commercial activities
- Technologies and know how
- Financial activities of projects
- Procurement
- Project price analysis
- Pelletizing Technologies

Trainings (Certificates):

1. INCOTERMS 2010, Commercial Chamber of Iran
2. Selection of Alloys for Oil and Gas Industries, Iranian Corrosion Association
3. MATLAB, Self Training
4. ANSYS Work bench, Novin Parsian
5. General Management, Fakoor Sanat
6. Patents and Papers Writing, Fakoor Sanat
7. Color Inspection, NIS (Germany) and Color Industries Research Center
8. Cathodic Protection, Iranian Corrosion Association
9. Welding Inspection, Iranian Technical and Professional Organization
10. Quality Control, Shahid Bahonar Semi Finished Product

Conferences papers:

- The effect of Nickel on sulphidation resistance of austenitic heat resistant alloys, 43rd annual conference of metallurgists of CIM, Hamilton, Canada, 2004
- The effect of nickel and aluminum on fracture mechanism of aluminum austenitic heat resistant steels, Steel Symposium, 2004, Yazd, Iran
- The effect of aluminum on sulphidation properties of austenitic heat resistant steels, 9th National Corrosion Congress, 2004, Isfahan, Iran
- The effect of nickel and aluminum on oxidation of austenitic heat resistant steels, 4th congress of material engineering and metallurgy of Iranian universities, Tehran, Iran, 2004
- An investigation of effective factors on fracture of heat resisting Fe-25Cr-12Ni alloy used in Copper complex converter, 8th Annual Congress of Iranian Metallurgy Engineers, 2004, Isfahan, Iran

Published papers:

1. The Effect of Nickel Increasing and Aluminum Addition on Sulphidation Resistance of Fe-Ni-Cr Alloys, International Journal of Engineering, 2005
2. The Fracture Mechanisms of an Austenitic Heat Resisting Steel in Copper Converter Atmosphere, International Journal of Iron and Steel, 2008
3. Comparison between Lurgi and Allis Chalmers Process, Pardazesh Magazine, Iran, 2016
4. An introduction of Endless Strip Technology, Pardazesh Magazine, Iran, 2016
5. Technical Note-Arvedi Technology , Samt News, Iran, 2016

Technical Reports and Translations

1. Comparison between Travelling grate and grate kiln Method of pelletizing
2. An outlook in steel making and pelletizing projects in Iran
3. Pelletizing- Technical and commercial outlook
4. Iran pelletizing plants
5. Comparison between different methods of pelletizing
6. Steel making vendor list
7. Translation- Lead and Zinc, tightening up slowly
8. Translation-Sentiments and fundamentals drive copper market

1. INTRODUCTION

Iran has a long history and tradition activities in Mining and related industries. It has the ninth largest minerals reserves in the world. Iran has about 4.3 billion ton iron ore reserves and produces 40 Mt iron ore, 25 Mt concentrate ,25 Mt pellet and 15 Mt steel in 2013.[1] The Iranian Mines and Mining Industries Development & Renovation Organization (IMIDRO) was established in 1999 to determine overall strategies and policies and execute projects related to the construction, development, equipment and renovation projects in metallurgy production industries. This organization consists of:

- Al-Mahdi Aluminum Company(AHAC)
- Ehdas Sanat Company (ESC) - Cement company
- Iranian Minerals Production and Supply Company (IMPASCO)
- Mobarakeh Steel Company (MSC)
- National Iranian Copper Industries Company (NICICO)
- National Iranian Steel Company (NISCO)
- Persian Gulf Mining & Metal Industries Special Zone (PGSEZ)
- Iranian Mineral Processing Research Center (IMPRC)
- IRITEC[2]

2. IRAN IRON PRODUCTION

Main Surveying and studied shows that Iron ore regions in Iran are divided into three regions:

1. Hamedan- Isfahan- Kerman (main parts is Sirjan GolGohar in Kerman province)
2. Zanjan- Semnan- Khorasan (main parts is Sangan in Khorasan province)
3. Anarak-Bafgh-Yazd-Kerman (Choghart and Chadormalu mines)

Main Iranian iron ore mines are as follows:

2.1. CHADORMALU

Chadormalu Mining and Industrial Company (CMIC) is the main iron ore concentrate producer for iron making by direct reduction in Iran. Beside of iron ore concentrate, the company produces also up to 1,000,000 ton/year crushed iron ore for using in blast furnaces in Iran as well for export purpose. The company was established on June

1992, as a private joint stock Co. Later, on 21st April 2003 the legal status of the company changed to public joint stock Co. and has been registered on Tehran stock exchange.[3]

2.2. IRAN CENTRAL IRON ORE COMPANY

The Choghart iron ore mine is located 12km northeast of Bafgh and 125km southeast of the centre of the Yazd province. Exploration activities started in this area in 1962. Detailed geophysical and geological studies, as well as drilling and mapping since 1968 have resulted in the identification of over 5.2 billion tons of iron and manganese ores in Bafgh and other parts of the country out of which about 38 iron anomalies with geological reserves of over 7.1 billion tons have been estimated in Central Iran. The most important iron ore deposits of this region are Choghart, Chadormalu, Chah Gaz, the northern anomaly and Se Chahun.[4]

2.3. GOLGOHAR

GolGohar iron ore Co. is located in southern Iran, 50 km from Sirjan, in southwest of Kerman province surrounded by mountains over 2500 m high. In 1969, GolGohar iron ore deposits were discovered by Iran Barite company. GolGohar follows a mining tradition in this region which dates back 900 years. GolGohar mines contain 6 ore bodies spread over an area of 40 square km. The total deposits of iron ore in the region are estimated to be over 1.135 billion tons. The major ore body has a deposit of more than 650 million tons. GolGohar is connected to the Iranian railway through the Tehran-Bandar Abbas line. At GolGohar, 6 million tons per year of concentrate is produced through crushing, drying and wet grinding, and magnetic separation methods using low intensity magnetic separators. [5]

2.4. SANGAN

Sangan is one of the biggest iron ore mining areas in Iran with around 1.2 billion tons iron ore resources. Development projects planned for Sangan mining area will increase its iron ore fine and pellet production capacity to 20 million tons when finalized and would surely improve Iran steel industry in the future. At the moment an iron ore concentration plant with 2.6 million tons production capacity is working in Sangan mining area.

Two other plants are under construction beside this production line. One of them is a 5 million ton/year pellet production line and the other one is an iron ore concentration line with 2.4 million ton/year production capacity. [6]

Fig 1. Iran Iron Ore Mines
Source: Google earth

Capacity of iron ore in Iran has been identified in table 1.

Table 1. Capacity of Iran Iron Ore Mines

Row	Mines	CAPACITY (MILION TON)			
		Grade (%)	Approx.	Exact	Geology
1	Choghart	Low phosphorus 55-56 High phosphorus 53-54	17	121	138
2	Chadormalu		47	330	377
3	Other Anomalies in Bafgh		874	376	1250
4	GolGohar	55.5	254	886	1140
5	Sangan	48	825	375	1200
6	Other Mines		200	100	300
			2217	**2188**	**4405**

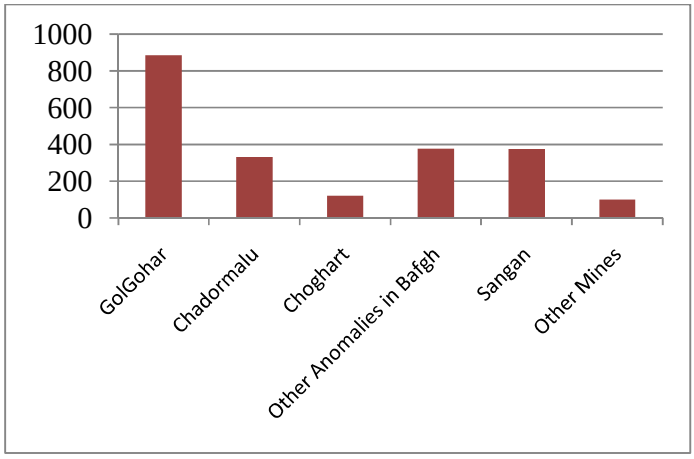

Fig 2. Exact Capacity of Iran Iron Ore Mines

3. IRAN PELLETIZING PLANTS

The capacity of operating pelletizing plants in Iran is 22.1 mt/y. This figure consists of Khozestan, Mobarake, GolGohar1 which are Lurgi and Ardakan pelletizing plants which is Allis Chalmers plant. The capacity of installing plants which are possible projects is 42.5 mt/y. By adding this figure to the existing capacity of pelletizing plant, pellet production capacity will reach to 64.6 mt/y.

3.1. PELLETIZING PLANTS ON OPERATION

3.1.1. ARDAKAN PELLETIZING PLANT[7]

Plant capacity	3.4 Million tons per annum
Location	Km 25, Ardakan-Naein Highway, Yazd, Iran
Technology	Allis Chalmers
Technologist	Kobe Steel
Client	Chadormalu Mining & Industrial Co.
Consultant	Arkan Tadbir Industries
Contractor	Kanrood Sazeh, MPSI co.
Plant area	602 Hectares
Start of Construction	September 2004
Start of Production	September 2007
Investment	Total 2100 Billion I.R.Rials (including 108.4 M.USD as foreign

	currency and 1684 Billion I.R.Rials as Local portion)
Machineries and equipment	Totally 16241 Tons 67.5% local portion and 32.5% foreign portion by a consortium of KOBE Steel, ABB Switzerland and TAIM Spain.)
Steel Structure	3300 Tons of Steel structure for Industrial & Semi-Industrial buildings
Raw material requirement	3.4 Million tpy of iron ore concentrate 24000 tpy of lime stome 24000 tpy of bentonite
Product specification	Iron ore oxidized pellets with the average size of
Operating days	300 days
Electricity	0.042 Kwh/t
Natural gas	33.8 Nm3/h
Water	0.099 m^3/t
Fe Content	66%

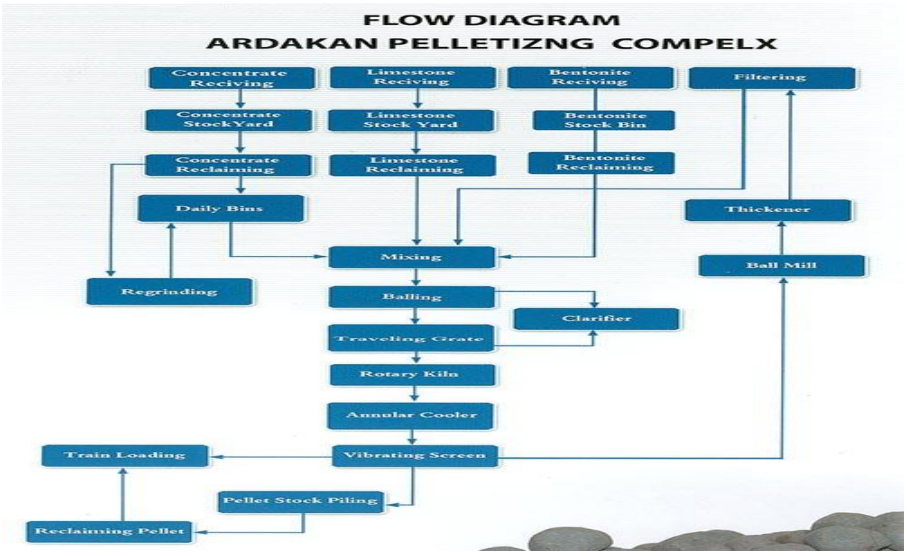

Fig 3. Ardakan process flow chart

Source: Chadormalu Annual Report

3.1.2. MOBARAKE PELLETIZING PLANT[8]

Plant capacity	4.5 mtpy nominal capacity 7.2 Million tons per annum production
Location	Mobarake, Isfahan, Iran
Technology	Lurgi
Technologist	Italian Pienti
Client	Mobarake steel company

3.1.3. KHOZESTAN PELLETIZING PLANT[9]

Plant capacity	2*2.5 mtpy increased capacity to 6.2 mtpy with process optimisation
Location	Khozestan
Technology	Lurgi
Technologist	Outokompu
Client	Khozestan steel Industries
Consultant	Poolad Consulting Engineers
Raw material requirement	0.9-0.8% bentonite, 1-2% lime

3.1.4. GOLGOHAR1 PELLETIZING PLANT[10]

Plant capacity	5.3 Million tons per annum
Location	Gol Gohar Sirjan
Technology	Lurgi
Technologist	Outotec
Client	GolGohar
Consultant	MMTE
Contractor	MPSI
Plant area	602 Hectares

3.1.5. ZARAND PELLETIZING PLANT[11]

Plant capacity	2.5 Million tons per annum
Location	Zarand
Technology	Allis Chalmers
Technologist	Sino steel(China)
Client	MIHDCO
Consultant	MEMSECO
Contractor	Mana

3.2. IRAN PELLETIZING PLANTS UNDER CONSTRUCTION

3.2.1. GOLGOHAR SIRJAN[10]

Plant capacity	5 Million tons per annum
Location	Sirjan, Kerman, Iran
Technology	Lurgi
Technologist	Outotec (Germany)
Client	Golgohar Mining and Industrial Co.
Consultant	Pamidco
Contractor	Keyson-Fara Tahghigh Sepahan

3.2.2. KAVEH SHARGH STEEL PELLETIZING PLANT[12]

Plant capacity	2.5 Million tons per annum with increasing capacity to 5 mtpy in future
Client	Kaveh Shargh Steel
Technology	Under investigation
Consultant	Somic

3.2.3. SOUTH KAVEH STEEL PELLETIZING PLANT[13]

Plant capacity	5 Million tons per annum
Technology	Alis Chalmers
Technologist	CIE (China)
Client	South Kaveh Steel
Consultant	Somic

3.2.4. GOHARZAMIN PELLETIZING PLANT[14]

Plant capacity	5 Million tons per annum
Location	60Km south west of Sirjan, Kerman, iran
Technology	Lurgi
Technologist	Outotec (Germany)
Client	Goharzamin
Consultant	Barsoo
Contractor	Tiv Energy-Asphalt toos, FST is responsible for financing portion
Machineries and equipment	16000 ton

Raw material requirement	Concentrate:1.081 t/t pellet, Additives:0.012 t/t pellet,
Product specification	67.1%
Natural Gas	Heat value: 8098 Kcal/Nm3, 0.75 GJ/t pellet
Electricity	Max 40 khw/t pellet
Water	0.071 m3/t
Fe Content	69.4%, S=max 0.2%

3.2.5. SIRJAN PELLETIZING PLANT[15]

Plant capacity	2.5 Million tons per annum
Technology	Allis Chalmers
Technologist	Sino Steel(China)
Client	Sirjan Iranian Steel Company
Consultant	MEMSECO
Contractor	Foolad technic
Electricity	64 kwh/t
Natural Gas	34 Nm3/t
Water	0.25 m3/t

3.2.6. BUTIA PELLETIZING PLANT[15]

Plant capacity	2.5 Million tons per annum
Location	Km 17 Emam Reza Boulvard, Chatrood, Kerman
Technology	Allis Chalmers
Technologist	SDM(China)
Client	MIHDCO
Consultant	Barsoo
Contractor	MEMSECO, GMI, Mana
Plant area	80 Hektars
Electricity	64 kwh/t
Natural Gas	34 Nm3/t
Water	0.25 Nm3/t

4.2.7. HOSCO PELLETIZING PLANT[16]

Plant capacity	2.5 Million tons per annum
Location	25 km northwest of BANDAR ABBAS
Technology	Lurgi
Project status	Under investigation

3.2.8. PASARGAD PELLETIZING PLANT[17]

Plant capacity	2.5 Million tons per annum
Technology	Allis Chalmers
Consultant	Asyn Foolad
Project status	Under Studying

3.2.9. MAADKOUSH PELLETIZING PLANT[18]

Plant capacity	2* 2.5 Million tons per annum
Location	Persian Gulf Mining & Metal Industrial Special Economic Zone, Bandar Abbas
Technology	Allis Chalmers
Technologist	BSIET
Client	Maad Koush Company
Land	33 Hectars
Project Status	45%

3.2.10. SANGAN PELLETIZING PLANT[19]

Plant capacity	2.5 Million tons per annum
Technology	Allis Chalmers
Location	Sangan
Technologist	NETC (China)
Consultant	Arkan Tadbir Industries
Contractor	Fakoor Sanat Tehran (FST)- Asfalt toos- Mashin Sazie Vijeh
Client	NIMIDCO
Project Status	In engineering and procurement stage

3.2.11 KHORASAN PELLETIZING PLANT[20]

Plant capacity	2.5 Million tons per annum expandable to 3.4 mt/y
Technology	Lurgi
Technologist	NHI(China) for core area- other area:Pamidco
Client	Khorasan Steel company
Contractor	Pamidco for P section , Asfalt toos for C section
Consultant	Amyar poolad- Now MMTE is consultant
Project status	79%

3.2.12. SECHAHUN PELLETIZING PLANT[21]

Plant capacity	5 Million tons per annum
Location	Bafgh
Technology	Allis Chalmers
Technologist	Kobe steel(Japan)
Client	ICIOC
Contractor	Fakoor Sanat- NFC is responsible for financing portion
Consultant	Hampai Tolid
Start of Construction	2015
Project status	Beginning of basic engineering

3.2.13. ASADABAD PELLETIZING PLANT[22]

Plant capacity	550000 tons per annum
Location	45 kilometers from Sanandaj road
Technology	Allis Chalmers
Technologist	China
Client	Saba Noor
Contractor	ZGK
Consultant	Mobtakeran
Project status	85%
Investment	107 billion rial

3.2.14. SHAHRAK PELLETIZING PLANT[22]

Plant capacity	920000 tons per annum
Location	100 kilometers from northwest of Bijar town
Technology	Allis Chalmers
Technologist	China
Client	Saba noor
Project status	At the last stage of engineering

3.2.15. IMIDRO PELLETIZING PLANT[23]

Plant capacity	5 million ton per year
Technology	Lurgi
Location	Sangan
Technologist	Torex , Uralmekhanobr
Consultant	Kani Kavan
Contractor	Azaran Industrial Structure
Client	IMIDRO

3.2.16. MOBARAKE PELLETIZING PLANT[23]

Plant capacity	5 million ton per year
Technology	Lurgi
Location	Sangan
Technologist	Torex , Uralmekhanobr
Consultant	Barsoo
Contractor	Azaran Industrial Structure
Client	Mobarake

3.2.17. BEHABAD PELLETIZING PLANT[24]

Plant capacity	5 million ton per year
Technology	Lurgi
Location	Bafgh
Client	Chadourmalu

4. A COMPARISON BETWEEN IRAN PELLETIZING PLANTS

The capacity of pelletizing plants have been shown in Fig. 4.[25]

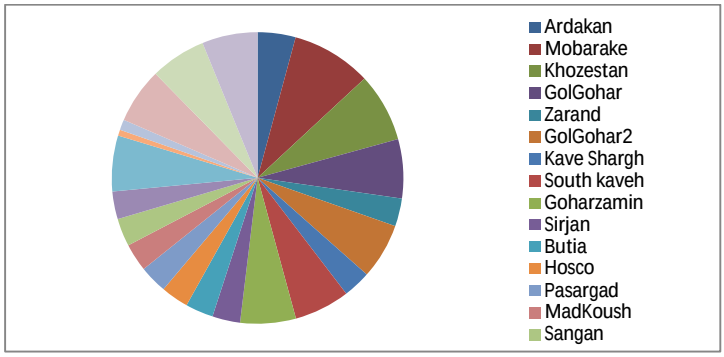

Fig 4. Pelletizing plants capacity in Iran

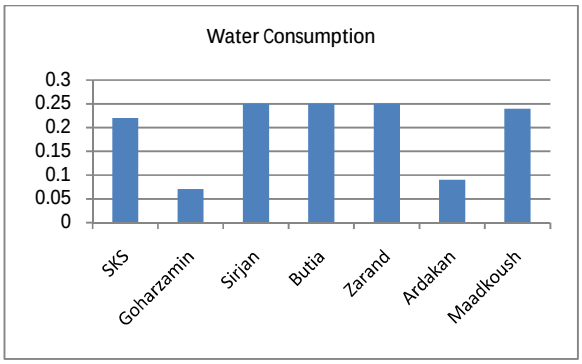

Fig 5. Water Consumption of pelletizing plants in Iran

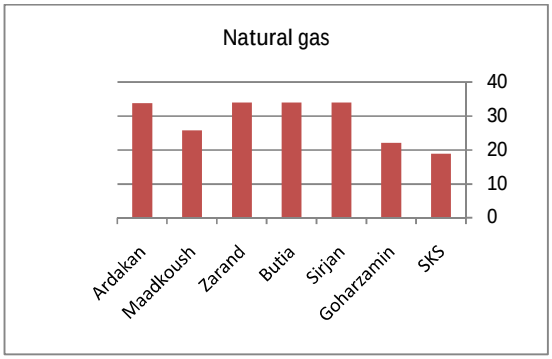

Fig 6. Natural gas Consumption of pelletizing plants in Iran

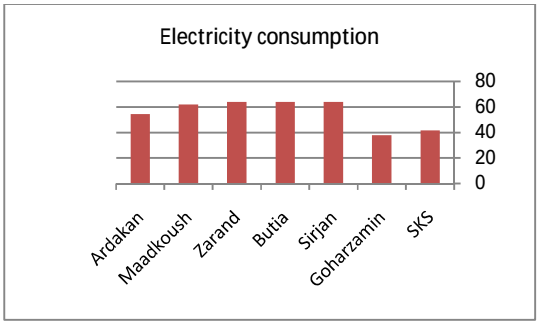

Fig 7. Electricity Consumption of pelletizing plants in Iran

5. SELECTION OF TECHNOLOGY

The selection of process technology will mainly depend on the following considerations: [26,27,28,29,30, 31,32]

Capacity of plants

Type of iron ore, hematite or magnetite

Availability of fuel type

Operating costs

Quality of product

Plant cost

- Capacity of plant:

High capacity plant more than 5 million ton uses travelling grate technology. There is only one reference for 6 million ton per year grate kiln plant. For less capacity both travelling grate and grate kiln is used.

- Type of iron ore:

Magnetite ore is the ideal raw material for pellet making. During preheating it releases heat due to oxidation to hematite and reduces heat energy consumption, increases productivity and strength of the pellet. In case of hematite ore, strength of the pre-hardened pellet will not be adequate to withstand breakage in rotary kiln due to tumbling of the pellets. This results for less experience of grate kiln technology for hematite ore.

- Availability of type of fuel:

Non-availability of adequate natural gas in a country will require use of costly oil in non-captive straight-grate process. In case of grate kiln process, main fuel can be pulverized coal. In travelling grate solid fuel cannot be used.

- Operating costs

Grate kiln operating cost is more than travelling grate. It is due to refractory in contact with feed caused refractory life time to be reduced. Also chunk formation in kiln is another problem. Tumbling of pellet in kiln caused more fine formation which should be return to the loop.

- Quality of product

In compared to travelling grate, grate kiln product has more CCS and better indurted. But in contrast more CCS means less reducibility. Because of better surface

induration in GK the pores and porosity decrease and cause the path for gas diffusion decrease so the reducibility will decrease. Heat transfer in convection form brings more oxygen to the pellet are indurated and oxidation reactions in the form of sulfur and magnetite oxidation are done better.

- Plant cost

Travelling grate needs to somehow more investment than grate kiln.

Table 2. shows the difference between TG and GK technologies in more details.

Table 2. Comparison between travelling grate and grate kiln

STRAIGHT TRAVELING GRATE	ROTARY GRATE KILN
Suited for hematite and magnetite ores.	Preferably suited for magnetite ores.
Drying, Preheating, Induration, Cooling Cycle are carried out in a single unit.	Drying, preheating, Induration, Cooling cycles are carried out in different units.
Grate protection is needed	No grate protection is needed
Induration of pellets is not very uniform	More uniform induration is happened in kiln
Generation of fines is a bare minimum, as there is no transfer of material.	Many transfer points hence heavy generation of fines
No ring formation/ accretion in the system.	Fines create accretion problems and affect the productivity.
Power and fuel consumption lower	Power and fuel consumption higher because of seal leakage
Efficient thermal process	Less efficient thermal process
Low maintenance	High maintenance
Refractory life is longer because refractory lined hood is stationary and at constant temperature.	Higher wear of refractories because kiln refractories are subjected to thermal cycling each revolution & abrasion from pellets
Several burners in preheating and firing	Single Burner in Rotary Kiln
Lower dust loading in the gas handling system	Higher dust loading in the gas handling system
Modular design of traveling grate allows removal and replacement of single pallet in about 5 minutes while process temperatures are maintained.	All repairs of the grate component occurs " off line " The complex chain grate in the grate kiln process must be shut down & cooled for maintenance.
There is no strength requirement of intermediate product	Before transfer to the Kiln the green pellets are to be sufficiently hardened
Higher investment cost	Lower investment cost
Thermal profile adjustment is possible with burners	No possibility of thermal profile adjustment in kiln
Less CCS	More CCS
Higher reducibility	Lower reducibility
Better magnetite and sulfur oxidation	Magnetite and oxidation reaction not completed in kiln because of oxygen requirement of pellet in kiln
Heat transfer is convection	Heat transfer is radiation

6. DIFFERENCE BETWEEN BF & DR PELLETS

6.1. DESIRED BLAST FURNACE (BF) PELLET CHARACTERISTICS

BF pellets characteristics have been shown in table 3.

Table 3. Desired blast furnace pellet capacity[33]

BLAST FURNACE (BF) PELLET		
High iron content	Fe, total iron: 60- 67%.	
minimal impurities		
high level of cold strength	tumbler > 95 %	
	abrasion < 5%	
narrow size range	> 80 % 9.5 x 12.5 mm	
very low amount of fines	< 3 % < 6.3 mm	
high level of L.T.B. (low temperature breakdown)	85 – 88 %, > 6.3 mm	
good reducibility		
Maximize Fe content		
Moderate amounts of basic oxides:	acidic oxide, TiO2	CaO<7%, MgO,3%
Minimize:	moisture	
	acidic gangue:	SiO2<7%, Al203<3%
	impurities–steelmaking impact	P, S, Mn, Cr, Ni, Cu, other minor elements
	elements harmful to iron making	Na, K, Zn

6.2. DESIRED DIRECT REDUCTION (DR) PELLET CHARACTERISTICS

DR pellets characteristics have been shown in table 4.

Table 4. Desired direct reduction furnace pellet capacity[34]

BLAST FURNACE (BF) PELLET		
Maximize	Fe, total iron > 67%.	
Minimize gangue:	SiO2+Al2O3+TiO2,acid gangue	prefer<2% but accept < 3%.
	CaO + MgO, basic oxides	basic oxides (<3.0%) displace purchased flux in steelmaking;
performance of shaft reduction furnace	unlike blast furnace, pellets are the only solid materials and determine gas distribution, permeability, reduction behavior	
physical properties	Size: >50 % + 12.5 mm	
	mechanical strength	
sticking of pellets	minimized by additives, such as limeston or dolomite in pelletizing, or oxide coatings after the pelletizing process	

A comparison between BF and DR pellet demand has been shown in Fig 8.

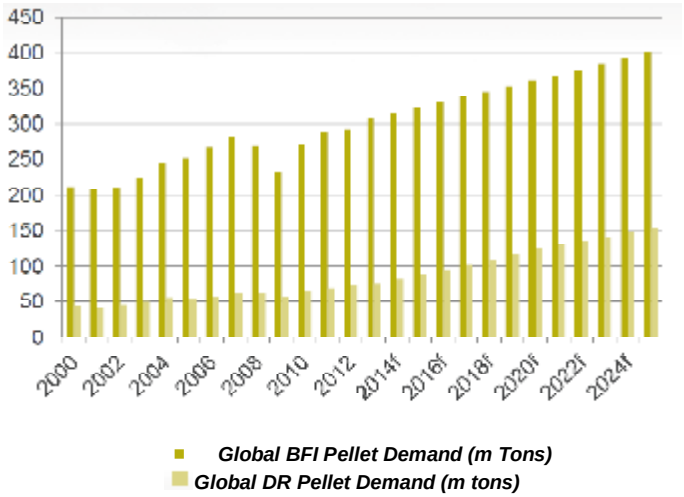

Fig 8. A comparison between BF and DR pellet demand

Source: World Steel Dynamics

Typical blast furnace feed for different countries has been shown in Fig 9.

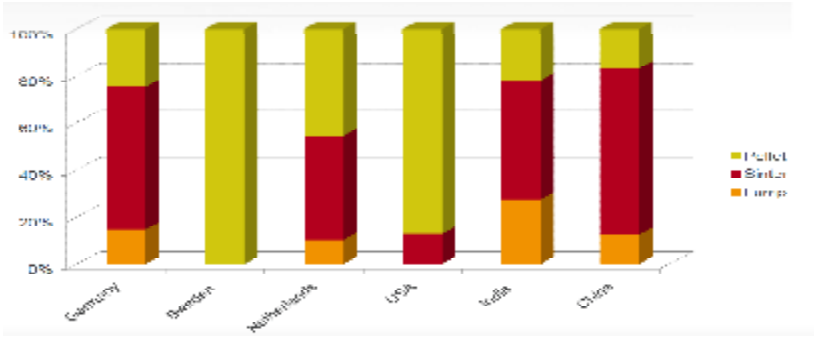

Fig 9. Typical Blast Furnace Burden in different countries
Source: MBR, 03.2011

In figure 10 blast furnace feed in India has been shown in different years

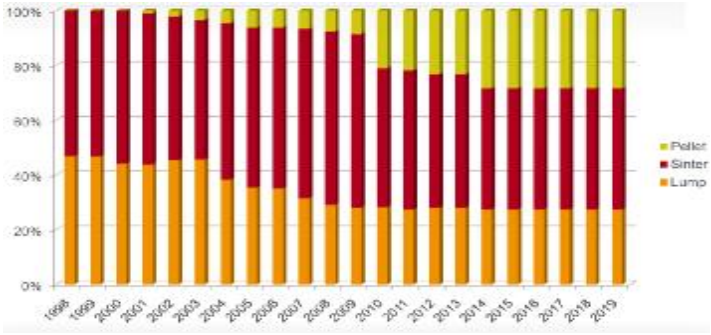

Fig 10. Blast Furnace Burden Development in India

Source: MBR, 03.2011

A pellet production capacity of world and Asia has been foreseen in Fig 11.

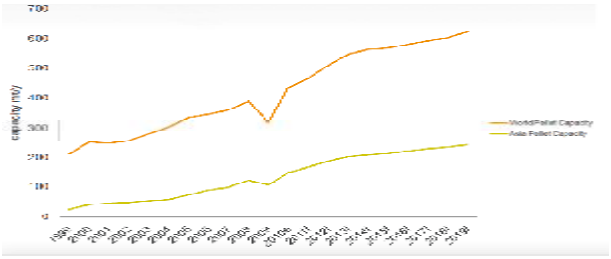

Fig 11.Pellet Production 1999 - 2019

Source: MBR, 03.2011

In Iran most of the pellet is used for direct reduction process in contrast to China which uses pellets in blast furnace. This is because natural gas cost is Iran is low and reduction process is done by natural gas. In technology selection for pelletizing reducibility of pellets for this process is needed to be considered as a main factor.

7. PELLETIZING PLANT AROUND THE WORLD

Here is the list of pelletizing plants around the world:

Country	Operations	Companies
Australia	Balmoral South, Savage River and Sino Iron	Australasian Resources Limited, Australian Bulk Minerals, China Metallurgical Construction Corporation, CITIC Pacific Limited, Cliffs Natural Resources Inc, Grange Resources Limited, and Ivanhoe Mines Ltd,
Bahrain	GIIC	Gulf Industrial Investment Corporation, and Vale S.A,
Brazil	Fábrica, Hispanobras JV, Itabrasco JV, Kobrasco JV, NAMISA, Nibrasco JV (I& II), Porto do Mangue (Mhag), São Luís, Tubarão (I&II), USIMINAS and Vargem Grande	ArcelorMittal, Companhia Siderurgica Nacional, Ilva SpA, Itochu Corporation, JFE Holdings, Inc., Kobe Steel, Ltd, MHAG Serviços e Mineração S.A., Nippon Steel Corporation, Nisshin Steel Co., Ltd., POSCO, Sojitz Corporation, Sumitomo Corporation, Usinas Siderurgicas de Minas Gerais SA, and Vale S.A,
Canada	Carol Lake, KéMag, Port-Cartier (ArcelorMittal Mines Canada) and Wabush Mines	(Private), ArcelorMittal, Cliffs Natural Resources Inc, Labrador Iron Mines Holdings Limited, Mitsubishi Corporation, New Millennium Capital Corp., Rio Tinto Group, and United States Steel Corporation,
Chile	Huasco	Compania Minera del Pacifico SA
China	Anshan I&S, Ansteel Straight Grate, Anyang Iron & Steel Plant 3, Anyang Iron & Steel Plants, Baotou Iron & Steel Shaft Furnaces, Baotou Steel Grate-Kiln, Baotou Steel Straight Grate, Benxi Iron & Steel, Changzhi I&S, Chengchao, Chengde Iron & Steel, Chengde Weiyuan Mining, Chengde Xinxin, Chicheng, Chongqing Xichang Mining, Dagushan, Daye, Dazhou Taixin, Delong, Ekou 1, Ekou 2, Ezhou, Fushun Xin, Gongchangling, Hami	(Private), Anshan Iron & Steel Group Corporation, Anyang Iron & Steel Group, ArcelorMittal, Baotou Iron & Steel (Group) Co. Ltd, Bayi Iron and Steel Company, Beijing Jianlong Heavy Industrial, Benxi Iron & Steel Group Co., Ltd., China Oriental Group Co., Ltd., Chongqing Iron & Steel Group, CITIC Pacific Limited, Delong Holdings Ltd , Handan Iron & Steel Co., Ltd., Hang Zhou Iron & Steel Co., Ltd., Hangzhou Iron and

Country	Operations	Companies
	Pellet Plant, Hami (Bayi) , Handan Iron & Steel, Hangzhou Iron & Steel, Hebei Jinxi I&S, Hebei Wenfeng I&S, Huaigang Special Steel, Huihuang Metal, Jiangsu Shagang Group, Jiangyin Xingcheng Special Steel, Jianlong I&S, Jinan Iron & Steel, Jintang Straight Grate Plant, Jiyuan, Kunming Iron and Steel Complex, Laiwu Iron and Steel Hametite, Laiwu Iron and Steel, Laiwu Mining Construction Pellet Complex, Lianyuan I&S, Litie, Liuzhou Iron and Steel, Lunan Mining, Ma'anshan I&S Shaft Furnaces, Ma'erling, Magang Grate-Kiln, Mengku, Miyibaima (Panzhihua I&S) Plant, Miyun, Nanfen, Nanjing I&S Pellet Complex, Panzhihua Iron & Steel, Rizhao Sanmu, Rockcheck, Shougang (Shoudu I&S) Plant I, Taiyuan I&S, Tangshan I&S, Tangshan I&S South, Tonghua I&S, Xianggang Ruitong, Xilin I&S, Xingtai I&S, Xinxing Ductile Iron Pipes, Xinyu I&S, Xuanhua I&S, Yamansu, Yaochang Grate-Kiln, Yaochang Shaft Furnace, Yichang Ming Corp, Yuxi Hongshan Pellet Industrial & Trade, Zenith Steel, Zhanjiang JV, Zhongyang I&S and Zhuhai Yujia	Steel Company Limited, Hebei New Wu an Iron & Steel Group, Henan Jiyuan I&S Goup, Huihuang Metal Pellet Co., Ltd, Hunan Valin Steel Co., Ltd, Jiangsu Shagang Group Co., Ltd. , Jinan Iron & Steel Company Ltd., Jiuquan Iron and Steel Group, Kunming Iron & Steel Company Limited, Laiwu Steel Corporation, Liuzhou Iron and Steel Company , Maanshan Iron & Steel Company Limited, Nanjing Iron & Steel Group, Panzhihua Iron & Steel (Group) Co., Shanghai Baosteel Group Corporation, Shanxi Zhongyang Iron & Steel Co Ltd, Shougang Corporation, Taiyuan Iron & Steel (Group) Co. Ltd., Tangshan Iron & Steel Co. Ltd., Tianjin Rockcheck Steel Group Co., Ltd, Vale S.A, Wuhan Iron & Steel Corporation, Xilin Iron & Steel Group, Xingtai Iron & Steel Co., Ltd, Xinxing Ductile Iron Pipes Co. Ltd, Xinyu Iron & Steel Co. Ltd., Yunnan Copper Co., Ltd., and Zenith Steel Group
Egypt	Ain El-Sokhana and Alexandria	Gulf Industrial Investment Corporation,
India	Brahami River, Chowgule Group (Mandovi), Essar Steel (Hy-Grade Pellets Ltd), Mangalore and Xindia	(Private), China Minmetals Corporation, Chowgule and Company Private Limited, Essar Global Limited, Kudremukh Iron Ore Co Ltd, NMDC Limited, Stemcor Holdings Ltd, and Xinxing Ductile Iron Pipes Co. Ltd
Kazakhstan	SSGPO	Eurasian Natural Resources Corporation PLC,
Malaysia	Kemaman (Southdown)	Grange Resources Limited,
Mauritania	Guelb el Aouj	Société Nationale Industrielle et Minière, and Sphere Minerals Limited,
Mexico	Las Encinas (LESA), Monclova (AHMSA) and Peña Colorada	(Private), Altos Hornos de Mexico SAB de CV, ArcelorMittal, and Ternium S.A.,
Oman	JFE - Foulath	(Private), Gulf Industrial Investment Corporation, and JFE Holdings, Inc.,
Peru	Shougang Hierra Peru	(Private), and Shougang Corporation,
Russia	Kachkanarsky (KGOK), Karelsky Okatysh, Lebedinsky GOK, Mikhailovsky GOK and Stoilensky GOK	(Government), (Private), Evraz Group S.A., Metalloinvest Holding, Novolipetsk (NLMK), Severstal, and ZAO Gazmetall,
Sweden	Kiruna and Svappavaara and Malmberget	LKAB
Ukraine	Centralniy (Tsentralny) GOK, Poltava and Severniy GOK	(Private), Ferrexpo plc, Metinvest Holding LLC, and Smart Group LLC,
USA	Empire Mine, Hibbing, Keetac, Minnesota Steel, Minntac, Minorca, Northshore, Tilden and United Taconite	AK Steel Holding Corporation, ArcelorMittal, Cliffs Natural Resources Inc, Essar Global Limited, Laiwu Steel Corporation, and United States Steel Corporation,
Venezuela	Piar Division (Toppca) and Sidor	Corporacion Venezolana de Guayana, and Siderúrgica de Orinoco C.A.

8. PELLETIZING TECHNOLOGISTS

- KOBE STEEL
- METSO
- HOVER & BOECKER
- VAI-SIEMENS
- OUTOTEC
- ORE PRO
- DANIELI
- URALMASH

Outotec, with works in Finland and Germany, is a global leader in pellet plant installations. Their straight grate technology dominates globally especially for hematite ore applications.

Siemens VAI, Austria & Germany has introduced a circular pellet plant for small scale (about 1.0 Mt/y) applications; the first plant is being built in India.

Miguel Sabanero of Danieli, Italy provided a technical presentation emphasizing the importance of maintaining permeability during pelletizing and provided much detail on key technologies: carbon addition, double-deck roller screens, deep beds, and the hearth layer bin.

Metso Minerals Industries of USA, is now able to offer both straight grate and grate kiln technology. They compared the two methods and provided some details of new projects.

8.1. KOBE STEEL[35]

KOBE STEEL a Japanese company Aluminum, copper and Steel field of work has been founded in 1905. Kobe Steel's history of pelletizing plants began when the company built a plant at its Kobe Works in 1966. In the past, plant owners had focused mainly on the quality of the product pellets and plant equipment, as well as the cost of the plants. Lately, however, the environmental aspects of plant operation have also been attracting

more attention. KOBE STEEL, use Alis Chalmers Technology. A grate-kiln-cooler system which consists mainly of a grate, a kiln and a cooler, respectively designed for drying/preheating, firing, and cooling the pellets.

8.2. METSO [36]

METSO was created on July 1, 1999 through the merger of Valmet, a paper and board machine supplier, and Rauma, which focused on fiber technology, rock crushing and flow control solutions. Metso has designs for a Grate-Kiln system with a capacity of up to 7 million tpy. By injecting air under the bed of pellets in the rotary kiln, complete oxidation can occur in magnetite pellets prior to the annular cooler. This patented development by Metso, in addition to lowering fuel consumption, significantly improves pellet quality.

8.3. HOVER & BOECKER [37]

In 1887 Carl Haver and Eduard Boecker founded the company in Hohenlimburg, Germany, starting with the production of woven wire mesh. HAVER SCREENING GROUP (HSG) offers custom made pelletizing discs with a size of 7500 mm in diameter and feeding capacities up to 150 t/h. HAVER pelletizing discc are maintenance friendly due to their rugged design, allowing a high productivity. The inclination angle of the disc can be adjusted automatically via a motor driven spindle, even during operation. The disc's rotary speed is also adjustable. Due to the sophisticated drive design, it is possible to start the disc fully loaded. To influence the product quality and to meet changing operation conditions the side wall height is adjustable automatically. The pelletizing discs are equipped with static scrapers to enable constant material layering with variable height.

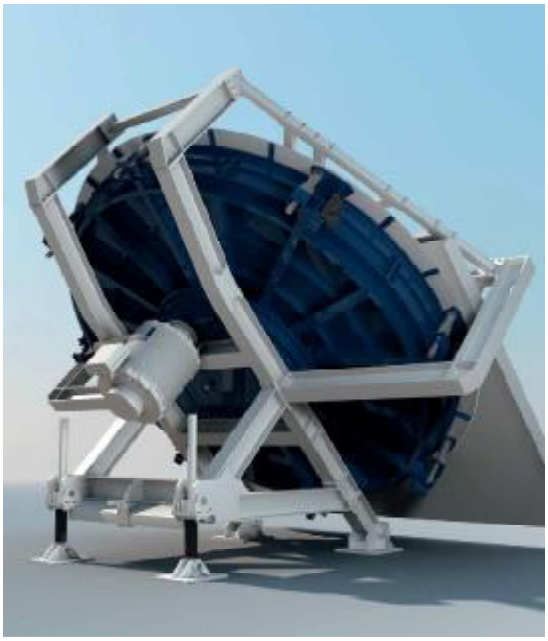

Fig 12. HOVER & BOECKER pelletizing disk

8.4. VAI-SIEMENS [38]

Siemens Metals Technology "Circular Pelletizing Technology" is the next step in the evolution of highly efficient, ultra-compact pelletizing plants. It is by half smaller than conventional plants and offers a completely new flexibility in integration and pellet production. Siemens Metals Technologies has combined two worlds – the well-proven travelling grate process with the simple and robust mechanical design of a circular dip rail cooler. The result is a revolutionary technology which reduces the size of a typical pelletizing plant by half: The Siemens Metals Technologies Circular Pelletizing Technology – the world's most compact plant for pelletizing by far thanks to a low building profile, short process air ducts and completely standardized equipment. The complete plant is as small as a sinter cooler and can be integrated easily and cost-efficiently within existing steelworks, even in sites where almost no free space is available. In comparison with conventional plants which are built up on a massive construction, the Circular Pelletizing Technology from Siemens Metals Technologies stands out through its ultra-light design and offers maximum flexibility to define the plant location.

8.5 OUTOTEC [39]

The traveling grate process, developed by former Lurgi Metallurgie, accounts for two thirds of the world's installed pelletizing processes.

8.6. ORE PRO [40]

ORE PRO introduces a new method for pelletizing. This technology has not been in an industrial scale but a new method in indurating of pellets.

The dielectric and magnetic properties of magnetite make it highly receptive to microwave heating. The dielectric properties characterize the response of the material to an applied external electric field. The magnetic permeability and magnetic loss factor characterise the response of the material to an applied external magnetic field Microwave energy is electromagnetic radiation consisting of an electric field and a magnetic field with wave lengths in the range of 1 meter to 1 millimeter or a frequency range of 0.3 GHz to 300 GHz. Ore Pro's process uses industrial microwave generators with a frequency of 922 MHz.

8.7. DANIELI [41]

The Danieli Corus Pelletizing process is based on the proven straight grate induration technology operating on a wide variety of materials on 83 operating lines in 14 countries around the world. Danieli Corus Pellet Plants can process a wide range of iron ores, in diverse physical forms, to produce high grade pellets for the Direct Reduction and Blast Furnace Iron making systems.

8.8. URALMASH [42]

The “Uralmash plant” Joint-Stock Company is the leading Russian supplier of plants and machinery for oil-and- gas production and mining sectors, as well as the iron and steel industry. The “Uralmashplant” is an only Russia's designer and supplier of travelling-grate induration machines.

Since 1964, about 50 pellet plants with travelling-grate induration machines of 72-700 m^2 effective area and component equipment of the required capacity for various technologies have been developed and put into operation.

The “Uralmashplant” supplies production complexes based on travelling-grate sintering machine of 18 to 592m^2 grate area and capacity up to 4.7 MTPA.

9. IRAN STEEL PLAN- HORIZON 2025

Iran Steel Plan (Horizon 2025) [43] is a complete investigation and study for identifying strategic plans and policies and balancing the steel chain industries in the country from mining to products using facilities and investments. Here is a glance to some pat of this study:

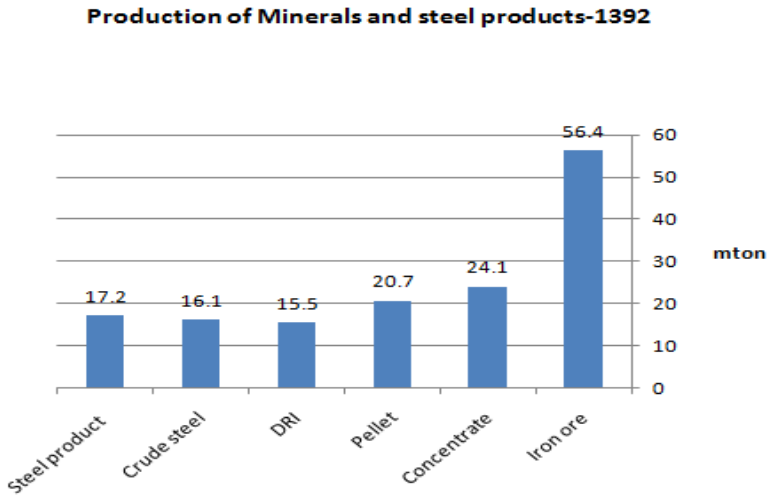

Fig13. Production of minerals and steel products-2013

Source: National Iranian Steel Company Portal

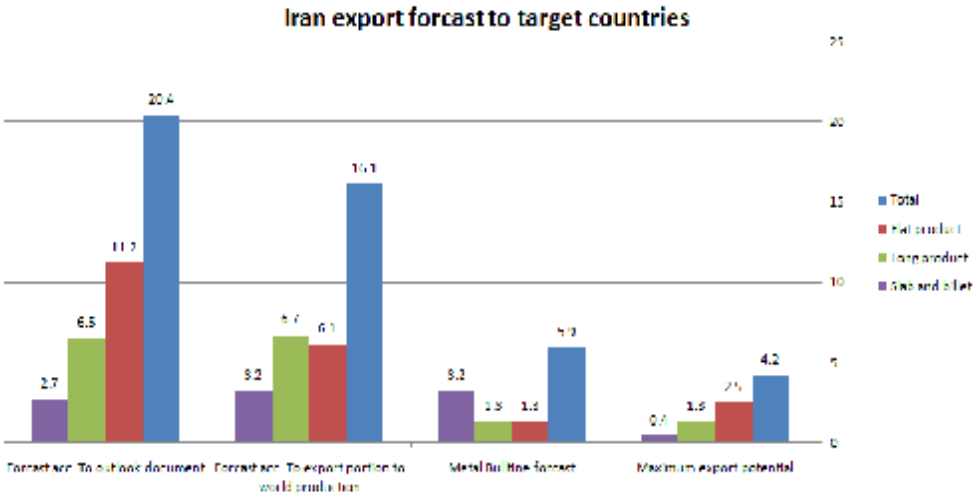

Fig14. Iran export forcast to target countries

Source: National Iranian Steel Company Portal

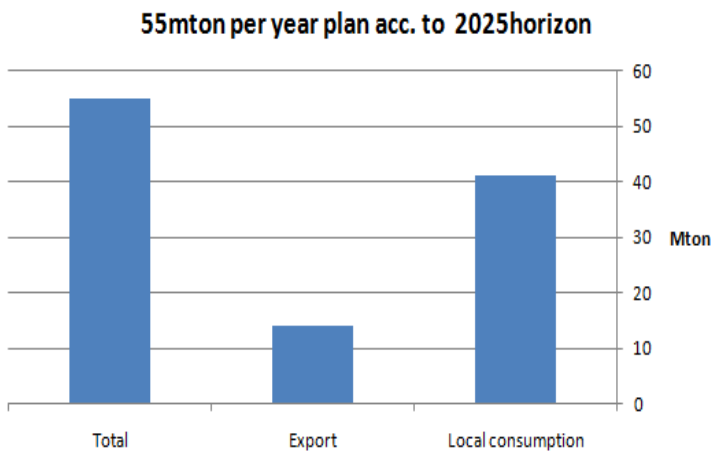

Fig15. Iran plan to reach 55 mton per year till 2025

Source: National Iranian Steel Company Portal

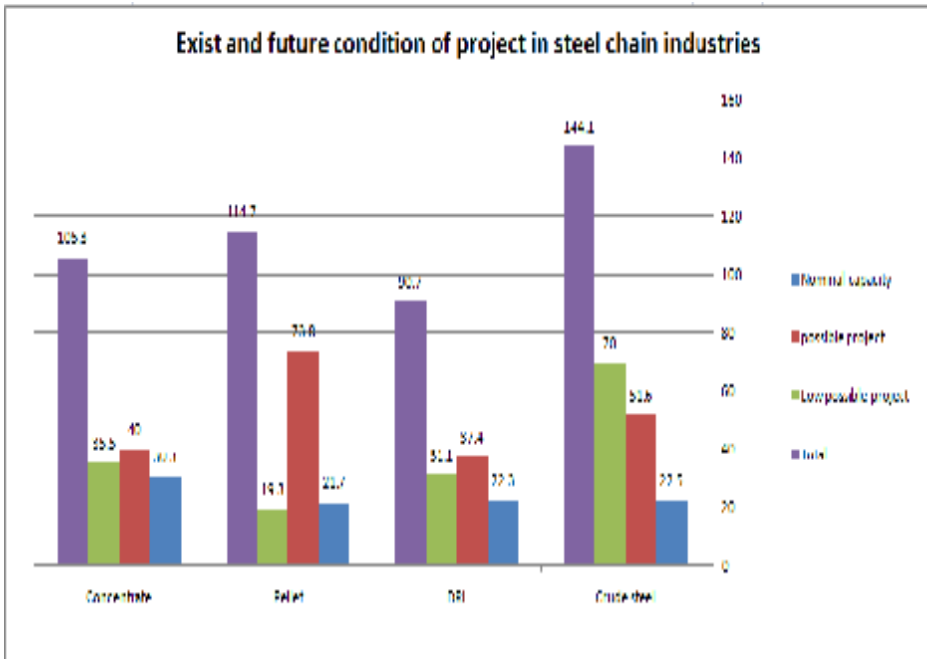

Fig16. Exist and future condition of project in steel chain industries

Source: National Iranian Steel Company Portal

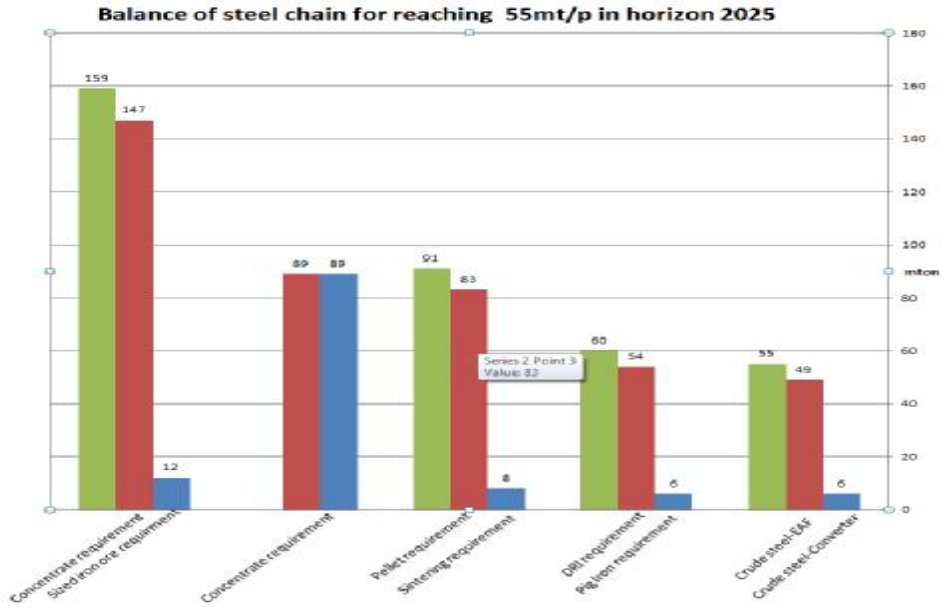

Fig17. Balance of steel chain in Iran to reach 55mt per year

Source: National Iranian Steel Company Portal

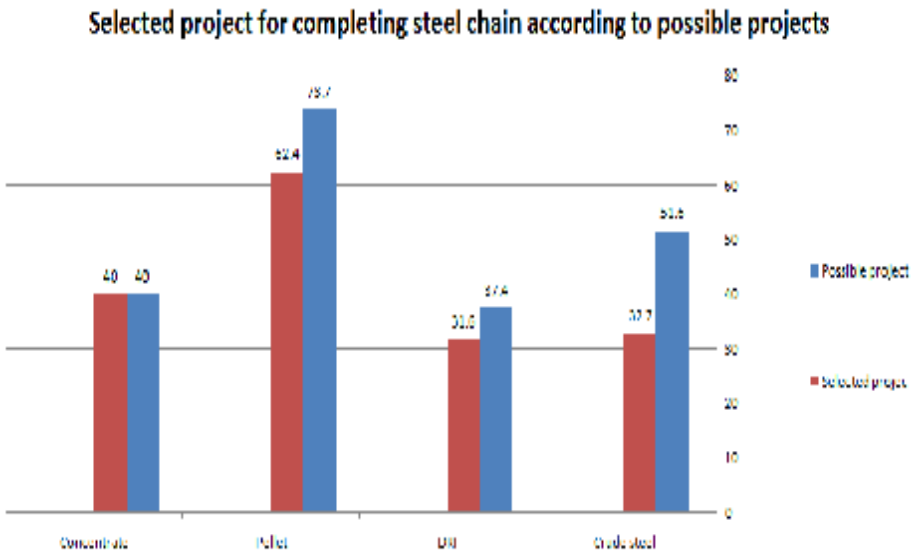

Fig18. Selected project for completing steel chain according to possible projects

Source: National Iranian Steel Company Portal

10. STEEL PROJECTS:

10.1. NISICO STEEL MAKING PROJECTS: [44]

In 2003, 8 steel projects were defined in eight province of Iran. After some progress in these projects there were stopped because of financial problems. Starting these projects, the situation of these projects are now as follows:

10.1.1. SEFID DASHT

Project name	Sefid dasht
Location	35 km Shahrekord-Brojen road
Date of Installation	July 2007
Investment	65% mobarake investment for completion
Shareholders	65% Mobarake-35% IMIDRO
Project progress	96% in DR plant, Steel making 40.71% , 61.79% total project

10.1.2. SABZEVAR

Project name	Sabzevar
Location	Sabzevar-Esfaraien road
Area	233 Hectars
Client	Pars Foolad Sabzevar
Date of Installation	July 2007
Investment	85% Opal kani Pars
MC	Tara Tarh
Direct reduction	800000 t/y
DR plant contractor	MMTE-NICC
Project progress	DR plant:74%, Steel making: 8.42%, Total project: 36.9%
Material handling investment	43,546,355 euro and 1,270,193,667,796 rial
Steel making	800000 t/y- under investigation for water shortage in the region
Steel making investment	287,000,000 euro
Auxiliries	2,211,445,514,924 rial

10.1.3. BAFT

Project name	Baft
Location	Baft-12 km Sirjan Road
Area	620 Hectars
Date of Installation	July 2007
DR plant Technology	PERED
Client	Ehia Steel Baft
Consultant	Barsoo
DR plant contractor	MME-Foolad PAYA, Khatam
Steel making project status	MCC-KDD-Khatam changed to khatam-MME
Project progress	DR plant: 77.88%, Steel making: 9.11%, Total project:39.22%
Investment	Foolad Novin Airik, Mines and Industries bank

10.1.4. NEI RIZ

Project name	Nei riz
Location	Ghotroie
DR plant	800000 t/y, 33000 t/y HBI
Contractor	Foolad Technic
Investment	Ghadir Investment company: 65%, IMIDRO:35%
Project progress	DR plant: 79.45%, Steel making: 22.76%, Total project:48.07%

10.1.5. SHADEGAN

Project name	Shadegan
Location	35 km of Shadegan
Area	260 Hectares
Investment	65% KSC, 35% IMIDRO
Consultant	Tara Tarh
Contractor	JFE Shoji
Project status	Investigation of increasing capacity to 4 mt/y
DR technology	PERED
Project progress	DR plant: 87.68%, Steel making 35.09%, Total project: 57.95%

10.1.6. GHAENAT

Project name	Ghaenat
Location	35 km of Shadegan
Area	260 Hectares
Investment	51% private section, 49% IMIDRO
DR Consultant	Barsoo
Steel making consultant	Fara Tahghigh Sepahan
DR contractor	IRITEC
Steel making contractor	MCC-KDD
Project progress	DR plant:80.54%, Steel making: 33.3%, Total project: 53.63%

10.1.7. MIANEH

Project name	Mianeh
Location	3 km South East of Miane
Area	35 Hectares
Client	NISICO
Consultant	Poolad consulting engineering co.
DR Contractor	Khatam
Steel making Contractor	MMTE-ASCOTEC-Aria Hadid-MME
DR technology	PERED
DR plant progress	84.9%
Steel making proress	25%
Utilities progress	56.5%
Project progress	DR plant: 84.82%, Steel making: 24.89%, Total project: 52.37%

Source: Samtnews, Special Issue for 1395

10.2. IRON AND STEEL MAKING PROJECTS: [45]

10.2.1. ARDESTAN STEEL COMPANY

Company Name	Ardestan Steel company
Location	Esfahan
Project progress	97%
Capacity	500,000 t/y

10.2.2. BOTIA STEEL COMPANY

Company Name	Botia Steel company
Location	Kerman
Capacity	2,000,000 t/y DRI+1,500,000 t/y Billet
Project progress	DR plant:10%+ 13.6% Steel making
Contractor	MEMSECO

10.2.3.SALAHSHORAN FARS

Company Name	Salahshoran Fars
Location	Fars
Capacity	800,000 t/y DRI+800,000 t/y Billet
Project progress	DR plant:14.3%+ 14.65% Steel making

10.2.4.TORBAT HEIDARIEH FARS

Company Name	Torbat Heidarieh
Location	Khorasan Razavi
Capacity	1,800,000 t/y DRI+1,450,000 t/y Billet
Project progress	21.35%

10.2.5.PASARGAD COMPANY

Company Name	Pasargad company
Location	Fars
Capacity	1,800,000 t/y DRI
Project progress	33%

10.2.6.KOWSAR (GOLGOHAR IRON AND STEEL DEVELOPMENT)

Company Name	Kowsar
Location	Sirjan
Capacity	1,800,000 t/y
Project progress	54.44%

10.2.7. SIRJAN IRANIAN STEEL

Company Name	Sirjan Iranain Steel
Location	Sirjan
Capacity	1,000,000 t/y
Project progress	72.34%
Contractor	MEMSECO

10.2.8. ZARAND IRANIAN STEEL

Company Name	Zarand Iranain Steel
Location	Zarand
Technology	Blast furnace
Capacity	1,500,000 t/y
Project progress	59.95%
Contractor	MEMSECO

10.2.9. SIRJAN JAHAN STEEL

Company Name	Jahan Steel
Location	Sirjan
Capacity	1,000,000 t/y
Project progress	47.75%
Contractor	MMTE

10.2.10. IRAN ALLOY STEEL

Company Name	Iran Alloy Steel
Location	Yazd
Capacity	650,000 t/y
Product	billet
Project progress	20.33% Steel making

10.2.11. BAFGH MINING AND INDUSTRIAL IRON AND STEEL COMPANY

Company Name	Bafgh
Location	Yazd
Capacity	800,000 t/y DRI+ 1,000,000 t/y billet
Project progress	60%DR plant+8.83% Steel Making

10.2.12. OROMIEH STEEL COMPANY

Company Name	Oromieh Steel Company
Location	West Azarbaiejan
Capacity	600,000 t/y DRI+ 400,000 t/y billet
Project progress	23.75%DR plant+81.5% Steel making

11. IRAN STEEL PRODUCT PRODUCERS

11.1. MOBARAKE STEEL MAKING PLANTS [46,47]

Mobarakeh Steel Company is the largest steel producer in Middle East and Northern Africa and the largest DRI producer in the world. it is the producer of more than 50% of Iran's steel in all major markets including automotive, construction, household appliances, and packaging. Mobarakeh Steel operates in seven industrial complexes.

The first electric arc furnace went functional in October 1991 and factory production lines were inaugurated by the then president on January 12, 1992. With the introduction of company's steel products to the market and the gradual increase of production up to the nominal capacity of 2.4 million tonnes a major part of this strategic need of country was satisfied.

Company Name	Mobarake
Location	near the city of Mobarakeh and 75 km to the southwest of Isfahan.
Address	http://www.msc.ir/
Area	35 square kilometers
Pelletizing plant	7.2 Mt/y
Direct reduction	5 Mt/y
Steel making	8*180 ton EAF
Hot rolling mill	5150000 t/y + 650000 t/y Saba
Tinned coil	2,000 t/y
Tinned sheet	103,000 t/y
Galvanized coil	42,000 t/y
Crude coil	340,000 t/y
Pickling coil	340,000 t/y
Colored coil	145,000 t/y
Hot sheet	410,000 t/y
Hot coil	2,750,000 t/y+650,000 t/y Saba

Source:Mobarake Annual Report, 2014-2015

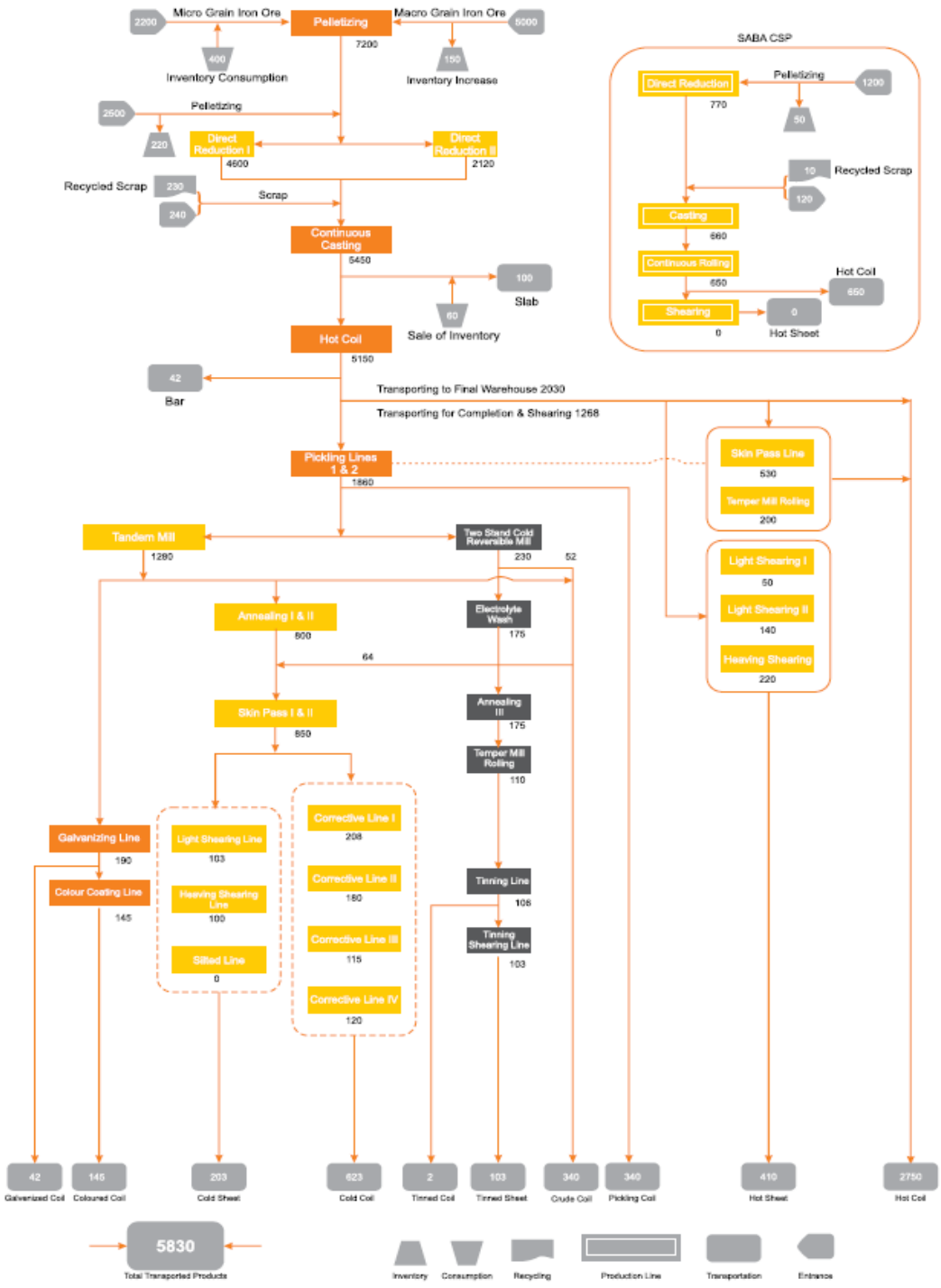

Fig 19. Schematic of Mobarake production line

Source: Mobarake Annual Report, 2014-2015

11.2. KHOZESTAN STEEL COMPANY [48, 49]

Company Name	Khozestan Steel Company
Location	in the vicinity of Ahwaz city
Address	http://www.ksc.ir
Area	3.8 square kilometers
Owner	Private sector
Pelletizing plant	6,200,000 t/y
Direct reduction	4,000,000 t/y
Products	Bloom, Billet, Slab
Steel Making Capacity	3,500,000 t/y

11.3. ESFAHAN STEEL COMPANY [50]

Company Name	Esfahan Steel Company
Location	45 km of North west of Isfahan
Address	https://www.esfahansteel.com
Owner	Private sector
Technology	Blast furnace
Products	Beams, Angels, Round Bars, Channels
Capacity	2,800,000 t/y

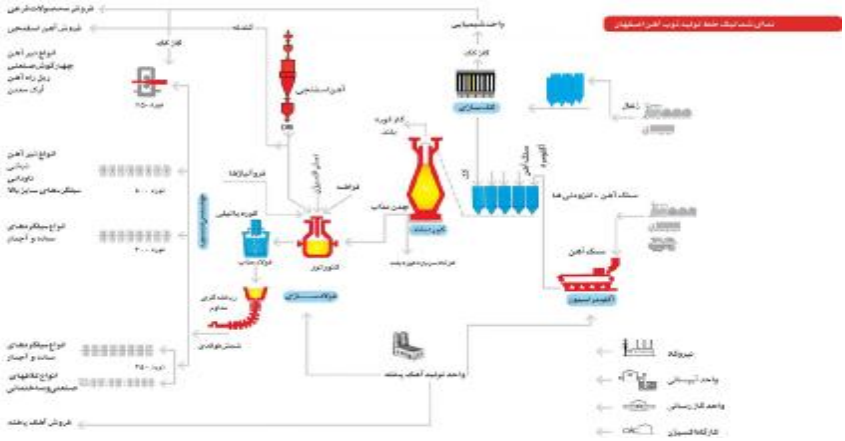

Fig 20. Schematic of Esfahan Steel production line

Source: Esfahan Steel Portal

11.4. IRANIAN GHADIR IRON AND STEEL COMPANY [51]

Company Name	Iranian Ghadir Iron and Steel Co
Location	25 kilo meters from the city of Ardakan, Yazd
Address	http://www.igisco.com
Area	86 hectares
Shareholders	Ghadir Investment Co., Chadormalu Mining & Industrial Co. (CMIC), Iron Alloy Steel Co., Iron Alloy Steel Co.
Ghadir Direct reduction	800,000 t/y

11.5. ARFA IRON AND STEEL COMPANY [52]

Company Name	Arfa Iron and Steel Co.
Location	Km 25 Ardakan Naein road
Address	http://www.arfa-co.com/en/
Shareholders	Chadormalu Mining & Industrial Co. (CMIC), Saba Noor, Omid investment group, Yaran pipe rolling co, Ghadir investment company, Mehregan economical group, National investment company of Iran,
Direct reduction	800,000 t/y DRI, 60,000 t/y HBI
Steel making	800,000 t/y, billet:130*130, 150*150, 200*200

11.6. KHORASAN STEEL COMPANY [53]

Company Name	Khorasan steel company
Location	15 kilometer from southwest of Neyshabor
Address	http://www.khorasansteel.com
Area	1400 hectares
light structural steel mill	550,000 t/y
direct reduction	2*800000 t/y
billet production	630,000 t/y
products	130*130, 150*150, 180*180 mm

Steel making project	720,000 t/y
Project progress	89.45%

11.7. SOUTH KAVEH STEEL COMPANY [54]

Company Name	Kaveh steel company
Location	Bandar Abbas
Address	http://www.sksco.ir
Area	170 Hectars
Direct reduction	1,200,000 t/y
Steel making	1, 200,000 t/y (phase 1)+ 1, 200,000 t/y (phase 2)
Steel making progress	92.58% (phase1)+35% (phase2)

11.8. KHUZESTAN OXIN STEEL CO. [55]

Company Name	Khuzestan Oxin Steel Co.
Location	Khuzestan
Address	www.oxinsteel.ir
Area	160 hectars
Founded	2005
Product	Wide plate rolling
Capacity	1,050,000 t/y

11.9. IRAN NATIONAL STEEL INDUSTRIES GROUP [56]

Company Name	Iran National Steel Industries Group
Location	Ahwaz
Address	http://insig.org/
Area	1200 hectars
Founded	1963
Product	first steel rolling plant of the country

Technologist	Danieli
Capacity	1,435,000 t of steel products and 430,000 t steel ingots
Steel making	430,000 tons, 100*100, 130*130, 150*150, 160*160
Kowsar rolling plant 2	550,000 tons, Danieli
Fittings & wire rolling plant	65,000 tons
Beam rolling plant	385000 tons per year
Pipe plant	90,000 t per year

11.10. HORMOZGAN STEEL COMPANY [57]

Company Name	Hormozgan Steel Company (HOSCO)
Location	Bandar Abbas
Address	www.hosco.ir
Product	Slab
Capacity	1,500,000 t/y slab

11.11. NATANZ STEEL CO. [58]

Company Name	Natanz Steel Company
Location	Natanz
Address	http://www.natanzsteel.com
Area	1200 hectars
Founded	1999
Product	Branch rebar rolling line, Coil rebar rolling line
Technologist	Danieli
Capacity	1,000,000 t/y

11.12. IRAN ALLOY STEEL CO. [59 & 60]

Company Name	Iran Alloy Steel Co.
Location	Esfahan

Address	http://iasco.ir
Founded	1999
Product	alloy & special steels producer
Technologist	VAI/BOHLER

11.13. KAVIAN STEEL [61]

Company Name	Kavian steel
Location	Ahwaz
Products	Steel Sheets
Capacity	840,000 t/y

11.14. PASCO STEEL COMPLEX [62]

Company Name	Pasco Steel Complex
Location	70 Kilometers south of city of Shiraz
Address	http://www.pascosteel.com/
Area	300 Hectars
Product	Billet
Capacity	1,500,000 t/y

11.15. VIAN STEEL MELTING AND CASTING COMPANY [63]

Company Name	Vian Steel Melting and Casting Company (VISCO)
Founded	2003
Location	42nd Km. of Hamedan
Address	www.viansteel.com
Technologist	Siemens-VAI
Product	Billet 120*120 to 160*160
Capacity	600,000 t/y

11.16. BONAB STEEL INDUSTRIES COMPLEX [64]

Company Name	Bonab Steel Industries Complex
Location	Bonab
Address	http://mfbco.ir/en/
Product	Ribbed bar, billet, I beam, Channel, Equal Angels
Capacity	3,500,000 t/y

11.17. FERRO GILAN COMPLEX [65]

Company Name	Ferro Gilan Complex
Founded	2004
Location	15th km of South West of Rasht
Address	www.ferrogilan.com/index_f.php
Area	60 Hectars
Capacity	Galvanized sheet 350,000 t/y, 2,000,000 t/y hot rolling sheet, 500,000 t/y cold rolling sheet

11.18. KASHAN AMIR KABIR STEEL CO. [66]

Company Name	Kashan Amir Kabir Steel Co.
Location	14th Km of eastern Kashan
Address	http://amirkabirsteelco.ir/en/
Area	72 hectars
founded	2000
product	Galvanizing sheet
Technology	hot dip galvanizing procedure
Capacity	540,000 t/y including 140,000 tons of galvanized sheets, sinus and trapezoidal sections, 250,000 tons of cold rolled sheets, and 150,000 tons of oiled annealed sheets.

11.19. NATANZ STEEL MAKING CO. [67]

Company Name	Natanz Steel Making Co.
Location	Natanz
Address	www.natanzsteelmelting.com
Area	80 Hectars
Product	Billet 125*125, 150*150

11.20. AZARBAIEJAN STEEL CO. [68]

Company Name	Azarbaiejan Steel Co.
Location	Mianeh
Address	www.azsco.ir
Founded	1989
Product	bars, Rounds, Unequal angels, Channels, flats
Capacity	550,000 t/y

11.21. ARDEBIL STEEL CO. [69]

Company Name	Ardebil Steel Co.
Location	Ardebil
Product	bars, strips, angels
Capacity	300,000 t/y

11.22. SEMNAN HOT ROLLING MILL [70]

Company Name	Semnan Hot Rolling Mill
Location	Semnan
Address	www.srtmg.com
Product	bars
Capacity	1,000,000 t/y

11.23. HIRBOD STEEL [71]

Company Name	Zarandieh Hirbod Steel Industries Company (Hirbod Steel)
Location	Zarandieh
Address	http://www.hirbodsteel.com/en
Product	Rebar, Pipes
Capacity	2,200,000 t/y

11.24. YAZD ROLLING MILL [72]

Company Name	Yazd Rolling Mill
Location	Yazd
Address	http://en.yazdrollingmill.com/
Founded	1980
Product	bars, wire rods, beams
Capacity	1,100,000 t/y

11.25. BOYER SANAT [73]

Company Name	Boyer Sanat
Location	Yasooj
Product	billet
Capacity	300,000 t/y

11.26. KAVIR STEEL [74]

Company Name	Kavir Steel
Location	Kashan
Address	http://kavirsteel.ir/page.aspx?pi=1&sl=1
Product	bars
Capacity	350,000 t/y

11.27. SEVEN DIAMOND COMPANY [75]

Company Name	Seven Steel Company
Location	Shiraz
Address	http://www.seven-diamonds.com
Product	Galvanized Sheet
Capacity	900,000 t/y

11.28. AMIR KABIR STEEL CO. [76]

Company Name	Amir Kabir steel Co.
Location	Arak
Product	Steel ribbed bars
Capacity	500,000 t/y
Projects	450,000 t/y DRI+513,000 t/y billet
Project progress	10.38% DR plant+ 10.05% Steel making

11.29. JAHAN FOOLAD GHARB [77]

Company Name	Jahan Foolad Gharb
Location	Kermanshah
Address	http://jahanfoulad-co.com/en/
Product	Channels, bars, equal angels
Capacity	300,000 t/y

11.30. FOOLAD GHARB ASIA CO. [78]

Company Name	Foolad Gharb Asia
Location	35 Km.Salafchegan to Delijan Road
Address	http://www.wasco-ir.com/en/
Product	Coils
Capacity	500,000 t/y

11.31. SADR STEEL COMPANY [79]

Company Name	Sadr Steel Company
Location	14 Km. Khoramabad Andimeshk
Address	http://www.sadrsteel.com/
Area	35 Hectars
Rolling Technology	Pomini
Product	bars
Capacity	200,000 t/y

11.32. GOLESTAN STEEL [80]

Company Name	Golestan Steel
Location	Gonbad Kavoos
Address	http://www.golestansteel.com/
Area	6 Hectars
Rolling Technology	Pomini
Product	Bars, coils
Capacity	340,000

11.33. CHAHARMAHAL & BAKHTIARI AUTOMOTIVE SHEET CO. [81]

Company Name	Chahar Mahal And bakhtiyary Automotive Sheet Company(CBASCO)
Location	33 km Borujen to Shahrekord road
Address	http://www.cbasco.ir/Content/Default.aspx?Landir=ltr&Lan=En
Product	Galvanized strip production
Capacity	300,000

11.34. PERSIAN STEEL [82]

Company Name	Persian steel
Location	Takistan
Address	http://persiansteel.co/en/
Area	50 Hectars
Founded	1986
Product	billet, beam, oil sheet, galvanized sheet, color sheet
Capacity	500,000 t/y

11.35. TARAZ METAL [83]

Company Name	Taraz Metal
Location	Shahre Kord
Address	http://tarazmetal.com/
Product	Galvalom and Galvanized
Capacity	330,000 t/y

11.36. KHAZAR STEEL [84]

Company Name	Khazar Steel Co.
Location	Rasht
Address	http://www.khazarsteel.co/
Capacity	500,000 t/y
Product	Billet

11.37. FOOLAD ALBORZ IRANIAN [85]

Company Name	Foolad alborz Iranian
Address	http://www.faicosteel.net/
Location	15th Km of Sari Neka Road
Capacity	700,000 t/y
Product	Rebar, Angels

11.38. SARMAD IRON & STEEL [86]

Company Name	Sarmad Iron & Steel
Address	http://www.sarmadsteel.ir/
Location	15th Km of Abarkooh- Yazd
Capacity	700,000 t/y
Product	Rebar, Angels

11.39. SAHAND STEEL COMPANY [87]

Company Name	Sahand Steel company
Location	15th Km of Bonab
Capacity	500,000 t/y Rebar, Angels

11.40. ORUMIEH STEEL GROUP [88]

Company Name	Orumieh Steel Group
Location	Km 25 Orumieh Mahabad Road
Area	225 Hectars
Product	Spiral pipes, pipes, tubes

12. STEEL INDUSTRIES TECHNOLOGIES:

The main technologists in the field of steel industries are as follows:

- SMS Group
- Danieli
- Tenova
- Primetals (VAI-Siemens)
- SMS Concast
- JP Steel Plantech Co.
- Sarralle

13. AN OUTLOOK TO NEW TECHNOLOGIES IN STEEL INDUSTRIES

Some of the innovations have been done by Steel technologists are as follows: [89, 90, 91, 92, 93, 94, 95]

- ECOARC by Steel Plantech Co.
- Submerged arc furnace by SMS Group
- Q-MELT by Danieli
- EAF Quantum by Primetals
- Corex by Primetals
- Finex technology by Primetals-Posco
- ITMK3 by Kobe Steel and Midrex Technologies
- Belt casting technology by SMS Group
- Beam-blank casting by Primetals
- BCT casting by SMS Group
- Convex strands by SMS Concast
- CSP technology for hot rolling by SMS Group
- fTSR thin slab rolling by Danieli
- i BOF by Tenova
- Efsop technology by Tenova
- Arvedi ESP by Primetals
- Q-ROLL by Danieli
- Spiral pipe technology by SMS Group
- Seamless tube technology by SMS Group

14. IRANIAN EPC COMPANIES AND CONSULTANTS

14.1. IRITEC [96]

Iran International Engineering Company (IRITEC) is one of the most successful general contractors in the country's industry with over four decades of experience. This company offers a wide range of EPC project services including financing, feasibility studies, planning, project management and control, engineering services, supply of equipment, technical inspection, equipment installation, execution management, supervision, commissioning and guarantee period of industrial projects commission.

References:

Ladle furnace project	Mobarakeh
Preheat slab furnace	Mobarakeh
Increasing the capacity of hot rolling mill production from 2,400,000 tons to 3,200,000 tons per year	Mobarakeh
Direct reduction Plant (F Module)	Mobarakeh
Batch Annealing furnace project	Mobarakeh
Hot Charging project	Mobarakeh
Cold Rolling Expansion/ 5 shelf Tandem Mill and new Skin Pass	Mobarakeh
Steel Making Expansion to the capacity of million tons 4.2	Mobarakeh
Steel making unit reconstruction and capacity enhancement to 5.4 Mt	Mobarakeh
Hot Rolling Mill Expansion	Mobarakeh
Shahid Kharazi Direct Reduction	Mobarakeh
Hormozgan Steel Complex Project	IMIDRO
Mining and Metals Marine Terminal	NISCO
Direct Reduction Plant (Zamzam module)	Khuzestan Steel
Khorasan Steel Direct Reduction 1st Module	International Metal Materials Production and Development
Khorasan Steel Direct Reduction 2nd Module	KSC
Arfa Steel Direct Reduction	Arfa iron & steel
Ghadir Direct Reduction	Iranian Ghadir Iron & Steel Company
Esfarayen ingot melting and casting	(IDRO)
Galvanized sheet production	Fajr e Sepahan Galvanizing Industries Company
Kashan Cold Roll	Fajr e Sepahan Galvanizing Industries Company
Kashan cold rolling expansion project (Acid washing line and Stress Relieving furnaces)	Fajr e Sepahan Galvanizing Industries Company

Chaharmahal & Bakhtiari galvanized sheet	Chaharmahal & Bakhtiari Automotive sheet company
Ghaenat Direct Reduction and Material Handling	NISCO
Ghaenat Steel Making Project	NISCO
Khorasan Steel Making Expansion	KSC
Persian Gulf Saba Steel Direct Reduction	Persian Gulf Saba Steel
Bangestan Gas Gathering (AMAK)	National Iranian Oil Company
Kharg Gas Gathering and NGL Recovery	Iranian Offshore Oil Company
Binak desalting plant	National Iranian South Oil Company
Engineering polymers	Khuzestan petrochemical company
Tabas Coal Mine Equipping Project	NISCO
Sarcheshmeh Copper Concentration Expansion	NICICO
Sarcheshmeh Copper Concentration Expansion - Phase2	NICICO
Sungun Copper Concentration Plant	NICICO
Engineering & Procurement of Chadormalu Iron Ore Concentration Plant Fourth Line	Chadormalu mining & industrial Co.
Chadormalu Fifth Concentration Line & The Second Crusher	Chadormalu mining & industrial Co.

14.2. MMTE [97]

MMTE is Engineering and Construction Company and one of the first Iranian EPC Contractors in steel industry Specializing in Management, Engineering, Procurement and Construction of Direct Reduction, Pelletizing and steel making plants.

Under Construction
1. SABZEVAR DRI Plant(EP)
DRI plant -capacity of 800,000 T/Y
2. BAFGH DRI plant(EP)
DRI plant -capacity of 800,000 T/Y
3. SIRJAN Jahan Steel DRI NO.2(EP)
DRI plant -capacity of 960000 T/Y Capacity
4. ARDAKAN Direct Reduction Project (EPC)
DRI plant -capacity of 960000 T/Y Capacity
5. GISD Mega Module KOWSAR-GolGohar CDRI/HDRI(EPC)
Capacity : 2,000,000 T/Y
6. Sirjan Jahan Steel SMP (EPC)
Capacity: 1000,000 T/Y
7. CHAHAR MAHAL DRI Project (EP)
DRI plant -capacity of 800,000 T/Y
8. KSC Consulting Project (MC)

Steel Making Project with 6000 T/Y Capacity Pelletizing Plant with 2,500,000 T/Y Capacity Oxygen Plant with 6500 nm3/h Capacity
9. MIYANEH Steel making plant (EPC) Steel Making Plant -capacity of 800,000 T/Y
In Operation
1. ZAMZAM I DRI Project (MC)
DRI plant-capacity of 800,000 T/Y
2. GISD Mega Module GOHAR-GolGohar CDRI/HDRI (EPC)
Capacity: 1,760,000 T/Y
3. ZamZam II DRI Project(EPC) DRI plant -capacity of 960,000 T/Y
4. SABA DRI Project(EP)
MEGA DRI plant -capacity of 1,500,000 T/Y
5. HORMOZGAN DRI Project Engineering
2 X DRI plant-capacity of 2 X 825,000T/Y
6. Gole-E-Gohar Pelletizing plant(MC)
Pelletizing plant -capacity of 5,000,000 T/Y
7. OXIN Wide Plate Mill (MC)
Wide Plate Mill Project-Capacity 1,050,000 T/Y
8. SIRJAN Jahan Steel DRI NO.1(EP)
DRI plant -capacity of 960000 T/Y Capacity
9. BARDSIR DRI Project(E)
capacity of 960000 T/Y
10. SOUTH KAVEH STEEL(SKS) (EP)
2X DRI PLANT-capacity of 2X928,000T/Y

14.3. MME [98]

MME GmbH is officially established and registered company in Düsseldorf, Germany since 1996 to provide engineering and technical services for mining and metal industries worldwide in Management, Design, Engineering, Construction, Commissioning & Plant Start Up.

References:

Chaharmahal Steel Complex
South Kaveh Steel Complex
Neyriz Steel Complex
Miyaneh PERED
KSC Wide slab caster
NISCO Shadegan DRI (PERED TECHNOLOGY)
Ney riz DRI (PERED TECHNOLOGY)
KSC DRI Revamping
KSC casters automation system
VISCO spare parts order

EAF revamping in KSC
HSM Finishing Descaler for MSE
DRI Plant with Coke Oven Gas as Reducing Gas
BAFT DRI (PERED TECHNOLOGY)

14.4. FOOLAD TECHNIC [99]

Foolad Technic international engineering company (FIECO) was founded in 1991. At the beginning, the field of company activity was the engineering and consulting service provider. After that the expansion of activities field to General Contractor (GC) with the market expansion trend and company capabilities development had been known necessary in strategic plan of the company. This was the opening gate for the starting of "EPC" projects in the Oil and Gas industry, Energy, Mining and other metal industry.

EPC Projects:

Row	Projects	Employer	Location	Status Of Implementation	Capacity T/Y	Type of contract
1	Neiriz Steel Complex (Steel Making Unit)	NISCO.	Fars	Ongoing	800,000 Steel sheet	EPC
2	Neiriz Steel Complex (Direct Reduction Unit)	NISCO.	Fars	Ongoing	800,000 Sponge Iron	EPC
3	Bardsir Steel Complex (Direct Reduction Unit)	Sirjan Iranian Steel	Kerman	Finished	1 million Sponge Iron	EPC
4	Azna Steel Making	Azna Steel complex	Lorestan	Ongoing	1.9 million Rolling mill	EPC
5	Bell less Top Charging System of Blast Furnace #2	Esco.	Esfahan	Finished	2.2 million	EPC
6	Sirjan Pelletizing	Sirjan Iranian Steel	Kerman	Ongoing	2 million and 500 thousand pellet	EPC
7	Sarmad Abarkoh Steel Complex	Sarmad Abarkoh Iron & Steel Complex	Yazd	Ongoing	450,000 Rolling Mill	E & C
8	Bafgh Iron & Steel Complex	Bafgh Iron & Steel Complex	Yazd	Ongoing	550,000 Rolling mill	C
9	Kavir Steel Project (second Part)	Sepid Farab Kavir	Esfahan	Ongoing	450,000 Rolling mill, Rebar and rounds	EPC
10	Kavir Steel Project (First Part)	Sepid Farab Kavir	Esfahan	Ongoing	400,000 Rolling mill	EPC
11	Gharb Steel company	Ghaem Reza Co.	Hamedan	Finished	800,000 Steel sheet	C
12	Saba Zagros Steel	Saba Zagros Steel	Charmahal	Finished	320,000 Round Bar	C

Engineering and Consultant:

Item	Projects	Employer	Location	Status Of Implementation	Capacity T/Y	Type of contract
1	ESCO Tavazon Project	ESCO	Esfahan Prov.	Finished	1.4 million Melted Cast Iron 2.4 million Sinter 800,000 Sponge Iron & Steel bar	Engineering, Consultant, Supervision & Project Management
2	Ardakan Direct Reduction & Steel Making Project	Arfa Steel Company	Yazd Prov.	Ongoing	800,000 Sponge Iron & Steel bar	Engineering, Consultant, Supervision& Project Management
3	Chaharmahal Galvanized Sheet Production	Chaharmahal Galvanized Sheet	Chaharmahal Prov.	Finished	400,000 Galvanized sheet	Engineering, Consultant, Supervision& Project Management
4	Expansion Project of ESCO. (SABA Project)	ESCO	Esfahan Prov.	Finished	700,000 Steel sheet	Engineering, Consultant, Supervision& Project Management
5	Meybod Steel	Meybod Steel Co.	Yazd Prov.	Finished	300,000 Cast Iron	Engineering, Consultant, Supervision& Project Management
6	Hamedan Blast Furnace	Gharb Steel Company	Hamedan Province	Finished	77,000 Cast Iron	Engineering, Consultant, Supervision& Project Management
7	Khoozestan Steel Making	Khoozestan Steel Co.	Khoozestan Prov.	Finished	1.7 million Steel bar	Engineering, Consultant, Supervision& Project Management
8	Zarand Steel Making	Zarand Iranian Steel Company	Kerman Prov.	ongoing	1.5 million Steel bar	Engineering, Consultant
9	Zarand Coke Making	Zarand Iranian Steel Company	Kerman Prov.	Ongoing	400,000 Coke	Engineering, Consultant
10	Expansion Project of Mobarakeh Steel Complex (Shahid Kharrazi Project)	Mobarakeh Steel Co.	Esfahan Prov	Finished	2.8 million	Consultant, Tender Documents
11	Expansion project of Esfahan Steel (ESCO)	ESCO	Esfahan Prov.	Ongoing	5 million	Consultant, Tender Documents
12	Songun Copper Complex	Iran Copper Industries Co.	Azerbaijan Prov.	Ongoing	200,000	Engineering, Consultant, Supervision& Project Management
13	Zarand Steel Making	Zarand Iranian Steel Co.	Kerman Prov.	Ongoing	1.5 million	Engineering, Consultant, Supervision& Project Management
14	Cooling of Melted coke By drying method	Zarand Iranian Steel Co.	Kerman Prov.	Ongoing	NA	Engineering, Consultant, Supervision
15	Esfahan International Exhibition	Esfahan Inter. Exhibition Co.	Esfahan Prov.	Ongoing	NA	Engineering, Consultant
16	Bafgh Steel Making	MME	Kerman Prov.	Ongoing	800,000 Steel Bar	Engineering, Consultant
17	Shazand Power Plant	Iran Electrical Power Expansion	Markazi Prov.	Ongoing	2X325 M Watt	Engineering, Consultant
18	Amir Kabir Steel Co.	Amir Kabir Steel Co.	Markazi Prov.	Ongoing	500,000 Sponge Iron & Steel Bar	Engineering, Consultant
19	Esfahan Steel Creosote Refinery	ESCO	Esfahan Prov.	Finished	3,000 Creosote	Engineering, Consultant,

						Supervision
20	Charmahal Steel making	Foolad Paya	Charmahal	Ongoing	800,000 Slab	Engineering, Consultant
21	Energy Audit in Copper Industry	National Iranian Copper Industries Co.	Kerman & Azerbaijan Prov.	Finished	NA	Engineering, Consultant
22	Energy Audit in Buildings of Oil & Gas Ministry	Iranian Fuel Conservation Company	Around the Country	Finished	NA	Engineering, Consultant
23	Oil Undesired Tank Unit	Gachsaran Oil & Gas Exploitation	Kohkeloie Prov.	Finished	NA	Engineering, Consultant
24	Expansion of DMT Cooling tower	DMT	Esfahan Prov.	Finished	1800 m3/h	Engineering, Consultant
25	Cooling tower of Kermanshah Refinery	Kermanshah Refinery	Kermanshah Prov.	Finished	3600 m3/h	Engineering, Consultant
26	Expansion of Oxygen Plant	ESCO	Esfahan Prov.	Finished	Oxygen: 1.4 m Azote: 700,000 Argon: 500,000	Engineering, Consultant, Supervision& Project Management
27	Renovation of Blast Furnace #1 & #2	ESCO	Esfahan Prov.	Finished	#1: 1.4 Million Cast Iron #2: 700,000 Cast Iron	Engineering, Consultant, Supervision
28	Optimizing of Steel Making	ESCO	Esfahan Prov.	Finished	1 million Cast Iron	Engineering, Consultant
29	Bonab Steel Industry Complex	Bonab Steel Industry Complex	Azerbaijan Prov.	Finished	2.4 million Sections & Bar	Engineering, Consultant, Supervision

Technical Inspection and Surveillance:

Item	Projects	Employer	Location	Type of contract	Status Of Implementation
1	Surveillance of Imported Pipes from China	Meh Arad	Esfahan Prov.	Foreign Surveillance	Ongoing
2	Surveillance of Chines Equipment	Ghaem Reza Co.	China, Ukraine	Foreign Surveillance	Ongoing
3	Surveillance of Foreign Equipment	Meybod Steel Co.	China	Foreign Surveillance	Ongoing
4	Surveillance of Foreign Equipment	IRITEC Co.	Italy, Germany	Foreign Surveillance	Ongoing
5	Surveillance of Foreign Equipment (Atlas Cop Co.)	Merat Poolad	Belgium	Foreign Surveillance	Ongoing
6	Surveillance of Foreign Equipment (Shafigh Co.)	Tejarat Bank	Esfahan Prov.	Foreign Surveillance	Ongoing
7	Surveillance of Chines Equipment	Ghaem Reza Co.	China	Foreign Surveillance	Ongoing
8	Surveillance of Cooling Tower Equipment	Ghaem Reza Co.	India	Foreign Surveillance	Ongoing
9	Surveillance of Compressor Equipment	Kish Plant Construction	Germany	Foreign Surveillance	Ongoing
10	Surveillance of Cold Rolling Equipment	West Asia Steel Co.	Italy	Foreign Surveillance	Ongoing
11	Surveillance of Refractory Materials	TATA Co.	India	Foreign Surveillance	Ongoing
12	Surveillance of Bread Production Equipment	Goljo Naghshe Jahan	S. Korea	Foreign Surveillance	Ongoing
13	Surveillance of Cable & Wire	Mine & Industries Bank	Esfahan Prov.	Local Surveillance	Ongoing
14	Surveillance of Local Equipment (Four Different Projects and different Equipment)	Mine & Industries Bank	Esfahan Prov.	Local Surveillance	Ongoing
15	Surveillance of Local Equipment	Mine & Industries Bank	Charmahal Prov.	Local Surveillance	Finished
16	Ardekan Steel Equipment	Ardekan Steeel	Yazd Prov.	Technical	Finished

		Co.		Inspection	
17	Ceiling Crane Technical Inspection	Esfahan Ferro Alloy Co.	Esfahan Prov.	Technical Inspection	Finished
18	Technical Inspection Of Belt Conveyor Equipment in Germany	Merat Foolad Co.	Germany	Technical Inspection	Finished
19	Equipment Technical Inspection	Charmahal Vehicle Steel Sheet	Charmahal Prov.	Technical Inspection	Finished
20	Technical Inspection Of Direct Reduction Equipment	Sirjan Iranian Steel Co.	Kerman Prov.	Technical Inspection	Ongoing
21	Technical Inspection Of Petrochemical Equipment	Khozestan Petrochemical Co.	Khozestan Prov.	Technical Inspection	Finished
22	Technical Inspection Of Neyriz Steel Complex Equipment (Direct Reduction & Steel Making)	NISCO	Fars Prov.	Technical Inspection	Ongoing
23	Technical Inspection Of Steel Making Equipment	Arfa Iron & Steel Co.	Yazd Prov.	Technical Inspection	Ongoing
24	Ceiling Crane Technical Inspection	Charmahal Vehicle Steel Sheet	Charmahal Prov.	Technical Inspection	Ongoing
25	Ceiling Crane Technical Inspection	Aban Ventilation Systems Co.	Fars Prov.	Technical Inspection	Ongoing
26	Technical Inspection Of Gharb Steel Co. Equipment	Gharb Steel Co.	Hamedan Prov.	Surveillance	Finished
27	Technical Inspection Of Electrical & Mechanical Equipment (Rolling Plant)	Lorestan Iron Production Co.	Lorestan Prov.	Technical Inspection & Surveillance	Finished
28	Technical Inspection & Surveillance of Coke Oven	ESCO	China	Technical Inspection & Surveillance	Finished
29	Technical Inspection & Surveillance of Equipment	Sar cheshme Cooper Co.	Kerman Prov.	Technical Inspection & Surveillance	Finished
30	Technical Inspection & Surveillance of Equipment	Swpid Farab Co.	Esfahan Prov.	Technical Inspection & Surveillance	Ongoing
31	Technical Inspection & Surveillance of Equipment	IRASCO Co.	Esfahan Prov.	Technical Inspection & Surveillance	Finished
32	Technical Inspection & Surveillance of Equipment (Shipping from India)	Ghare Bagh Cement Co.	India	Technical Inspection & Surveillance	Finished
33	Technical Inspection & Surveillance of Coke Making Plant Equipment in Ukraine	IRITEC CO.	Ukraine	Technical Inspection & Surveillance	Ongoing
34	Technical Inspection & Surveillance of Power Plant Equipment in China, French & Sweden	ESCO	China, French, Sweden	Technical Inspection & Surveillance	Finished
35	Technical Inspection & Surveillance of Ladle Car Co. Equipment	Ghaem Reza Co.	Esfahan Prov.	Technical Inspection & Surveillance	Finished

14.5. PAMIDCO [100]

Parsland Mines & Industries Company (PAMIDCO) has been established as an engineering, procurement and construction (EPC) corporation providing upstream steel industries and mining industries with general contracting and engineering consultation services in order to perform services concerning project management, engineering design, manufacturing, acquiring technical knowledge and transfer of technology, installation and commissioning of the relevant industries and supervision over implementation of turnkey projects.

References:

Research Projects:

Project feasibility study of Behabad Pellet Production Plant Construction;
Project feasibility study of Mahan Steel Production Plant, Mazandaran Province
Project for operation system evaluation and formulating appropriate methods for appointing contractors at Chadormalu Mining & Industrial Co.
Project for preparing and providing report on technical and economic justification plan of Ferrochrome Baft Industrial Co.
Location project and preparation and presentation of technical and economic justification plan concerning construction of a coking plant with a capacity of 300,000 tons per year;
Project feasibility study of concentration plant of Sabanour Steel Raw Material Supply Co
Project feasibility study of metal grid and solar grid silicon production plant construction.
Consultation, Supervision & Contracting Projects
Mahneshan steel project, Arfa Iron & Steel Company
FAC operations of Semnan sodium carbonate plants;
Consultation services and initial design of materials handling system of Golgohar Iron Ore Co.;
Equipment project of technical and engineering office of Sabanour Steel Raw Material Supply Co.
Mine design project of Sabanour Steel Raw Material Supply Co.
Ghadir Iranian reduction project in Ardakan (site supervision)
Concentrate production line construction project of Shahrak Mines Complex
Arfa iron and steel reduction project in Ardakan (site supervision)
Golgohar concentrate plant (two million-ton) construction project (site supervision and consultation).

Ongoing Projects

EPC:

Project	Site	Client	Technologist	Current Status
Pellet Production– 2.5 Million Tons	Khorasan	Khorasan Steel Complex	NHI, China	Construction & Installation

EMP:

Project	Site	Client	Technology Partner	Current Status
Chadormalu Steel Making Plant	Yazd	Chadormalu Mining & Industrial	Tenova SMSConcast CPG	Machinery & Equipment Installation
Complementary Project of Chadormalu Steel Making Plant (Mega Module Reduction Plant)	Yazd	Chadormalu Mining & Industrial	CPG Kobelco.	Engineering & Procurement

MC:

Project	Site	Client	Technology Partner	Current Status
Construction of 5th Production Line of Concentrate	Yazd	Chadormalu Mining & Industrial	IRITEC	Guarantee Period
Construction of Golgohar Iron Ore Concentration Plant	Kerman	Golgohar Mining & Industrial	Fakoor Sanat	Completion of Phase 2
Construction of Golgohar Pellet Production Plant (No. 2)	Kerman	Golgohar Mining & Industrial	Outotec + Kayson	Engineering & Procurement
Gohar Zamin Pellet Production Plant- 0.5 Million Tons	Kerman	Gohar Zamin Iron Ore	----------	Engineering

14.6.KDD GROUP [101]

KDD Group was established with the desire of integrating technology, industry, trade, finance and agriculture. It also has focused on EPC Projects by management, coordination and supply of different equipment for these projects especially in metallurgical fields.

References:

Projects
Ardakan Steel Making Project
Employer : Arfa Iron Ore and Steel Co
Status : In Production
BAFT Steel Making Project
Status : Construction Phase
GHAENAT Steel Making Project
Status : Construction Phase
MIYANEH Steel Making Project
Status : Construction Phase
NEYRIZ Steel Making Project
Status : Construction Phase

14.7. ENERGY GOSTAR NASIR [102]

NICC is established in Aug. 1991 as International General Engineering, Procurement & Construction contractor in Oil, Gas, Petrochemical, Industrial & Mine Fields. NICC with relying on past worthwhile experience and valuable professional human, efficient and effective work force, with grades 1 in The fields of Oil & Gas, Buildings, Mines & Industries, Industrial Utilities from M.P.O of Iran as well as experiences of numerous partnership with international industrial companies, has ability to accomplish turn key projects.

References:

Completed and Ongoing Projects:

Row	Projects
1	Ghatran Coal Tar Refinery
2	SUI GAS Refinery (Pakistan)
3	Imam Khomeyni International Airport
4	Upgrading of Alhodeidah Oil Terminal (Yemen)
5	Seismic Data Collection of Persian Gulf & Oman Sea.
6	Khouzestan Petrochemical
7	project equipment Fuel Research and Production Center Iran

8	Kosar Rolling Mill Capacity 500,000 Tons/Year
9	Upgrading of Alhodeidah Oil Terminal (Yemen)
10	Poul Kalleh Turbo Compressor Gas Station
11	Blast Furnace No.3 Isfahan
12	Dorahan Turbo Compressor Gas Station
13	Phases 6,7&8 South Pars Gas Compressor Station
14	Phases 9&10 South Pars Gas Field Development SOUTH OSBL
15	Phases 9&10 South Pars Gas Field Development
16	Hormozgan Direct Reduction Iron plant Capacity 1,800,000 Tons/Year
17	South Kaveh Direct Reduction Iron plant Capacity 1,850,000 Tons/Year
18	Qadir-e-Iranian Direct Reduction Iron plant Capacity 800,000 Tons/Year
19	Arfa Ardakan Steel Making Plant Capacity 800,000 Tons/Year
20	Tavazon Steel Plant, Coke Making Capacity 900,000 Tons/Year
21	Sabzevar Direct Reduction Iron plant & Material Handling plant Project Capacity 800,000 Tons/Year
22	Saba Mega module Direct Reduction Iron plant Capacity 1,500,000 Tons/Year
23	Chaharmahal Bakhtiari Direct Reduction Iron plant & Material Handling plant Project Capacity 800,000 t/y
24	Sabzevar Steel Making Plant Capacity 800,000 Tons/Year
25	Phases 20&21 South Pars Gas Field Development (Area F). Assaluyeh

14.8. GHAEM REZA [103]

In 1994, Ghaem Reza Industries Company (GRICO) was established as a private company by a group of specialists from ESCO.

The following companies were established by GRICO:

- Milad & Metec Company for manufacturing steel structures and mechanical equipment
- Satha Company for producing electrical panels and cable trays
- Nasbe-Ghaem for equipment installation and plant erection

References:

1. Coke Making Plant -Tavazon Project in Esfahan Steel Complex (ESCO)
Plant: 900,000 TPY
Client: ESCO
Main Contractor: GRICO
Project Type: EP
Scope of Work: Detail Engineering and Procurement
2. SABA
Plant Product: 700,000TPY of steel sheets
Client: ESCO
Main Contractor: Danieli, Italy
Scope of Work: Detail Engineering, Supply of Equipment, Supervision
Concerned Subsidiaries: Milad, Foolad Technic, Nasb Ghaem, Satha
3. Khorasan Steel Complex

Plant Product: 550,000 TPY of steel bars
Client: NISCO
Main Contractor: Danieli
Scope Of Work: Detail Engineering, Supply of Equipment, Supervision
4. Blast furnace Package (Tavazon project, ESCO)
Plant Product: 1,400,000 TPY
Client: ESCO
Main Contractor: POSCO, Korea
Scope of Work: Manufacture, Supply of Equipment (Local Portion)
5. Sintering Plant (Tavazon project, ESCO)
Plant Product: 2,400,000 TPY
Client: ESCO
Main Contractor: POSCO
Scope Of Work: Manufacture, Supply of Equipment (Local Portion)
6. Auxiliary Project Services Package (Tavazon Project in ESCO)
Plant Product: Facility for extension of factory until 3,500,000 TPY
Client: ESCO
Main Contractor: POSCO
Scope of work: Construction, Supply of Equipment (Local Portion)
7. Maybod Steel Plant
Plant Product: 300,000 TPY Pig Iron
Client: Maybod Steel Plant Main Contractor: GRICO
Project type: EPC
8. Hamedan Steel Plant
Plant Product: 70,000 tons/year Pig Iron
Client: ZGK (Zob Ahan Gharb Keshvar)
Main Contractor: GRICO
Project Type: EPC
9. Sintering Plant (Tavazon project, ESCO)
Plant Product: 2,400,000 TPY
Client: ESCO
Main Contractor: POSCO Scope Of Work: Manufacture, Supply of Equipment
10. Auxiliary Project Services Package (Tavazon Project in ESCO)
Plant Product: Facility for extension of factory until 3,500,000 TPY
Client: ESCO
Main Contractor: POSCO
Scope of work: Construction, Supply of Equipment (Local Portion)
11. Maybod Steel Plant
Plant Product: 300,000 TPY Pig Iron
Client: Maybod Steel Plant
Main Contractor: GRICO
Project type: EPC
12. Hamedan Steel Plant
Plant Product: 70,000 tons/year Pig Iron
Client: ZGK (Zob Ahan Gharb Keshvar)
Main Contractor: GRICO
Project Type: EPC

14.9. VARIA TARH PARS [104]

Varia Tarh Pars is working in the field of Mines and Industrial projects.Some of its mai activities are as follows:

- Design and Engineering
- Management Contractor (MC)

References:

Butia Steel Complex Process Study and Technology Selection
Neyzar Pars Mersad Steel Complex Process Study and Technology Selection
Jahan Foolad Sirjan Steel Complex Steel making plant Feasibility Study
Neyzar Pars Mersad Steel Complex Feasibility Study
Oman Iron ore Benefication Plant Feasibility Study
Ravar Coking Plant Feasibility Study
Gol-e-Gohar Mine and Industry Complex Master Plan Study :
Gol-e-Gohar Mine and Industry Complex Material Handling Basic Engineering
Sirjan Jahan Steel Complex Infra-Structure Engineering Project
Chadormalu Direct Reduction Plant Basic and Detail Engineering Project
Bardsir Steel Complex Material Handling and DR Plant Design Review
Bardsir Steel Complex Main Electrical Sub. Station ,Air separation Plant ,Steel making and Billet Casting Plant Design Review
Gol-e-Gohar Mine and Industry Company Engineering Consultancy services
Gol-e-Gohar Mine and Industry Complex Material Handling Detail Design Review, Overal Supervision and Site Supervisory Services
Arvand Jahanara Steel Co. Steel Making Plant MC Project

14.10. MEMSECO [105]

Established on Jan 9, 2011, Middle East Meyar Sanat Co. have business activity relying on engineering activity.

References:

1. Botia Steel Project
Capacity of Plant / Project : 1.5 million tons
Close to Kazemabad village, Chatrood region, kilometr 17 of Imamreza Turn Road, Kerman
2. Direct Reduction Bardsir
Capacity of Plant / Project : 1 million tons of Sponge Iron (DRI) from Iron Ore Pellet
3. Bardesir Steel Factory
Capacity of Plant / Project : 1 million tons of steel billet of Sponge Iron (DRI)
4. Zarand Blast Furnace Steel Factory
Capacity of Plant / Project : 1.7 million tons of steel billet from iron ore pellet
5. Zarand Coke Making Factory
Capacity of Plant / Project : 800,000 tons of steel billet from iron ore pellet
6. Zarand pelletizing
Capacity of Plant / Project :2.5million tons pellets

7. Butia pelletizing
Capacity of Plant / Project : 2.5million tons pellets
8. Sirjan pelletizing
Capacity of Plant / Project : 2.5million tons pellets

14.11. TAM IRAN KHODRO [106]

References:

Bardsir Steel Making
Capacity:800,000 t/y
Bafgh Steel Making
Capacity:800,000 t/y

14.12. FARA TAHGHIGH SEPAHAN (SBR) [107]

SBR provides complete EPC solutions for industrial projects, the company has been established since 1997 . It has been committed to adding value to its clients by successfully completing a wide range of large and complex projects in many countries throughout the world.

References:

Chaharmahal Production Line
Saba Steel Expansion
Hot Dip Galvanizes and Color Coating Plant
Khorasan Steel Complexes
Design of Cold Mill Roll Shop
Fluid Plant Expansion of MSC
Power Plant Expansion of MSC
Loading & Unloading Project in SABA
Ghazvin Recycling Complex
Khozestan Production Line for Dolomite and Limestone
Golgohar2 Pelletizing Plant
Yazd Alloy plant Expansion
Mazandaran Coke Making Plant

14.13. KANIKAVAN SHARGH [108]

KaniKavan Sharq Engineering Company was established in offering technical, engineering, research, construction, installation, commissioning and executive management services to meet the requirements of projects involved in civil, industry, mining, oil and gas, and power plant.

References:

Construction of Bafgh Sintering Plant with a capacity of 890,000 t/a on EPC basis with cooperation of LCMEEC from China
Complementary explorations and mine mobilization of Tabas Parvadeh 4 Coal Mine Project on EPCF basis with cooperation of CMC from China
Construction of a coke-making plant with a capacity of 300,000 t/a in Savadkouh (Mazandaran Province of Iran) on EPCF basis with cooperation of CMC
Savadkouh River diversion on PC basis
Consultant of
2 Iron Pelletizing Plants
27 engineering projects involved in coke-making, copper, iron, nepheline, and alumina
Operation of an iron ore concentrator plant
13 environmental projects acquiring the required environmental permits
35 exploratory and geological projects
11 research projects and compilation of mining standards and regulations
14 technical-economic feasibility studies

14.14. TARA TARH [109]

Tara Tarh is an independent professional consulting company established to provide consulting, engineering, project management and other technical services to the clients in all fields of oil and gas, power, metals, and mineral processing from the beginning to the end.

References:

Khorasan Steel Co. 1.200.000 t/y Expansion Project
Kouzestan Steel Co. 800.000 ton/y Direct Reduction Plant Project
Khouzestan Steel Co. Midrex Direct Reduction Modules Revamp
Khouzestan Steel Co. Expansion project
INSIG 550,000 ton/y Rolling Mill Project
Light-Section Rolling Mill Project
Esfaraien Alloy Steel Company Project
KSC Meltshop No.1
KSC Wide Plate Mill project
Yazd Alloy Steel Company
Almahdi Aluminum Complex Project
Pre-feasibility for new steel complex at Khouzestan
Feasibility study for INSIG new Steelmaking Plant
Feasibility study for INSIG new Direct Reduction Plant
Feasibility studies National Iranian Steel Company for establishing new steel complexes at Shadegan
Feasibility studies National Iranian Steel Company for establishing new steel complexes at Mianeh

14.15. BARSOO [110]

BARSOO Engineering Company is established on 1993 to render Services to various industrial projects. During last year, it has rendered Consulting, Engineering and Design Services to more than 55 Projects in miscellaneous fields such as Iron, Zinc, Lead, etc.

Torbat Heydariyeh Integrated Steel Project

Project Description subject / product, capacity Material Handling: 5.2MTPA ...
Persian Gulf Saba Steel DRP Project
Project Description subject / product, capacity ...
Iranian Kaveh Precision Tubes Project
Project Description subject / product, capacity Hot Rolling Mill &...
Hormozgan Steel Project
Project Description subject / product, capacity Foreign Procurement: 1...
Golgohar
Project Description subject / product, capacity 1st Phase: DRP: 1.7...
Gohar Zamin Crushing
Project Description subject / product, capacity Crushing: 10MTPA Crushed Ore ...
Ghaenat Steel Project
Project Description subject / product, capacity 0.8 MTPA Sponge Iron as middle produ...

14.16. POOLAD CONSULTING ENGINEERS [111]

Poolad Consulting engineers (PCE) was established on April 1983 to undertake different industrial projects in Iran and abroad. All activities encompasses a full range of industrial and general services based on department wise system.

References:

Khuzestan Steel Complex
Miyaneh Steel Complex
Sefid Dasht Steel complex
Torbat e Heydariyeh DR Plant
Sechahun PelletizingPlant
Azar Hadid Bonab Steel Making
Sarakhs

14.17. ASEH SANAT [112]

Aseh Sanat Consulting Engineers is one of Iran's engineering consultancies. The company was established by a team of experienced engineers and professional managers in 1989 to provide a wide ranging consultancy services in Industries, Mineral Processing, Civil, Structural and Power Generation.

References:

Consulting services for GOL-E-GOHAR Iron ore Co. projects including:
Feasibility study for a 4 MTPY pelletizing project & construction's supervision of the expansion project of the concentration plant
Preparation of the international tender documents & tender execution for a 4MTPY pelletizing plant
Consulting engineer to 6MTPY iron ore concentrate lines No.5,6&7 projects
Feasibility study for a 5 MTPY pelletizing plant(pelletizing plant No.1)
Preparation of the international tender documents & tender execution for a 5MTPY EPC contractor sellection (pelletizing plant No.2)

Preparation of the international tender documents & tender execution for a 1MTPY concentration plant (Polycom Project)
Consulting engineer to the iron ore crushing unit project including storage & transfer of 15 MTPY crushed iron ore with belt conveyor for a distance of 3 kms
Consulting Services for National Iranian Copper Industries CO. including:
Consulting Engineer to Khatoon Abad Copper Refinery project with the capacity of 200,000 TPY cathodic copper in Shahr'e Babak Copper Complex located in Kerman province.
Consulting Engineer to expansion project of Meydook copper mine concentration plant with the capacity of 280,000 TPY.
Consulting Engineer to Iran Mines and Mining Industries Development and Renovation Organization(IMIDRO) for:
Alumina production from Nepheline Syenite project
Consulting engineer to Zarshooran gold ingot production plant located in Takab, west Azarbaijan province
Basic and detail engineering for cold rolling mill expansion project of Mobarakeh steel complex project including:
Mechanical & electrical systems & structural design of recoiling and pickling plant.
Mechanical & electrical systems and structural design, optimization and capacity increase for Acid Regeneration plant.
Consulting services for National Iranian Steel Co. (Sangan iron mines project) including:
Feasibility studies for a 1.3 MTPY concentration & pelletizing plant
Preparation of the international tender documents & tender execution for 1.3 MTPY iron ore concentrate & Pellet production.
Basic & detail design, construction supervision for the plant infrastructure (132/20 KV substation, process water pipeline and reservoirs facilities, buildings and access roads).
Management and project control services
Feasibility studies for a 2.6 MTPY concentration & pelletizing plant
Basic design review and approval for the concentration and pelletizing plant
Management consultant to Iran Zinc Production Co.(IZPC) for construction of 100,000 TPA Zinc Ingot & 50,000 TPA lead concentrate production plant located in Mahneshan, Zanjan province
Feasibility studies for Mehdiabad Zinc Co. (M.Z.C.) for 100,000 TPY zinc ingot plant
Feasibility study for Angooran mine's Zinc Sulfide Ore Roasting Complex Project for Iran Zinc Production Co.(IZPC)
Feasibility studies & tender execution, design review, construction & erection supervision for a 400,000 t/y crushed & processed iron ore plant for Khorasan steel raw material supply & production Co. in Khorasan Razavi province
Feasibility studies for 2.6 MTPY Iron ore concentration & pelletizing plant for Foolad Shargh Kaveh Co. in Khorasan province.
Consulting engineer to Akkahoor Co. for a 1 MTPY iron ore concentration plant project in Hormozgan province.
Employer's Consultant to Iran Central Iron Ore Company (ICIOC) for the optimization & capacity increase project of Choghart & Sechahun iron ore concentrate production lines in Bafgh, Yazd province.
Feasibility studies for 20,000 TPY melting & casting of steel plant for Behabad Yazd Co.

14.18. NAMVARAN [113]

Namvaran Consulting Engineers; Managers founded in 1979 in the era of engineering service industry genesis in Iran, was in fact unfolded from a foreign base - a joint ventured partnership.

Today, they have extended their field of work as a leader of providing comprehensive EPCM services in Oil & Gas, Petrochemical, Mining and Metal industries.

References:

PetroChemical:
Mobin Petrochemical off-site facilities, Asaluyeh-Iran
3d NGL Fractionation Plant, Bandar Imam-Iran
South Pars Gas Field Development, Asaluyeh
Kermanshah Ammonia & Urea Plant, Kermanshah-Iran
Marjan 5000 MTPD Methanol Plant, Asaluyeh-Iran
PET 2, Bandar Imam-Iran
PET 1 & PTA-1, Bandar Imam- Iran
Lavan Oil Refinery, Lavan Island-Iran
Development Phase 1 of Yadaravan Oil Field, Khouzestan–Iran
Engineering Polymers Plant Project, Bandar Imam-Iran
Jam Butadiene Project, Asaluye-Iran
Esfahan Gasoline Production Plant (GPP)
Aboozar Offshore Oil Production & Wellhead Platform Persian Gulf-Iran
Amir Kabir Low Density Poly Ethylene Plant (300 kt/y), Bandar Imam-Iran
Abadan Refinery, Abadan, Iran
Jahrom LLDPE/ HDPE Swing Plant, Jahrom-Iran
Mines & Metals
Gol-e-Gohar Iron ore Complex, Sirjan-Iran
Alumina plant of Iran in Jajarm
Persian Gulf Alumina plant
Hormozgan Aluminum plant (Hormozal)
South Aluminum Complex (SALCO)
South Aluminum Complex (SALCO), Lamerd-Iran
Sangan Concentrate Plant, Khaaf-Iran
Choghart Iron Ore Concentrate Plant, Choghart-Iran

REFERENCES:

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21. Sechahun pelletizing: http://www.fstco.com/news
22. Asadabad and Shahrak pelletizing: http://sabanour.ir/default.aspx?lang=en#0
23. IMIDRO and Mobarake pelletizing: http://azaranspc.ir
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65. Ferro Gilan complex: www.ferrogilan.com/index_f.php
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71. Zarandieh Hirbod steel industries company (Hirbod steel):http://www.hirbodsteel.com/en
72. Yazd rolling mill: http://en.yazdrollingmill.com/
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75. Seven steel company: http://www.seven-diamonds.com
76. Amir Kabir steel co.: http://amirkabirsteelco.ir/en/
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89. SMS Group:https://www.sms-group.com/
90. Danieli: http://www.danieli.com/en/
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