

# **Mirror, Mirror on the Wall: Is Iranian Steel the Fairest of Them All?**

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## IS IRANIAN STEEL A "RISING STAR?"

The answer is "yes." Based on knowledge gained during a week in the country about in extensive interviews with Iranian steel companies and those tied to the steel industry, it's quite evident to WSD that, despite its current financial crisis, the Iranian steel industry will be one of the global industry's "rising stars" in the next decade. In comparison, steelmakers in a number of countries, including China, are now falling stars.

On February 16, 2016, this writer made a presentation at the Iranian steel industry's major annual conference in Tehran with a title identical to the one above. The conference was quite well attended since the Iranian steel industry is sizable with many players to begin with and, now that the country is opening up offshore investment, there were many international equipment vendors in attendance.

The Iranian steel industry is facing an array of challenges in the next decade, including: a) a severe shortage of capital since the central government is not providing direct financial help and profitability is down sharply the past 18 months; b) capital from domestic sources is extremely expensive given the current interest rate of about 20% on bank loans (down from 27% recently); c) the risk that the Iranian currency, the Rial, appreciates sharply in the next decade (WSD's view), which will boost the Iranian steel mills' costs on a U.S. dollar basis; d) far from adequate low cost iron ore reserves to meet the steel industry's optimistic of the steel production scenarios looking ahead to 2025 – in part due to water shortages and the need to engage in more underground, and higher cost, extraction of the iron ore; e) the lack of a sufficient countrywide rail transportation system; and f) poor labor productivity since the government wants to maximize the number of steelworkers.

Nevertheless, granted that economic sanctions are not re-imposed on the economy by foreign countries, the Iranian steel industry's risks and problems seems to be less than those faced by steelmakers in most other countries. The opportunities for a prosperous industry are good given the highly favorable steel demand outlook, the access to low-cost energy in the form of natural gas and the price charged for electricity, the fairly low cost iron ore mines in the country, the good location to export, attractive capacity expansions via the DRI/EAF route and a government that will be sufficiently supportive on the industry (including the imposition of trade barriers against foreign steel mills when needed). *(Note: The need for import protection is one of the unfortunate realities of the global steel business.)*

The country's largest steelmaker, Mobarakeh, which has about a 60% share of the country's steel sheet deliveries including subsidiaries, is the "brightest rising star" in WSD's opinion. Besides its

ultra-low costs, including an operating cost to produce hot-rolled band just below \$300 per tonne, the company is positioned to expand capacity at a relatively low capital investment cost. And, it's positioned to continue to enhance its already-strong standing with customers in the domestic marketplace. It has a highly qualified and pro-active management team, including a visionary leader (Bahram Sobhani, its CEO).

Given the current reduced profitability of the steel business in Iran and the lack of direct governmental financial support (including the government-owned financial institutions that own a sizable share of Mobarakeh common stock), it's clear that Iranian steel companies and iron ore producers, in general, and Mobarakeh Steel, specifically, need to attract equity funding and loans from offshore groups. Mobarakeh Steel and the other steelmakers, for example, could benefit substantially from "strategic partnerships" with non-Iranian steelmakers – especially since steel's technological revolution has continued to advance at a rapid pace the past decade and that, because of the economic sanctions against its country, Iranian steelmakers have not had direct access to, and/or have installed, many of these new and important technologies.

If an Iranian steel company can borrow funds outside of Iran, let's say for an annual interest expense that ranges from 5% to 10% per annum, rather than about 20% per annum in Iran (just reduced by the government from 27% per annum), the interest expense will be far lower. Although, of course, there would be big debt-repayment problem if the Iranian Rial were to weaken sharply – a development not expected by WSD, but nevertheless is a theoretical possibility given Iran's high "country risk" ratings at the present time.

Steel demand currently is quite weak in Iran in large part due to the decline in oil prices, which has dampened capital spending in the country. And, it's oil exports have yet to rise sharply. In the case of Mobarakeh, the leading company, its EBITDA to sales ratio is down to only about 5% at present versus 30% for a while a few years ago.

One of the problems for steel companies the world over, when they are seeking to raise outside equity and debt funds, is that the Chinese steel industry is so threatening. Exports of steel from China have surged to a 100+ million tonne annual rate versus only 50-60 million tonnes several years ago – which greatly destabilizes this market since it's "only" about 360 million tonnes per year

And, in December 2015, the Chinese mills were so desperate to boost exports in order to sustain steel production that they were exporting hot-rolled band at a price of \$270 per tonne, FOB the port of export – which translates back to only about \$230 per tonne ex-works. In comparison, for the median-cost Chinese steel mills, at that point in time its marginal cost was about \$300 per tonne, its operating cost was about \$350 per tonne and its pretax cost was about \$400 per tonne.

While WSD is quite confident that China's "Steel Exporting Armada" will be defeated in the next few years, in part due to trade sanctions, actions by the Chinese government to reduce capacity and the Chinese steel mills' only average production costs, in fact this is only a forecast. Those providing funds to steel companies, including the Iranians, may want more proof of this before turning on their financial spigots.

Interestingly, a good number of Iranian steel industry people are buying into the IMIDRO forecast that the country's steel production in 2025 will rise to about 55 million tonnes versus about 16 million tonnes per annum at the present time. Included in this forecast, apparently, is about 18 million tonnes of exports by Iranian steel mills. In fact, WSD thinks that the export market for steel products is so "competitive," in the academic sense of the word, over much of the steel cycle that it will be impossible for Iranian steel companies to obtain funding based on an expectation that exports rise so sharply.

One of the unfortunate realities of the global steel business is that, in order for most steel companies to generate a good profit margin over much of the cycle, it needs significant protection from foreign deliveries – with the protection existing in the form of quantitative trade restraints and/or sufficiently high tariffs and duties that its government have put into place.

Another critical long-term issue for Iranian steelmakers is the price of natural gas in Iran, which is already highly plentiful and is forecast to be doubling in supply by 2020 based on the drilling of new oil and gas wells and the construction of a natural gas pipelines. However, if the price in the next decade rises sharply on Rial basis and the Rial appreciates versus the U.S. dollar, the currently highly attractive price of natural gas in the country, from the viewpoint of the 20-22 natural-gas-based DRI plants in the country, would go away.

As noted in one of the accompanying graphics, the price of natural gas per cubic meter in Iran risen to \$0.0451 per cubic meter in early 2016 from \$0.0235 Rial per cubic meter in 2013. Assuming 37,000 BTU per cubic meter, there are about 27 cubic meters per million BTU. Hence, the current price of \$1.22 per cubic meter compares to only \$0.63 in 2013 assuming 35,000 Rial per dollar, on a black market basis, in both periods.

The risk, of course, is that Iranian governmental planners, like those in most other countries, decide to boost the price of natural gas, or other goods and services, in order to pay for their ever-expanding entitlement – i.e., social benefit - programs. *(Note: WSD has observed over the years that the wealthier the country, the more likely it becomes that its politicians boost entitlements in order to get a higher approval rating from its citizens.)*

Iranian price of natural gas (presumably for Mobarakeh)

Year	Rials/m3	\$/m3	\$/million BTU*
2015	1,580	0.0451	1.31
2014	1,566	0.0447	1.30
2013	821	0.0235	0.68
2012	702	0.0201	0.58
2011	700	0.0200	0.58

\*A cubic meter of natural gas may only contains about 34,524 BTU rather than the 37,000 BTU figures that's in the literature. Hence, the table above assumes that 29 cubic meters of natural gas are needed per million BTU.

One factor always to be considered is the exchange rate when converting Iranian Rials to U.S. dollars. In this report, we use a figure of 35,000 Rial per U.S. dollar. Interestingly, in the past XXX years, the black market figure has often not been far from this level, while the official value for the Rial has weakened to 30,000 from about 10,000 per U.S. dollar. Please see the accompanying graphic.

Unless there are renewed economic sanctions against Iran, the odds are high in WSD's opinion that the Iranian Rial will appreciate significantly versus the U.S. dollar in the next decade reflecting: a) sizable foreign capital flows into Iran to be invested – i.e. there will be increased FDI, or foreign direct investment; b) the government's revenue from oil exports will be rising due to higher deliveries and, probably, a recovery of the price to, let's say, \$55-70 per barrel from the current range of \$28-35 per barrel; d) high interest rates in Iran, currently 20% on bank deposits, will attract offshore funds; e) the Iranian inflation rate in Iran declines from the current 15% per annum – and 30% per annum a few years ago – to only 5-10% per annum; and) the "country risk factor" declines as based on growing confidence on the trustworthiness of investing in the country.

Mobarakeh Steel, for example, may seek to borrow about \$500 million on the international debt market in the next year – which would be real cheap debt if the Rial appreciates in the years ahead and, of course, the converse if it depreciates significantly.

## THE GLOBAL STEEL INDUSTRY ENVIRONMENT TO 2025

WSD thinks the steel industry environment in the next decade will remain "competitive," although, conditions will not be as adverse as the current time when world export prices are so remarkably depressed relative to the mills' cost. Nevertheless, versus the period 2004 through the first half of 2008, the profit prospect for the global steel industry in the next decade and for sure, in 2016 and

probably in 2017, seems to be dimmed because steel demand in China almost certainly is headed down. Hence, global steel production growth in the next decade will likely be limited if, in fact, there's any at all. Oversupply of steel globally will be the normal condition, which means that world steel export prices will often be lower than home country prices.

The current remarkably low prices for hot-rolled band and other products on the world export market has created a "financial suicide" condition for many steel mills. One of the consequences is growing bankruptcies, capacity reductions in many countries and steel plants for sale are ultra-bargain prices (especially if "catch-up" capital expenditure needs are sizable). The steel industry is so capital intensive and low profit-margined that many high cost producers will be eliminated in the next few years. It's simply too expensive for most steel mills to keep substantial unused capacity in a ready-to-operate condition.

Granted that steel demand outside of China shows fair growth – perhaps 2-3% per annum – and granted the Chinese "steel exporting armada" is defeated, non-Chinese steel mills will be much more profitable than at the present time. Well-positioned steel companies will have the opportunity to benefit from M&A activities and to boost their competitive marketplace positions.

Some of the steel industry conditions WSD expects in the period from to 2025 include:

- A 100 million tonne decline in Chinese steel demand to about 650 million tonnes on a crude steel equivalent basis – and, the decline could easily be more because China is planning a major shift to household spending, rather than fixed asset investment spending, to propel up the economy. In general, household spending is about 1/7th as steel intensive as fixed asset investment spending (which is also Gross Fixed Capital Formation that's only reported in China once per year, usually in March, for the previous calendar year.)
- Global steel production in 2025 is likely to not be greatly different than in 2015, with the decline in China about offset by roughly 2-3% per annum growth elsewhere. In 2025:
  - Chinese steel production falls about XXX million tonnes.
  - Advanced Country production rises about YYY million tonnes.
  - Rest of Developing World steel production rises about XXX million tonnes.
- The Chinese steel industry's "exporting armada" is defeated. It declines – in fact, its "encapsulated" –for these reasons:
  - The avalanche of trade suits against the mills.

- Government "reassignment" of excess steelworkers.
- Elimination of marginal steelmaking and rolling units.
- When the export price is low, so is the Chinese home price – which causes a suicidal financial environment. (Note: WSD hears that man of the medium-sized and larger steel mills in China have reduced salaries about 20% in the past year.)
- Chinese mills in most cases are only average cost.
- Declining capital spending.
- Global steelmaking capacity by 2018 is reduced about 14% versus 2014. Regarding how to measure steelmaking capacity, WSD is focusing on a new measure that it introduced in our February 2015 "Early Warning System" report; this measure is called "ECO-Capacity." ECO-Capacity is defined as just how high steel production can rise to, in a rising steel industry production environment, before there's a sizable increase in cost to produce the last tonne. Once this happens, the odds of a sizable price boost in steel products become extremely high.
- The non-Chinese steel industry ECO-Capacity operating rates in 2018 rises to about 95%, which is probably sufficiently-high for a steel shortage – a "short" period of surging prices on the world market – to occur.
- However, notwithstanding capacity reduction, the Chinese steel industry's ECO-Capacity operating rate does not rise sufficiently for the mills to boost their pricing power greatly in their home market.
- Steel scrap prices remain fairly depressed compared to these in effect in the period from 2005 to 2014. The reason is the sharp rise in China's obsolete steel scrap reservoir that's, on average, 10-40 years old.
- Oil prices rebound to the \$50-70 per barrel range. The reason is that oil demand continues to rise and the leading producers, somehow, limit output sufficiently to permit a recovery to this level.
- Iron ore prices stay low reflecting declining iron ore demand in China and the fact that the world's leading iron ore companies have an operating cost to deliver sinter feed to the port of export that's probably less than \$15-16 per tonne at present. Overall, WSD



expects that a typical price delivered to China in the years ahead is about \$35-45 per tonne.

- Ocean freight rates remain fairly low because of the huge surplus of Capesize vessels. Currently, the iron ore freight rate from Brazil to China is about \$6 per tonne versus a \$20+ per tonne figure not unusual in recent years. In the next decade, we expect the figure might be about \$9 per tonne. For the iron ore freight rate from Australia to China, the figures are about \$4 per tonne, \$11 per tonne and \$7 per tonne, respectively.
- The WSD monthly *World Cost Curve* remains relatively flat in good part because steelmakers' raw material prices will not be elevated. In today's condition, there's a lessened disadvantage of steel mills without their own raw material sources. Flatter cost curves, in general, create more competitive steel pricing structures because it takes a lower price to drive medium- and high-cost producers from the marketplace.
- Global steel trade remains at high levels at about 330-370 million tonnes per year.
- In most countries, the steel mills cajole their governments to provide it with protection against low-priced foreign steel product deliveries.

A new factor to consider, which is threatening to non-Chinese steel companies, is the determination of the Chinese government to create a "global financial colonial empire." Based on its support of massive infrastructure projects in a number of countries, these countries' governments will become quite loyal to the Chinese because they are receiving such substantial financial aid. This new type of empire, conceptually speaking, has some theme that are consistent to the Ottoman Empire created 500 years ago and the British, Spanish, French and Portuguese colonial empires constructed about 250 years ago.

The Chinese government's founding of the new **Asian Development Bank**, which has been supported by financial institutions in a number of other countries, is an important development. At first, supporting this bank was "stonewalled" by USA economic policymakers perhaps because it would lessen the relative importance of the U.S. dollar versus the Chinese RMB; and/or this institution would compete against the World Bank that the USA dominates in many respects. However, after some cajoling, USA government financial policymakers have decided to help participate in providing loan support for the Asian Development Bank.

Here's another important related development. The IMF (International Monetary Fund) announced in **February** 2016 that, as of **November** 2016, it would be adding the Chinese RMB to its official basket of currencies that are used to obtain "special drawing rights. Granted this happens, it will

raise enormously the status of the Chinese RMB when it comes to international financial transactions.

## **IRAN IS NO CHINA**

In fact, this viewpoint also applies to India where, similar to China, many industry people and the leading steel association are engaged in grandiose, and truly unattainable, steel production forecasts for 2025.

By way of background, Chinese steel production rose from 129 million tonnes in 2000 to 823XX million tonnes in 2014 – which is an 11.2% per annum compounded growth rate. The gain has been so immense that, currently, the Chinese steel industry accounts for about 52% of global steel production and 60% of global blast furnace output (excludes about 80 million tonnes of directly reduced iron production that's based either on coal, where Indian producers are a good example, and/or natural gas, where a number of Middle Eastern companies and many others a good example of the popularity of this approach – that is, of course, where natural gas prices are cheap.

Is there another China lurking in the weeds that's about to spout? WSD does not think so, although this opinion is not share by many steel industry people in India and Iran that see quite explosive gains in steel production in their countries by 2025.

- In Iran's case, its industry association, IMIDRO, forecasts steel production to be about 55 million tonnes in 2025 versus about 16 million tonnes annually at present. If so, this would be a compounded **annual growth rate of about 13.1% per annum**. In comparison, WSD thinks that a more reasonable "mid-high" figure is about **36 million tonnes**, which is a growth rate of 8.5% per year.
- In India's case, the Ministry of steel seems to be forecasting steel production at about 300 million tonnes in 2025 versus about **78** million tonnes last year. If so, this is a compounded growth rate of 14.4%. Instead, WSD's "mid-high" figure for 2025 is 150 million tonnes, which is a gain on the same basis of **6.8% per annum**.
- Given the fact that: a) global steel production in 2025 may be roughly unchanged versus 2015; b) steel export market will be quite price competitive at least six of the next 10 years; and c) Indian and Iranian steelmakers are facing major capital shortages and profit margin problems at the present time, we think that even our "mid-high" production estimates probably are far-fetched.

- WSD is convinced that economic developments in Iran and India in the next decade, along with what's happened in China the past 15 years, to strong validation of - if not absolute proof of - the "Capital Fundamentalism" economic theory. In this theory, it's construction and capital spending drives much of the growth of an economy. An economy grows quite substantially when fixed asset investment (actually, Gross Private Capital Formation from a GDP terminology point of view) is rising as a share of GDP and GDP is also expanding at a 4% or more annual rate.

(Note: Perhaps there's an upper limit for FAI/GDP because, when it's too high, the rise in debt to support the FAI is too substantial. Also, one needs to consider the multiplier factor, also called "social capital," which is the responsiveness of an economy to rising FAI - or, Gross Fixed Capital Formation - as a share of GDP.)

- Iran obviously lacks the economic power, and the incredibly efficient and productive manufacturing base, that's so much in evidence in China. China has many economy "clusters," which is a concentration of the manufacturers of similar products, promote the efficiency and technological advance - such as producers of electrical equipment, textiles, consumer goods and a host of other items.
- China is a massive exporter of manufactured goods. In 2015, Chinese exports of manufactured products may amount to \$4.2 trillion versus \$XX billion for Iran when excluding its oil exports.
- Iran has about 80 million people versus 1.4 billion in China. Although, the growth rate in Iran is probably 1.5% per year versus roughly nil in China.
- Iran seems to have a far higher standard of living for more people, on average, than China. No slums. Educated. Productive.
- China is creating a "global financial colonial empire" with the support of its new Asian Development Bank, which has no parallel in the case of Iran.
- China has a well-developed transportation infrastructure including a vast network of highways and rail systems. And, its river system, and especially the Yangtze River Delta plays a huge role in the economy.
- China has a far more ports that are, in many cases, are far larger and permit far bigger vessels than is the case for Iran.

- China has a "command economy" that, based on the wisdom of its economic planners, has been astonishingly successful in promoting economic growth, in raising the standards of living, in creating countless millionaires and, that, believe it or not have on balance a very happy population even though there's virtually no involvement in politics and far less freedom to say negative things about the government.
- The Iranian economy is more traditional in the "western" sense. Most people have very little interaction with the religious leaders. Have religious freedom.
- Iran has been left behind by economic sanctions. During which time, there's been a technological revolution. Hence, given its large population, its location, its energy, there will be fairly amazing investment. The economy will be dragged into the West to a degree that it, as long as virtually all other countries, would never risk using an atomic bomb.
- Iran in the next five years will not have the benefit of a surging global economy to promote its exports, as did China in the period from 2000 through the first half of 2008. In this period, many governments decided to boost their "gearing" – i.e., their borrowings – in order to promote economic growth. Such a policy can't be long sustained because debt rises to substantially as a share of GDP.
- Many groups in China in the period from 2000 to 2013 had access to loans from government banks, which is the only type of bank in China, at very low interest rates. This easy loan situation may have promoted a sizable rise in bad debts; but, on balance, it gave entrepreneurs in China the opportunity to grow explosively.
- Chinese companies have had access to "shadow" banking loans to a sizable extent, which is not the case in Iran. Also, in the past year, Chinese steelmakers have probably had more than \$30 billion of borrowing of "super" short-term loans, many of which have been investment grade on a ratings basis, that are about 270 days in duration. Perhaps another term to describe these loans is commercial paper.
- Municipalities in Iran lack the independent power and revenue generating capability that we see in China – where the municipalities' bureaucrats appoint the Chairman and CEO of their company (in which they have a significant ownership).
- China has a far lower inflation rate than Iran – only about 2-3% per annum.
- China has had far greater FAI/GDP – probably close to 48% of GDP.

- China has a far higher savings rate that's close to 50% of GDP when including households (22% of GDP), enterprises (also about 33%) and the government at perhaps 6%.
- India has no drinking and drug problems, both of which exist in China.
- Iranian engineering and construction companies can build steel plants faster and at lower cost than elsewhere in the West, but not as low cost and as rapidly as in China
- China's GDP is growing at a faster rate.
- China's massive gain in steel consumption after 2000 is not able to be replicated elsewhere.
- China in a number of respects is a "command" economy in which government policymakers are "pulling the strings." Their policy-making has fostered incredible economic expansion in a way in that's simply not available to others.
- Steel consumption per capital is as follows: Iran, India, South Korea, Taiwan, Japan, Western Europe, Russia, EU and many others. Per capital income in 2025 would be XXX tonnes compared to about XXX in China, YYY in the United State, ZZZ in Japan, XXX in India, BBB in Brazil and XXX in YYY.\
- In Iran, the water shortage is even worse than in China.
- China has far better coking coal mines.
- China not in a situation in which many people are using the black market currency value when effecting transactions, as is the case in Iran.
- Loans are cheaper in China.
- Chinese government is pro-active when it comes to supporting their basic industry.
- Iran is not a command economy; although, very much impacted by governmental actions.
- Both countries have corruption, as do all countries and societies. However, the extent to which is retarding the growth of the Iranian and the Chinese economies is hard to determine.
- Iran has only four wide hot strip mills versus about 90-92 in China.
- Iran lacks the massive number of smaller integrated mills that in China are almost exclusively dedicated to the production of rebar, wire rod and other construction projects.

- Iran has lower iron ore costs than China.
- Iran lacks good coking coal reserves. In contrast, China's are higher grade and much lower cost.
- Iran seems to have air pollution problems to a lesser extent than China; although many of the newer Chinese steel plants, if which there are many, probably have more extensive control of air and water pollution than most Iranian plants. *(Note: In general, it's a less challenge restricting emissions at EAF-based steel plants than integrated ones (that need the support of coke ovens and blast furnaces. In general, a gas-based DRI plant per tonne of output emits about 55XX% less pollutants than a blast furnace.*
- Iran not have the municipalities with the means to create revenues for themselves via land sales; and, to promote growth in their region.
- China has a more vast system of state-owned enterprises.
- China has a very good education system at the local level.
- Both companies have prosperous and ambitious people.
- Both countries have a water s shortage – perhaps worse in Iran.
- Iran is a country surrounded by other countries at war. Shia versus the Soonies is a very nasty affair.
- Iran not have the large number of deep water ports than can take the larger vessels.
- Iran does not have the same ultra-low low interest rates.
- Iran not have the high savings rate that funnels such a vast amount of cash, in the form of deposits, to its banks.
- Iran does not have as vast a system of state-owned banks. Iso, shadow banking in zChina can be a significant factor at times.
- Not have the funds or the cash flows to support capital expenditure requirements/dreams.

- Not have the same "friendly steel industry environment" as that from 2003 to the first half of 2008 in which to boost steel production and increase exports.
- Almost daily, the Iranian policymakers and others are making "deals" with a large number of foreign governments and leading companies, including airplane manufacturers, to provide goods and services to Iran.
- Iran may have a better location from which to export.
  - Iran has no significant drinking or drug problem. Virtually no unwed mothers in the country. Families take care of their children. If unemployed, the kids live at home.
  - Virtually no terrorist attacks in the Iran or China.
  - The Iranian people we observed seemed to be happy and sunny (because no politics?)
- Iranian government pays 20% to depositors. Hence, many depositors become rich. Can double one's money in four years. Question, is interest income taxed, and what at what rate?.
- Iran tends to be XX% Shia Muslim, with a number of its neighbors being Sunni Muslims.
- Much of the region surrounding Iran is at war.
- China has atomic weapons.

## **SIMILARITIES BETWEEN IRAN AND CHINA**

Here are some examples:

- The steel industry is viewed as very important.
- The companies can install the latest technologies and, most probably, at a lower construction cost than that much of the non-Chinese world. Iranian equipment companies are proficient in adopting new technologies.
- Similar to China, very little religious strife.
- Educated workers.
- Home market steel prices in Iran are far above those in China. Iran steelmakers, fortunately, are not burdened with a highly "competitive" steel pricing structure, in the academic sense of the word, that prevails in China.

## **WHERE DOES IRAN COME OUT WELL VERSUS CHINA?**

- Vast oil reserves.
- Vast natural gas reserves
- Low cost iron ore mines – and, a higher average grade of the ore.
- Lower prices for electricity.
- Less air pollution problems – Tehran far better than Beijing.
- Going forward, steel demand to rise far more sharply in Iran than China.
- Iran's national debt is relatively low.
- Iranian steel companies are positioned to tie up with, and merge with offshore steelmakers. This condition is really not the case for the major Chinese steelmakers.
- Iran has true religious freedom.
- Iran coming into a period of a sizable trade surplus due to the sale of crude oil.

## **IRANIAN ECONOMIC DATA AND RELATED ITEMS**

- Public debt at only 11.9% of GDP.
- Current account balance at 0.8% of GDP
- Budget balance at -2.5% of GDP
- Inflation at 16.5% in 2015 versus 2014 at 15.5%, 2013 at 34.7% and 2012 at 30.5%.
- GDP at 2.0% growth in 2015 versus 2014 at 1.0%, 2013 at -1.7% and 2012 at -5.6%.
- A currency for which the "black market" value of the currency is both far different from the official value; and, with most of the transactions occurring on the black market basis. The Black market value of the Ria, the Iranian currency, is currently at about 35,000, which has



been the case roughly for the past XX years, while the current official rate is 30,000. When converting Iranian Rial to U.S. dollars, the business community in the country uses the black market rate.

- Population about 79 million.
- Religious freedom is the case in Iran. All forms of worship are observed and co-exist. The population is about XX% Shite and YY% Sunni.
- Decline in oil prices has been a severe negative for the economy. (*Note: See Coface.co eco studies for risk assessment.*)
- Almost no poverty in the country. No drinking and no drugs. Families take care of the unemployed. No unwed mothers.
- Iran has 34 trillion cubic meters of natural gas reserves. It plans to double output by 2020 to 400 billion cubic feet per year. It already has 11 large diameter natural gas pipelines. Iran currently has 36,000 km of high-pressure gas transmission lines and 254,000 KM of distribution network lines.
- Iran's oil production is currently about 3.3XX million barrels per day, with about XXX barrels for export. It is seeking to boost oil exports by 0.5 million barrels per day.  
(Note to those in Iran. Please update and expand this section.)

## IRANIAN IRON ORE SITUATION

Iran's iron ore reserves are substantial. Currently, about 30 government-owned and about 180 private mines are operating, with an average Fe content for the government mines about 51%. The iron ore reserves for these government mines is about 4.53 billion tonnes. These mines include:

- Markazi: 16 mines with 24-57.3% Fe content. Reserves = 1.8 billion tonnes.
- Gol-e Goha: 6 mines with 53.6 to 56.4% Fe content. Reserves = 1.24 billion tonnes.
- Sangan: 4 mines with an average of 48.9% Fe content. Reserves = 1.2 billion tonnes.
- Xanjan: 1 mines with 50% Fe content. Reserves = 0.055 billion tonnes
- Hamedan: 3 mines with a 61-66% Fe content. Reserves = 0.193 billion tonnes

Looking ahead to 2025, IMIDRO, the country's influential steel industry and government-related organization, is forecasting the following:

- Crude steel capacity. Rises to 59 million tonnes in 2025 versus 24 million tonnes in 2015 (and production of about 16.5 million tonnes)
- Exports of steel products: About 18 mmt in 2025 versus 5XX million tonnes in 2015.
- Iron ore concentrate: Capacity rises to 66 million tonnes per year (mmtpy) from about 29 million tonnes per year at present.

- Pelletizing capacity. It jumps to 84 mmtpy versus 21.7 million tonnes in 2015.
- DRI production. It increases to 57.7 mmtpy versus output of 23.7 mmtpy 2015.
- Pig iron output rises to 5.9 mmt from 2.2 mmt.
- Rolling mill capacity: Rises to 62.7 mmtpy versus 62.7 mmt in 2015.

These production forecasts, of course, are ludicrous because not attract the capital to pull it off. Given the "competitiveness" of the world market for steel, steel prices over the cycle will not be sufficient to support exports of 18 million tonnes in 2025.

Other key developments:

- Gol Gohar, one of the top iron ore producers, now has plans to export HBI. Under Iranian law, it can't export lump and fines.
- The government in 2015 reduced mining royalties up to 70%. There was also a "bill of exemption" of exploration on taxes and duties.
- Iranian iron ore mining costs are down about 25% in the past few years.
- There's a shortage of DRI pellet in Iran. Kurdemukh Iron Ore Company Limited (KIOCL) is currently negotiating to provide about 2.0 mmtpy of DRI pellet to Iran, which compares to the current pellet shortage of 7-8 mmtpy.
- Iranian iron ore mining cost are down about 25% the past few years.
- It's claimed that only about 7% of Iran's land mass, and area of 1.648 million square kilometers, has been explored for iron ore reserves.
- The country has 2.7 billion tonnes of definitive iron ore reserves; 2.5 billion tonnes of prospective reserves, or which about 75% is magnetite and 25% is hematite; and the an average F3 content is about 51% (versus the world at 42%).
- The distance from the iron ore mines to the steel plants is sizable. Please see the exhibit.
- The allocation of the iron ore concentrate and pellets by producer is influenced by the Ministry of Industry, Mine and Trade.
- The smaller iron ore mines and steel plants have apparently suffered. more than the large ones in recent years because they are higher cost in most instances.

### Delivery Cost to China for Selected Iron Ore Mines/Regions (\$ per metric tonne)

	Cost/ton	To port	To load	To China	Total
Sangan	>10	20	3	12	45
Kerman	> 6	7	3	12	28
Yazd	> 7	9	3	12	31
Hormozgan	> 9	2	3	12	26
Northwest	>10	11	3	12	36

IMIDRO from 2001 to 2014 sponsored 60 raw material expansion projects with a value of \$17 billion. Through 2020, another 98 projects are planned with for investment of about \$26 billion. These projects include, besides steel, zinc, copper, aluminum, gold and magnesium.

IMIDRO will spend up to \$500 million in the next five years to define and finalize new iron ore projects.

The capacity to produce iron ore pellets in Iran is 21.7 million tonnes per year, consisting of:

- 7.3 million tonnes at Mobarakeh Steel Company.
- 6.0 million tonnes at Khousestan Steel Company.
- 5.0 million tonnes at Gol-e-gohar Mining Company
- 3.4 million tonnes at Chadormalo (steel company?)

The pricing of iron ore concentrate and pellets is based on the policies of IMIDRO and the Ministry of Industry, Mine and Trade.

## THE PRICING OF IRON ORE

The price of iron ore concentrate is set to be between 11% and 14% of the Kh's billet (not slab) price. Granted a billet price of \$300 per tonne, and an average figure of 12.5%, the iron ore concentrate would be priced at about \$37.50 per tonne. This figure, by the way, compares to the VALE price realization, FOB the port of export, of \$34 per tonne in the fourth quarter of 2015.

The price of DRI pellets is set at 21.5% of the billet (slab) price. Granted a billet price of \$300 per tonne, this works out to \$64.50 per tonne of pellet. This VALE price realization, FOB the port of export, in the fourth quarter of 2015 was \$64XX per tonne. The price in Iran is quite low when considering that DRI pellet internationally sells about \$40 per tonne premium to the price of iron ore fines.

In 2013, the Iranian iron ore industry exported 23.5 million tonnes to China, ranking it as #5 in terms of supply to that country. In that year, iron ore production in Iran was 48 million tonnes. In comparison, iron ore output in the fiscal year ended March 2016 will be about 36 million tonnes. In the year ended March 2016, much of the decline in iron ore occurred at the smaller private mines, with the drop in output at the government-owned mines only about 8%. *(Note: In a number of respects, this is similar to the steel situation in China.)*

In Iran, the operating cost for the iron ore concentrate at the mine is only \$10-11 per tonne that, after freight cost, is about \$20 per tonne at the port. There's a high stevedoring cost in Iran. The country has three exporting ports for iron ore, with the average loading rate 7-8,000 tonnes per day (versus 40,000 tonne per day for the Brazilian Valemax vessels). The Iranian ore mines export their ore in 75-80,000 tonne Panamax and 45-50,000 tonne in a Supermax vessels.

The key ports are: a) Bandar Abbas just across the Persian Gulf from Oman; b) BIK (sp??) that's close to Kuwait in the north; and c) Chambara (sp??) that's close to Pakistan.

Bandar Abbas is the major port. There are two areas to load iron ore at Bandar Abbas, one of which loads by conveyor, which is Supermax vessels.

At BIK in the north, the tide varies by 3 meters. Hence, there are only three hours for ships to get into the port and/or depart from it.

The government has helped to reduce iron ore mining costs the past . Regarding the export duty:

- For pellets, its cut from 50% to 15%.
- For concentrate, its down from 35% to zero.
- For fines and lump, its remained at zero.

The cost to mine the ore varies from \$8 to \$12 per tonne. The average grade of the ore is 51%; and, it varies from 40-62%. The concentrate is often 66-68% Fe. It takes about 1.5 tonnes of crude ore per tonne of concentrate (which tends to be 67.5% Fe).

The cost to concentrate is \$3-5 per tonne.

## *World Steel Dynamics*

If the cost of the ore is \$10, this comes to \$15 per tonne of concentrate, plus \$5 cost above, which brings the cost of concentrate to about \$20 per tonne. The price of the concentrate is currently set at 15% of the Khouzestan billet price – hence, \$300/tonne for the billet  $\times 0.15 = \$45$  per tonne for the concentrate.

The pellet price is determined by formula; it's 23% of the domestic billet price (???). Some of the DRI pellet is shipped about 400 kilometers to the steel plant with a freight cost, perhaps, of \$11 per tonne by road and \$8-9 per tonne by rail. If a unit train is used, this brings the transport cost figure down to \$5-6 per tonne.

Apparently the price for DRI pellet delivered to Mobarakeh is about \$49 per tonne.

The cost to produce the sinter feed the direct ore may be about \$10 per tonne. This figure might be composed of 10-15% for labor, 40% for machinery and other operations and 25% for explosives. In addition, there's a royalty payment.

The iron ore concentrate produced by Gol-e-Gohar will be 66% Fe, but in some cases with a sulfur content of 1.6%, which is high.

There are 9 state-owned iron mines and concentrating complexes that account for about 80% of the iron ore production. In addition, there are currently about 180 private mines, with the peak at 199 mines two years ago. (*Note: Similar to India, iron ore reserves are so plentiful and easy to mine because they are at the surface, that private mines can start up and flourish when the price is high.*)

A typical overburden rate in Iran is 3.1 tonnes moved per mine 1.0 tonnes of ore.

There are no private pellet plants.

The lack of RR capacity is a major bottleneck. The RRs are state-owned. The private mines ship 100% by truck. A truck holds 25 tonnes, which a rail car holds 50XXX tonnes or IO.

The price of iron ore as a percentage of the price of billet that's assumed for this exercise at \$300 per tonne. The figures are:

- 7% for lump, or about \$21 per tonne.
- 12% for concentrate, or about \$36 per tonne.
- 24% for pellet, or about \$72 per tonne.

If Iran is to produce 55 million tonnes of steel in 2025, it will need to produce about 159 million tonnes of iron ore; that is, if iron ore imports are to be low.

Existing mines have 2.5 billion tonnes of proven reserves. Overall, there are about 9 large government-owned mines and 190 private ones. A number of these mines will be depleted in 8-10 years.

Iron ore output in fiscal 2016, ended March 2017, will be about 42 to 45 million tonnes. Capacity is about 60 million tonnes. About 90% of the private sector mines are closed at present.

When output was 56 million tonnes in 2013, this included 23 million tonnes for export. Exports were stimulated by India's export constraints as its government sought to end illegal mining.

If Iran needs to produce, let's say, 150 million tonnes of iron ore in 2025, this compares to existing capacity of about 60 million tonnes per year. If 20 "big mines" with a capacity of 100 million tonnes of capacity need to be developed at a capital cost of \$50XX per tonne, this is a capital outlay of \$5 billion.

The current average depth of drilling at the government-owned open pit mines is 10 meters, which is less than the figure in some other countries. Most of the new mines are in the NE, SW and middle region of the country. Mobarakeh is planning a new mine close to its Hormozgen subsidiary, that's close to the port.

In 2013 and 2014, when export surged, a number of the mines had a profit margin of 50%. The current figure is 5-10%.

About 0.5 cubic meters of water are needed per tonne of iron ore concentrate.

IMIDRO expects to boost iron ore reserves by 50% to about 3 billion tonnes. It is exploring 250,000 square kilometers in about 20 "sections" of the country. It thinks there are about 300 "promising zones."

The ore from Gol-e Gohar, one of the leading iron ore providers, is processed into a 67% Fe magnetite in concentrate form that's good for DRI.

When exporting iron ore, the Iranian ports are not as deep and the loading facilities not nearly as efficient as those in Australia and Brazil, for example. Typically, an 80,000 tonne ship is the maximum size to carry iron ore from Iran.

In 2025, if iron ore iron ore rises to about 150 million tonnes for fines and lump, concentrate output might be about 120 million tonnes versus 22XX million tonnes the present time. DRI pellet output

would be 80-90 million tonnes versus about 18 million tonnes present. DRI output could be about 70 million tonnes versus XXX million tonnes present.

In the mid-southern Iran, in the region of the Gol-e Gohar mines, a 340XX kilometer pipeline has been constructed that carries salt water to the region where it is desalinized in thermal power plants.

Much of the Iranian iron ore, which is often about 51% Fe; and, contains more-than-desired amounts of sulfur and phosphorus. Hence, an extra several dollars per tonne of expense is incurred when creating the iron ore concentrate that's good enough to be processed into pellets for the country's 22xx DRI plants.

As in India, medium-grade iron ore is plentiful in the country especially in the remote northeastern region of the country. However, new Iranian reserves face challenges including: a) some of them are underground; b) some are quite distant from the steel mills; c) good rail systems to carry the ore don't exist; and d) there's a severe shortage of water in the country, in general, and in the new contemplated mining regions, specifically.

The price of IO and pellets is based on the IMIDRO policy. The price of concentrate is set at 11-14% of the slab price. If the slab price is \$375 per tonne and the average figure for the concentrate is 12.5%, this comes to \$47 per tonne. Pellet is set at 21.5% of the slab price = \$81 per tonne, which is the price before the 9% value added tax.

As indicated in the accompanying exhibits:

- The international IO price is down from \$168 to about \$45, while the local price for 62% ore is up from 797 Rials to 1,784 Rials per tonne (which is about \$59 per tonne). Sinter feed and lump for the BF tends to be 10-30 mm in size.
- The price of 67-68% Fe pellet is \$78-80 per tonne.
- The price of sponge iron with 4-5% gangue is \$170 per tonnes in the domestic market.
- The cost of electricity is up from 375 to 621 rial/KWH, or 1.77 cents in US per KWH.
- The inflation rate in Iran in 2016, it's hoped will be 10-12%

The international iron ore price will likely be so low at times, in WSD's opinion, that this development will likely discourage new investment in Iranian iron ore mines. Currently, for the three major international iron ore companies (Vale, BHP Billiton and Rio Tinto), the average cost of sinter feed delivered to Brazilian and/or Australian ports is probably no more than \$15 per tonne. In its latest quarterly report for the fourth quarter of 2015, Vale shows an operating cost figure of \$12 per tonne for sinter feed and \$44 for iron ore pellets.

Fortescue, a new major Australian mining company, is currently producing about 165 million tonnes per year of sinter feed. Its cost may be only about \$20 per tonne. And, Roy Hill, a new Australian mining company, by year-end 2016 seeks to ramp up its facilities to an annual rate of 55 million tonnes.

Hence, given that Chinese iron ore demand is likely to lower in the years ahead due to reduced steel consumption, and even after assuming a sizable decline in Chinese concentrate production, a global glut of iron ore seems to be the likely condition. If so, an average price of 62% Fe iron ore delivered to China of \$45 per tonne could prove to be an optimistic figure.

The current massive oversupply of Capesize vessels will also be holding down ocean freight rates. Currently, the spot Capesize freight rate for iron ore from Brazil to China is only about \$5.50 per tonne versus a figure that at times was well above \$20 per tonne in recent years; while the rate from Australia to China is now only about \$3 per tonne versus a \$8-10 per tonne figure often in recent years.

In the fourth quarter of 2015, VALE's cost of sinter feed was only about \$12 per tonne delivered to the port of export including, while its price was about \$27XX per tonne). Its pellet operating cost was just \$44 per tonne versus its price of \$XXX per tonne.

Iran has 146 mines with 2.7 billion tonnes of definite reserves and 2.5 billion tonnes of prospective reserves – with the ore being about 75% magnetite and 25% hematite. The average FE content is about of 51%.

The four biggest producers of concentrate are Chadormalou, Golegohar, Contral Iron Ore and Mobarakeh. These producers have 12 development plans that will boost nominal capacity to 35.3 mmpy. Expansions include 5 mmpy for Mobarakeh at Sangan, 6 mmt for Goharzamin in Kerman region, and 1.6 mmt for Saba in Hamedan.

Pelletizing capacity is currently 50 mmpy, with four additions boosting output by 11.5 mmpy.

A major deposit in Gol-e Gohar has a high sulfur content; hence, new flotation systems are being installed that boost the iron content of the pellet to 67.5%. The goal is to have a maximum sulfur content of 0.008%.

At Gohar Zamin, the plan is to install 10 mmpy of concentrate and 10 mmpy of DR pellet capacity, with an iron content of 67.1% and the size of the pellet ranging from 9 to 16 mm.

When the DRI's carbon content is about 2.5%, the kWh requirement per tonne is only 400; while with a 1% carbon content, the kWh required is about 700 per tonne.



Gol Gohar has six mining areas with IO reserves at 1.25 billion tonnes. The company is putting in a 500 MW combined cycle power plant, and is planning to desalinize salt water arriving from the Persian Gulf (about 350 kilometers distant).

Iran has 33 Midrex plants with a planned capacity of 30.3 mtpy. Of those in operating = 11 have a DRI capacity of 18.0 mtpy; and, 11 are under construction or planned with a capacity of 12.3 mtpy.

## **DISCUSSION WITH GOLGOHAR MANAGEMENT**

The company has a major mine at Golgohar and one to the east at Goharzamin. The company's current reserves are 650 million tonnes, of which 240 million tonnes are open pit. Others are underground. It is building two new concentrate lines that in six months will have an additional 2 million tonnes of annual capacity. Further, another 5 mtpy is planned in about a year. This will bring its concentrate capacity to about 11 mtpy. Output at present is 4 million tonnes per year of concentrate up to 68% Fe. It's all DRI grade.

There are two separate companies that, combined, are producing 5 mtpy of pellet. They are bringing on an additional capacity of 5 mtpy in the next month. Hence, Goharzamin next year will have 5 mtpy of pellet capacity versus none today. Both companies will have 15 mtpy of pellet.

The Golgohar management is also planning to produce steel and DRI. Currently, it has a Danieli plant under construction with a capacity for billet of 1.0 mtpy. This new plant is 48% complete; but, construction is currently at a "slow speed" because they need \$90 million of additional capital from outside investors to complete it. The steel plant is near Golgohar is about 350 km from the port. The pellet for the DRI plant is brought in from their existing mines.

They also have a tender outstanding to build a plant with 1.0 mtpy of DRI capacity and 1.0 mtpy of billet capacity. The cost for this facility is estimated at 400 million euros.

The Golgohar group also includes Gohar Energy that operates a 500 megawatt power plant and is building 320 megawatts of new capacity. They are planning another 700 megawatt facility, which will bring total capacity to 1,520 million MW.

Golgohar is managed as a private company even though it's owned by the banks and the retirement funds. The key bank is Sepah Bank. Its income in the current year ending in March 2016 may be

## *World Steel Dynamics*

only about \$150 million. In 2014, they earned about \$250 million; and, \$500 million per year before that.

In the current fiscal year, the group will export about 3 mmt of concentrate and sell about 1.5 mmt of concentrate domestically. They also produce 5 mmt of pellet, none of which is exported. No DRI is exported. However, they are positioned to export 2.0 mmt of HBI once capacity is expanded.

Golgozar pays about \$6 per tonne for the iron ore fines from Gohar; and, it needs 1.5 tonnes per tonne of concentrate = a cost for the iron ore per tonne of concentrate about \$10 per tonne. They, they pay \$6 per tonne of royalties and fees to the government. Operating costs are about \$7 per tonne. Overall, the cost for the concentrate is about \$23-24 per tonne.

The DRI pellet has a concentrate cost of about \$30 per tonne, which includes a profit for the producer of the concentrate, plus \$20 per tonne of other costs, for a total of about \$50 per tonne.

The export price today for DRI is \$155 per tonne. The cost to ship it to the port is \$10 per tonne. Hence, their ex-plant price realization is \$145 per tonne.

The G cost of the DRI could be as follows (PFM estimates):

- Pellet at  $\$50 \times 1.5 = \$75$ .
- Plus: Natural gas = 11 million BTU at \$1.20/mmbtu = \$13.20
- Plus: Cost above at \$45 per tonne
- Equals: The ex-plant cost at about \$135 per tonne, or \$145 per tonne delivered to the port, for a profit of \$10 per tonne granted a sales price of \$155 per tonne for DRI not in the form of hot-briquetted iron.

There is a XXX km pipeline bringing salt water from Bandar Abbas to the Gol-e Gohar iron ore mines. The salt water is desalinized in thermal power plants. They need 4.2 cubic meters of water per tonne of concentrate (need to double check this). The pipeline cost \$1 billion to build, with 47% funded by Gol-e Gohar and 53% by others.

The cost of water is 0.058 Rials per cubic meter, with the desalinized water at about 0.09 Rials per cubic meter. G borrowed \$330 million of European funds at 6% to build the water pipeline (and the desalinization plant?)

Overall, Golgozar has \$6 billion of facilities under construction – but, currently reduced prices is a problem for their profits and cash generation. END OF GOLGOZHAR DISCUSSION

#### Other steelmakers' raw materials"

- Coking coal in Iran is considered to be relatively high cost and only mediocre in product quality. Coking coal reserves are about 261 million tonnes. The price in Iran is about \$150 per tonne.
- Annual demand for steel scrap in Iran is about 4 million tonnes, with the domestic supply at 2.0-2.4 mmtpy.

### **IRANIAN STEEL: ON THE FORWARD EDGE**

The Iranian steel industry currently producing at a rate of about 16 mmtpy. Of this amount, about 70% of output is in the hands of the public companies that are operating at a higher rate of capacity than the private companies.

In the past 15 years, IMIDRO, the key metals industry association, has authorized \$16 billion of projects and created 70,000 jobs. It's now planning 29 projects for \$9 billion; and, by 2025, another series of projects with a cost of \$20 billion.

The four major steel companies in Iran:

- Mobarakeh: Current capacity at 6 mmtpy. Longer-term plan to be produce 12.5 mmtpy just at Esfahan.
- Khouzestan: Current capacity at 2.4 mmtpy of slab/billet/bloom. Production to be boosted to 5 mmtpy at Ahvaz
- Esfahan: Current capacity 3.5 mmtpy, via the blast furnace/BOF route, for bloom and long products. It's now building a fourth blast furnace.
- Hormozgan: Current slab capacity at 1.5 mmtpy to be boosted to 3.0 mmtpy; and, then, to 6 mmtpy. Location is close to Bandar Abbas port.

In 2014, Iranian steel product demand was 10.0 mmt for flat products and 8.1 mmt for long products. Mobarakeh's share of the flat rolled market was about 60%.

In 2014, Iran produced:

- 20.7 million tonnes of pellet and imported 8 million tonnes.
- 24.1 tonnes of concentrate and exported 0.5 mmt.

- 52 million tonnes of iron ore and exported 20.1 million tonnes. About 97% of the iron ore exports were to China. Peak exports were 23.6 million tonnes in 2013. In 2015, exports were only XXX million tonnes.

Key new projects in Iran:

- Charahar Steel on the eastern portion of the South Coast. The port is XXXX. Planning a 5 mmpy plant, with iron ore coming from Iran and Afghanistan. Project cost at \$2.15 billion.
  - At Bandar Abbas, a new 5 mmpy steel plant for an investment of \$3 billion. New 6 mmpy jetty for unloading.
  - At Parian SEZ, new plant with 1.6 mmpy of capacity. Cost at \$0.8 billion.
- Iranian steel companies tend to be low cost due to the low prices paid for natural gas and electricity; and, as well, competitive iron ore costs. Please note that we convert Iranian costs to U.S. dollars at the black market rate of 35,000 per U.S. dollar rather than the official rate of 30,000 per U.S. dollar.

Labor productivity at Iranian steel plants tends to be poor because the government wants to maximize the number of workers employed. Mobarakeh has 15,000 workers, which probably is more than double what it needs.

The government sets the amount of wage increase and, as noted, is resistant to efforts to boost labor productivity since there's a high unemployment rate in the country.

- Government-owned steel mills pay among the highest hourly wages in the country.
  - About 80% of the steel production is by government-owned companies, with the government-owned companies have a higher operating rate.
  - The steel mills' common stocks tend to trade on the Iranian stock exchange.
  - There's been an immense drop in profitability for both the steel mills and the iron ore companies the past two years.
- The iron ore companies are no longer able to ship 25 mmpy to China at a high price.
- The steel mills only garner very low prices when exporting – in fact, the price is not far from the Chinese export price except when steel is shipped to nearby users in the Middle East. The Iranian steel export prices is directly impacted by the world price.
- There's a major water shortage in Iran especially in the northeast where a number of new iron ore mines are planned.

- Iranian steel mills are short of money because of the high interest rate paid for domestic loans – down recently to 20% from 27% - and current spending plans beyond their means.
- Some steel mills have access to lower-cost offshore loans (which is OK for them as long as the currency does not weaken massively).

Some of the Iranian steel plants are not modern and, as well, have a bad location. Transport cost is high.

The steel mills are now being "privatized," with ownership transferred to government-owned institutions, which means that there will be no financial subsidies from the government.

Currently, there are four wide HSMs in the country. Mobarakeh is planning to build another one at its Hormozgan subsidiary; and, as well, at this plant boost its steelmaking capacity to 3.0 mmpy from 1.5 mmpy. The hot strip mill is a traditional one – i.e., not a thin-slab/hot-strip-mill unit.

The country has 22 DRI plants, with a capacity of about XXX million tonnes per year, and three blast furnaces at Esfahan Steel with a capacity of about XXX million tonnes per year. Currently, there is major new DRI capacity under construction, as well as one additional blast furnace at Esfahan Steel.

Natural gas is plentiful and cheap, in part because it can't be exported. The price of natural gas is currently \$43.54 per 1,000 cubic meter (for Mobarakeh's SABA plant, which has a DRI complex), with each cubic meter of natural gas containing about 34,500 BTU. Hence, about 39 cubic meters are needed for 1.0 million BTUs of energy. Given that the price is \$0.04354 per cubic meter  $\times 29 =$  \$1.26 per million BTU for natural gas. If consumption in the DRI plant is 9.6 million BTU, this comes to \$12.16 per tonne – which is a very happy number.

## **CURRENT STEEL AND RELATED CAPACITIES IN IRAN**

DRI and liquid steel capacity is current "in balance" in Iran. The shortfall is 10-12 mmpy of pellet capacity and good quality iron ore concentrate. Some of the iron ore concentrate is not acceptable due to too much moisture and the wrong size to produce good-quality DRI. Overall, says a contact, Iranian DRI has high gangue, low metallization at 91%, and a low carbon content at 1.7%. Also, there's no hot-charging of DRI into the EAFs. Therefore, the DRI that's produced in Iran cannot be used as efficiently in the EAF compared to some other countries.

Much of the long product capacity is for rebar. Only a few wire rod mills.

The country is lacking a good rail and large section mill, says a contact. And it has only

two old seamless mills. It has no stainless pipe mill for usage in petrochemical plants. Also, it needs to upgrade its steel sheet rolling mills.

There's a shortage of good quality CRC capacity, say our contacts.

There's a need for more tinplate capacity, with domestic production at 100,000 tonnes per year versus imports of 200,000 tonnes per year.

Also, there's no mill in Iran that produces stainless pipe for use in the petrochemical industry.

Electric power plants need better fume control and water treatment facilities.

## **DIRECTLY REDUCED IRON**

Iran has 22 mmpy of pellet capacity now and 10 coming on, for a total of 32 mmpy. It will have at least 25 mmpy of capacity under construction in the next 10 years, for a total of about 70 mmpy. The figure in 5 years may reach 60 mmpy.

Esfahan Steel, the only BF/BOF producer in the country, has three BFs (two at 2,000 cubic meters and one at 1000). Plus a third at 2.000 cubic meters under construction.

50% Fe iron ore costs about \$11 per tonne at the mine; 66% concentrate is about \$35 per tonne and pellet is about \$63 per tonne. **DRI is priced at about \$148 per tonne.**

Regarding the DRI price, the companies sell in the local market at a price equal to 51% of the Khouzestan billet price; but, this year, this has been cut to 46% of the billet price.

In 2015, steel demand in Iran was roughly 45% for long products and 55% for flat products – which is unusual for a Developing Country (for which demand for long products tends to predominate due to the high level of construction activity).

## **IRANIAN STEEL COMPANY FINANCES**

Despite their mostly favorable cost position, most of the Iranian steel mills are seriously short of funds. First, they were in the midst of major capital spending programs when the global market turned down in 2015. In all cases, iron ore and the steel company profitably has plunged since early 2014 – in many cases down at least 70%. Hence, the mills lack the cash flows to sustain some of their capital spending programs. In Mobarakeh's case, its EBITDA margin – the EBITDA to sales ratio – has plummeted to about 5% from about 30%.

The signs are few that the Central Government is about to provide sizable new funds; although, it's been willing to reduce mining royalties and begin to erect more sizable barriers against low-priced foreign steel deliveries. The central government in recent years has shifted ownership of a number of the companies to government-owned financial institutions.

In early 2016, steel demand in Iran is weak because of lower fixed asset investment spending due to lower oil prices.

Iranian corporations pay an income taxes that is 25% of pretax income. Also, there's a 9% value added tax, with two-thirds of the proceeds apparently going to cities and towns in the vicinity of the steel plant. *(Note: However, unlike China, the local municipalities don't own a good share of the steel companies; and, as well, appoint the top executives of the company. Also, in China, the local municipalities receive sizable revenues from the sale of land at an attractive price to groups seeking to build new manufacturing facilities.)*

## RISKS FOR IRANIAN STEEL

The companies are facing a series of risks and challenges:

- The value of the Iranian Rial. The prospect for the Iranian Rial is a big risk. If it weakens sharply, the funds borrowed on a U.S. dollar basis, or euro basis, become far more burdensome to repay because of the amount of loans outstanding when converted to Rial has climbed so sharply. Yet, a major appreciation of the Rial would push up costs on a U.S. dollar-denominated basis. Steelworkers wage increases in the past five years have probably risen at least 15-20% per year as mandated by the government; and, the government is resistant to moves by the companies to reduce the size of the work force. Hence, if wage boosts remain high and the current is strong, labor costs rise exponentially. *(Note: In effect, the government is benefitting the workers far more than if they were unionized.)*
- Very few Iranian steel companies, if any, have ownership in "downstream" steel-consuming units outside of the country.
- The government will likely continue to boost the prices for natural gas and electricity.
- Iranian steel product quality needs much improvement.
- There's a significant pollution problem, not only in the steel industry, but in Tehran, where the population may be 13 million.
- The country lacks a rail and large section mill.
- Seamless tube plants are antiquated.
- The Iranian Revolution occurred in 1979. Hence, many of the key executives in the Iranian steel industry, and other Iranian industries, have lived in a cloistered world perhaps with less awareness of what's going on abroad than would otherwise be the case.
- A number of the new iron ore deposits in the Northeast are: a) is sizable huge distance from the steel plants; b) may have an ore body that's 600 meters underground; and c) very short of water. As says a contact: "There's no water."
- The quality of the Iranian iron ore is somewhat sub-par, which means that extra expense is incurred to lessen the amount of sulfur and phosphorus that's contained in the pellets that feed the DRI plants. Iron ore pellets tend to be imported from Oman and Bahrain.



- Iran has an inadequate rail system, which means that the cost to transport the iron ore by truck in a number of instances is high.
- The price of iron ore and coking coal in Iran are now at or above the international price because prices are down so much internationally.
- **No steel mill in the country produces steel sheet for the skin of automobiles.**
- The steel mills and IMIDRO don't have available government capital for the massive capital spending program. They need enormous offshore financing. The current interest rate on debt in Iran is 20%, down recently from 27%
- A number of the steel plants are poorly located to serve the market and transport costs are high. The country's railway system is inadequate.
- **Coking coal is expensive at about \$150 per tonne and poor in quality.**
- The steel mills don't have good import protection. The duty against Chinese steel is only 10%, which is not low enough to keep them out.
- Profit margins have been crushed in the steelmaking, rolling mill and mining sectors.
- Mobarakeh's profit margin is down to 3% versus far higher in prior years. Its profit is down to 450 rial per tonne in the fiscal year ending March 2016, versus 14% in the prior fiscal year; and, 28-30% in the two fiscal years before that. One problem is ultra-low prices when exporting. *(Note: Based on the January 2016 World Cost Curve figures, the average cost Iranian steelmaker has losing \$XXX per tonne, when exporting.)*
- The Chinese don't pay attention to the 10% duty on steel coming into Iran because it's so low.

According to a contacts, billet sells for \$277 per tonne in the local market, rebar ranges from \$335 to \$339 per tonne, wire rod 5.5-6.5 mm in diameter is \$372 per tonne, HRC is \$380 per tonne for product 15 mm thick and up (\$408 for 8-15mm thick and \$437 for 3-6 mm).

WSD's World Cost Curve analysis: Iranian steel company costs

The price of steel in Iran per tonne is about as follows says a contact:

- Billet at \$277.
- Slab at \$324.
- Rebar at \$335 +/-
- HRC at \$437 (3-6 mm thick). Yet, the export price in December 2015 was only \$275/tonne.
- HRB at \$408 (8-15 mm thick).
- HRB at \$380 (15+ mm thick).
- Iron ore at 50% Fe at \$11.
- Iron ore concentrate at 66% Fe at \$35
- Pellet at \$63. (Note: Currently at 20% of Khozestan billet price versus 23% before.)
- DRI at \$148 for 91% Fe content. Price is set at 51% of Khozestan billet price.
- Tinplate at \$732

The average prices for steel products on the Iran Merchandise Exchange from March 22, 2015 to December 19, 2015 was as follows: (Question: Excluding the 9% VAT?)

- Rebar at \$379 per tonne.
- Bloom at \$331 per tonne
- Slab at \$375 per tonne.
- Hot-rolled band at \$430 per tonne.
- Cold-rolled sheet at \$552 per tonne.
- Galvanized sheet at \$593 per tonne.

Iranian price of electricity (presumably for Mobarakeh)

Year	Rials/kWh	\$/kWh
2015	621	0.0177
2014	540	0.0154
2013	454	0.0129
2012	379	0.0108
2011	375	0.0107

Iranian price of natural gas

Year	Rials/m3	\$/m3
2015	1,580	0.0451
2014	1,566	0.0447
2013	821	0.0235
2012	702	0.0201
2011	700	0.0200

**Iranian Domestic Ore Price versus Price Delivered to China**

(at the concentration plant (?))

Year	Iran Rials/tonne	Iran \$/tonne	Chinese CFR to China \$/tone
2015	1,784	51	168
2014	1,784	51	138
2013	1,758	50	128
2012	1,337	48	90
2011	797	43	47

Mobarakeh Sales Price, Production Cost, Operating Profit (EBITDA)  
(Hot-Rolled Coil \$ per tonne at 35,000 Rial/\$)

Fiscal Year	Price	Prod'n Cost	EBITDA Profit	EBITDA Margin
2015	435	423	13	3%
2014	495	424	71	14
2013	484	338	146	30
2012	337	243	94	28
2011	233	196	37	16

## MOBARAKEH COST ANALYSIS

Operating costs are low because of the low price paid for natural gas and electricity. And, it has its own iron ore mines, pellet plants and DRI plants, which adds greatly to profitability. The company is also well located to serve its customers, with whom it has a market share of about 60% in steel sheet products.

The company's CEO, Bahram Sobhani, is recognized as the leading manager in the steel industry when it comes to detailed knowledge of operations from an engineering point of view, big-picture perspectives, hands-on management skill and a forward-looking attitude. Mr. Sobhani is a self-confident, trustworthy and people-oriented individual. There are not many executives like him in the global steel industry in the opinion of Peter Marcus.

WSD's process-by-process cost analysis January 2016 is as follows:

Comparison Mabarakeh and WSD's World Cost Curve Cost Systems  
(\$ per tonne as of January 2016)

	<u>Mabarakeh Cost System</u>			<u>WSD WCC</u>	
	<u>Home Price</u>	<u>Cost</u>	<u>Margin w/o plant o'head</u>	<u>Cost</u>	
Coke					
Concentrate	57	57			
Pellet	69	65	4		
Pig iron		--			
DRI	160	123	27	124	
Liquid steel		--	--		
Slab	329	237	92	240	
Hot-rolled coil		415	259	56	265
Pickled coil	425	279	46	287	
Hot-rolled sheet	431	275	56		
Full Hard CR coil	492	302	90		
CR coil	533	360	273	351	
Cold rolled coil sheet	544	425	119		
Galvanized coil	604	387	217		
Painted coil	701	494	207		
Tinplate	737	630	107		
Selling expense		11			
Administration		17			
Plant overhead		28		30	
Subtotal CRC		388		381	
Depreciation expense			12		10
Interest expense		48		40	
Pretax cost CR coil		420		431	
SABA HRB	426	493			

### Mabarakeh Budget for Fiscal Year Ended 3/2017

(Per tonne based on 6.0 million tonnes of steel deliveries and the Rial at 35,000 per U.S. dollar)

SHARE OF COSTS		
Administration costs	\$ 17	
Sales expense		\$ 11
Interest cost	\$ 48	
Contractors	\$ 9	
Services	\$ 23	
Gas, water, electricity	\$ 45	
Labor cost	\$ 59	
Rolling cost	\$ 2	
Consumption material	\$ 15	
Raw materials		\$156 (41%)
• Iron ore (16%)	\$61	
• Iron ore transport (3%)	\$11	
• Pellet (13%)	\$49	
• Scrap (2%)	\$ 8	
• Ferroalloy (4%)	\$15	
• Others: Tin, zinc, .... (3%)	\$11	
SUBTOTAL w/out depr. expense	\$386 per tonne (100%)	
Depreciation expense		\$ 12
TOTAL Pretax	\$398	

For hot-rolled band (HRB), Mobarakeh Steel's operating cost appears to be just under \$300 per tonne when including plant overhead items such as sales expense and administrative expense. Reasons for such a favorable cost position, besides some reasonably good facilities, include: a) the low prices for natural gas and electricity; b) the reasonable price for iron ore; and c) wages rates are not excessive by global steel industry standards, even though they have risen sharply in recent years.

Overall, it appears that steel prices in Iran are not particularly high by relative to those in a number of other home markets

A positive for the country is the relatively low cost to build steel-industry-related capacity. Iranian engineering and construction companies can build good quality DRI facilities at a low cost – perhaps one-third less than that elsewhere in the world. During our visit, a number of contacts claimed that a state-of-the-art DRI plant could be built in Iran for about 30% less than a comparable facility in

the West. *(Note: Nevertheless, in China, steel plant construction costs could be 20% less than in Iran per tonne of capacity.)*

## **IRANIAN STEEL DEMAND OUTLOOK**

WSD expects that steel demand growth in Iran will be sizable in the next decade because fixed asset investment (FAI) will be rising so sharply. Hence, FAI will be rising as a share of GDP. WSD expects the substantial expansion of the Iranian economy to be further validation of the "Capital Fundamentalism" economic theory whereby an economy, and steel consumed in the economy, rises sharply when FAI is rising as a share of GDP. Such a situation causes the steel intensity of the economy to rise sharply. And, as infrastructure improved substantially, manufacturing companies find themselves in an ever-more-supporting environment in which it makes sense to expand and prosper.

The economy in China is the best recent example of the applicability of the Capital Fundamentalism economic theory, with its ratio of FAI to GDP rising from about 0.38 in 2000 to about 0.48 in 2014 – and, perhaps up again in 2015.

Here's an amazing example of the impact of sharply rising FAI for a number of years. In China, rebar demand in 2015 was about 205 million tonnes, down from 215 million tonnes the year before. However, this figure compares to only about 8 million tonnes in the United States.

WSD forecasts that per annum compounded growth of Iranian steel demand to 2025 will be about 7% per annum. If so, given that steel consumption in 2015 on a crude steel equivalent basis in 2015 about 16 million tonnes, the figure in 2025 rises about 97% to 32 million tonnes. If, at that time, the country's steel product net steel product exports, on a crude steel equivalent basis, amount to 8 million tonnes, steel production would be about 40 million tonnes – which WSD would characterize as a mid-high forecast.

Of course, a steel production gains of this magnitude, including the supporting rolling mill facilities, would require a massive capital outlay in the Iranian steel industry. At a cost of \$1,200 per tonne of additional capacity, the 24 million tonne boost in capacity would require capital spending of \$30 billion – plus, perhaps another \$3 billion on normal capital outlays and an additional figure \$5 billion for Iranian iron ore mining companies.

Granted that the Iranian population grows by 2025 to 90 million from 80 million, per capital steel consumption for Iran in 2025 could be XXXX per person, which compares to the current figure of

XXXX per capita. The figures for China, South Korea, Japan and the USA are XXX, YYY, AAA and ZZZ, YYY, respectively.

A steel production figure of 40 million tonnes in 2025 presumes:

- The Iranian government may continue to raise natural gas and electricity prices in order to help pay for ever-more-expensive social programs.
- The global steel industry environment will be competitive. Former "rising stars" will be crashing to earth. The craters and explosions that occur when this happens will cause "collateral damage" to steelmakers globally.
- Iran may likely be tardy in creating the sizable infrastructure improvements that are so essential.
- Steel scrap prices will be relatively low reflecting the sizable rise in China's reservoir of steel scrap that's 10-40 years old.

Key perspectives on Mobarakeh: Iran's leading steelmaker.

Mobarakeh was established in 1991. Steel production started in 1993. It has 8 200-tonne EAFs under one roof and 11 mmpy of DRI capacity.

Its current capacity to produce steel sheet products is 6.56 mmpy, with competitors at 6.10 mmpy, for a total of 12.66 million tonnes per year. In 2016, the demand for sheet products, excluding exports, is forecast to be 8.87 million tonnes, with the figure growing to 14.22 million tonnes in 2025 – which is a compounded growth rate over 9 years of 5.4% per annum.

Mobarakeh is operating its facilities at more than 90% of capacity, which is one of the highest operating rates in the country.

The company is the largest integrated producer in the Middle East – with its main plant near Esfahan plus two steel-producing subsidiaries, Hormozgan Steel Complex and Saba Steel Complex.

Mobarakeh seems well positioned versus its domestic competitors for a variety of reasons including: a) low production costs; b) dominant position in steel sheet products; c) low cost expansion; d) offshore clients; e) solid management; f) company owned pellet capacity, g) company-owned iron ore mines; h) sizable benefit from M&A transactions in prior year, including ownership of two other

steel companies; i) low cost inputs for natural gas and electricity; and j) a well trained and loyal workforce.

We doubt that many other Iranian steel companies will be able to keep pace with Mobarakeh due to: a) funds shortages; b) relatively higher-cost expansions; and c) not able to match Mobarakeh when it comes to improvements in product quality including the production of automotive sheet. Currently, there are only five hot strip mills in the country, of which Mobarakeh owns two, with the other two devoted to downstream applications such as welded pipe and XXXX.

The Hormozgan steel plant is only 300 km from the port of Bandar Abbas, which is good for export. Its capacity is being boosted from 1.5 to 3.0 mmtpy; and, this figure could be doubled at some point to 6 mmtpy.

The operating rate data for steelmakers in first half of fiscal 2015-2016, ending in September 2015, indicates that Mobarakeh fared the best:

- Mobarakeh Steel with subsidiaries. Output of 3.69 mmt = 95.7% operating rate including Hormozgan Steel Complex and Saba Steel Complex.
- Khouzestan Steel. Output of 1.72 million tonnes = 86.1% operating rate.
- Esfahan Steel. Output of 1.17 million tonnes = 78.2% operating rate.

Mobarakeh's current crude steel capacity of 7.5 mmtpy is planned to be expanded to 14 mmtpy by 2020.

Regarding Hormozgan Steel near Bandar Abbas, it has signed an agreement with NISCO and SMS to build a new 1.5 mmtpy slab caster.

Mobarakeh is commissioning a new pelletizing plant to feed its DRI plants. The 5 mmtpy beneficiation and pelletizing plant, located in Khorasan Razavi province – i.e., the Sangam mine – will start production in the next fiscal year. The company is also commissioning 1.5 mmtpy of DRI capacity at its Sepid Dasht subsidiary; and a 900,000 tpy expansion of the thin-slab unit at Saba Steel.

The company is also considering the import of some pellets.

Iranian steel exports in 2015 included 750,000 tonnes by Mobarakeh, 700,000 tonnes for Khouzestan Steel and 400,000 tonnes for Esfahan Steel.



Mobarakeh's common stock is listed on the TME (Tehran Metal Exchange) with a current market value of \$XX billion – and, a peak market value of \$XX billion in 2014XX.

The company employs about 15,000 people at Esfahan. The average age of the Mobarakeh worker is 39 years (while at Hormozgan Steel subsidiary it's only 30 years because the company only began steel production in 2010). The educational breakdown of the Mobarakeh worker is 2% are illiterate, 30% don't have a diploma, 46% have a diploma and 57% are expert workers, technicians or engineers.

The average worker works 44 hours per week. Assuming they get a month off – i.e., if we assume 47.5 weeks per year  $\times 44 = 2,090$  hours worked per year per worker. If the average wage is \$27,000 per year including all benefits, this is a wage cost of about \$12-13 per hour.

Workers receive bonuses based on production and performance.

The wage cost paid by Mobarakeh is very high compared to the average wage cost in the country. For Mobarakeh, its employment cost including all social benefits appears to be about 2,000 euro per month, or about \$26,000 per year. This works out to about \$12-13 per hour worked.

In Iran, there are no drug or drinking problems. Hence, there's no need to engage in random drug tests (that, in fact, are not permitted by the unions in some countries).

Each day about 160 buses and mini-vans deliver the workers to the Esfahan steel plant.

The company is shifting its product mix to higher-specification steel products.

In the fiscal year ended March 20, 2017 (i.e., 2016), the flat-rolled steel market in Iran is forecast to be 10.07 million tonnes, with Mobarakeh providing 6.56 million tonnes of this amount – including 3.9 million tonnes of hot-rolled band (market share of xx%), 0.35 million tonnes of hot-rolled pickled and oiled coil (market share of xx%), 960,000 tonnes of cold-rolled coil (market share of xx%), 510,000 tonnes of full-hard cold-rolled coil (market share of xx%), 610,000 tonnes of galvanized coil (market share of xx%), 130,000 tonnes of pre-painted steel (market share of xx%) and 100,000 tonnes of tinplate (market share of xx%).

By 2025, the company forecasts that that Iranian steel market demand will rise to 16.150 million tonnes, which is a 5.6% per year increase compounded. *(Note: This forecast seems reasonable if fixed asset investment in the country rises as expected.)* The largest forecasted gain is for galvanized sheet and coil, at 9.7% per year, with the lowest for hot-rolled band at 4.3% per year compounded.

## *World Steel Dynamics*

Flat products demand in 2025 at 16.15 million tonnes is forecast to be construction at 52%, automotive at 14%, rerolling, drawing and coating at 13%, energy at 11%, appliance at 4%, machinery at 3% and packaging at 2.

Hormozgan Steel, which began production in 2010, is in the process of boosting its slab capacity to 3.0 mmpy from 1.5 mmpy.

Existing Iranian pellet capacity for the four producers is 20.4 mmpy, with eight expansion bringing the total to 55.1 mmpy. Of the 34.7 mmpy of expansion, the amount for Mobarakeh including its subsidiaries is 9 mmt including 2.5 mmt at Khorasan Steel Complex and 6.2 mmt at Sangan.

The current price that Mobarakeh pays for "fine" iron ore concentrate is about \$47/tonne delivered to its steel plant. The usage requirement for this product is 5 million tonnes per year. Coarse concentrate is priced at \$43/tonne ex-works, with a 3 million tonne usage requirement. The transport cost to Mobarakeh for the concentrated ore is about \$15 per tonne. The cost of pellet from the internal market is \$72 per tonne, including (???) \$15 per tonne of freight.

The cost of imported pellet at the Bandar Abbas port is about \$80 per tonne. Then, the extra expense to deliver it to Mobarakeh includes \$8 per tonne for customs clearing and \$20 per tonne for freight = \$28 per tonne.

In 1998, Mobarakeh increased the capacity of its hot strip mill to 3.2 mmpy from 2.4 mmpy. It also completed two new 1.5 mmpy DRI "Mega-mods" in 2014.

It has recently completed the Module B of the 1.5 mmpy Shahid Kharrazi DRI unit.

The Sangan expansion project includes 3 mmpy for the production of pellets, with sufficient concentrating capacity.

In 2014, Mobarakeh's domestic sales were 4.41 mmt and exports were 1.48 mmt.

Mobarakeh's capacities, including its subsidiaries are as follows:

- Esfahan at 5.2 mmt of steelmaking. In 2016, boosted to 7.2 mmpy.
- Hormozgan Steel at 1.5 mmt of steelmaking and slab, at the port Bandar-e Abbas. Boosted to 3.0 mmpy in 2018.
- Saba Steel at 0.75 mmt via the thin slab/hot-rolled band route. Located south of Esfahan. Boosted in 2016 to 1.5 mmpy.

- Kashan at 0.1 mmt of galvanized coil product.
- Sepiddasht at 1.0 mmt of hot-rolled coil capacity. Boosted to 1.2 mmt in 2018.
- Sangan iron ore mine. 5 mmt of iron ore pellet and concentrate capacity. Location in the northeast not far from Afghanistan.
- Charmahal car body plant. 0.4 mmt of galvanized coil capacity.

The steel and iron ore companies affiliated with Mobarakeh may merge into a 10 mmtpy single unit including: a) Hormozgan; b) Maad Koush IO Pelletizing Co.; c) Maad Chemi iron ore concentrate; d) Saba Steel; e) South Kaveh Steel; and f) Part Mining Industries Development. The companies will share one railroad, have one electricity source, one water treatment plant. The goal is lower costs.

Mobarakeh in 2016 is undergoing "hot tests" for 5 million tonnes an annual iron ore beneficiation capacity and, as well, a pelletizing complex in Khorasan Razai. It's also expanding its Sangan mine in the Northeastern region of the country. It's also adding a 1.5 mmtpy DRI module at its Sepid Sasht subsidiary. Further, it's boosting capacity by 0.9 mmtpy to 1.6 mmtpy at its thin-slab/HRB plant at Saba Steel.

Mobarakeh provide slabs to the Khouzestan Oxin plate mill, which has been underutilized. It's capacity is 1.05 million tonnes per year. It produces 5-150 mm thick plate and 1100-4500 mm wide plate.

The other Iranian plate producer, Kaavian Steel, has a plate mill with a capacity of 0.9 million tonnes at Ahwaz. It produces a plate 8-40 mm thick and 1,000-1,5000 wide.

POSCO, near the port city of Chabarhar, plans to support the construction of a new integrated steel plant whose facilities will include POSCO's revolutionary Finex unit (that converts iron ore fines to molten pig iron). Hot-rolled band capacity, based on POSCO's revolutionary thin-slab caster, will be 1.8 million tonnes per year from a single strand. The plant will also include a 600,000 tonnes per year cold rolling mill (for which there's currently an inadequate supply in Iran).

Mobarakeh's yield at its hot strip mill is about 96%. However, some of this loss is scale that's converted into iron ore briquettes.

Import duties. The current 10% tariff on steel sheet products will be raised to 25-30%? If so, when?

## MOBARAKEH FINANCES

The company's debt as of September 2015 was \$3.51 billion for short-term and \$0.20 billion for long-term debt , for a total of \$3.7 billion.

The interest expense on this debt annualized was \$256 million, which works out of an average interest cost of 6.92%.

Cash and marketable securities were \$64 million short-term plus \$145 million for other items = \$209 million.

Long-term investments were \$1.078 billion, plus marketable securities of \$868 million, for a total of \$1.946 billion.

The long-term liability for retirees is \$15 million.

The depreciation expense is \$70 million per annum. Assuming shipments 5.9 million tonnes, this amounts to \$12 per tonne. The interest expense, on the same tonnage basis, basis was \$256 million, or \$43 per tonne.

Capital outlays in fiscal 2015 ended March 20, 2016 were about \$2.1 billion (???)

Dividend payments were \$642 million.

The company is planning to borrow an additional \$500 million in the next year, with some of the funds in the form of less expensive offshore debt that would be denominated in U.S. dollars and would skyrocket on a Rial basis if the Rial were be extremely weak (not expected by WSD; although, admittedly, the outlook for the Rial is a wild card).

The Iranian steel market has been in the midst of a sizable turndown the past two months.

Mobarakeh's capital outlays in the year ended March 20, 2017 may be \$2.1 billion, with dividend payments at only \$218 million due to the reduced profit.

EBIT in fiscal 2016 ended March 2017 is forecast at \$700 million.

Note: Our capital outlay figure discussed above may be far too high. Capital outlays for the six months ended September 2015 were only \$270 million annualized???

If the price of iron ore fines delivered to China is \$45 per tonne for a 62% Fe product, the adjustment for a higher Fe iron ore, such as a 66% Fe ore, is \$1.50 per Fe unit, or \$6 per tonne.

When exporting, an advantage for Mobarakeh and all Iranian companies is that they receive U.S. dollars. Then, these dollars can be used to purchase materials abroad and bring them to Iran, which means that they avoid the 12% transfer fee when converting the U.S. dollars to Rial. This is a key point.

The company's common stock market value is about \$3.0 billion. This figure is based on XXXX billion shares outstanding the common stock market price of \$XXX per share.

The net asset value of the company is about \$8 billion, which includes the value of its various subsidiaries and raw material investments. Of course, this is only a "book" item?

Mobarakeh's administration cost is about \$14 per tonne shipped, while the sales expense is also about \$14 per tonne. The interest expense is about \$48/tonne, with the depreciation expense for HRB is only at about \$8 per tonne. Note that these figures are converted to U.S. dollars at the current "black market" Rial value of 35,000 per U.S. dollar, which compares to the official rate of 30,000 per U.S. dollar.

The corporate income tax in Iran is 25%. Iran's value added tax (VAT) is 9%, of which 3% goes to the local municipalities. Mobarakeh also provide an array of special city benefits; however, these amount to only about 0.1% of revenue.

Mobarakeh's distance from iron ore mines

One of the company's negatives is the sizable, although not huge, distance from its Esfahan steel plant to the iron ore mines.

- From the Chadormalo (3.4 mmtpy of pellet capacity), the distance is 499 kilometers by rail and 513 by road.
- From Gol-e Gohar (5.0 mmtpy of pellet capacity), the distance is 787 kilometers by rail and 640 by road.
- From Sangan (XXX mmtpy of pellet capacity), the distance is 1202 kilometers by rail and 1183 by road.
- From Markazi (XXX mmtpy of pellet capacity), the distance is 488 kilometers by rail 496 by road.

Mobarakeh has Iran's largest capacity to produce pellets. This is one of the important factors reducing its operating costs and adding to its profitability. Pellet capacity in Iran is:

- 6.0 mmtpy for Khouzestan Steel
  - 3.4 mmtpy at Chadormalo
  - 5.0 mmtpy at Gol-e Gohar
  - 7.3 mmtpy for Mobarakeh Steel
- The total is 21.7 million tonnes.

## **Mobarakeh's profitability is well down the part two years, especially on export sales**

Mobarakeh has suffered a major decline in its profitability in part because, when exporting, its hot-rolled band export price, FOB the port of export, has tended to track closely with the Chinese steel mills' price. And, typically, the Chinese export price is the lowest of all.

- In July 2014, Mobarakeh had domestic sales operating income (of HRB?) of \$23.9 million and an export operating income of \$10.2 million, for a total of \$35.1 million.
- In November 2014, four months later, Mobarakeh had an income on domestic sales (of HRB?) of \$12.9 million and an export operating income of \$1.6 million, for a total of \$14.5 million.

## **PRICE DOMESTIC AND EXPORT AND RELATED ITEMS**

The average HRB price in Iran in February 2016 was about \$350 per tonne. Regarding the price for different thicknesses of HRB: 2 mm thick HRB sells for about \$360 per tonne, while 3-16 mm thick HRB sells for \$345 per tonne.

The average freight expense for the customer was \$20 per tonne.

The export price in February 2016 was about \$280XX per tonne, with the company's freight expense to the port and loading the steel on the vessel at about \$20 per tonne. Hence, the ex-works price amounted to about \$280 per tonne. *(Note: There's been a sizable rally of the world price for HRB the past two months because it fell so low that many steel mills decided to withdraw their offerings at the low price. During the same time, there's been a sizable rally of the ex-world price for domestic buyers in China.)*

HRB at times in the past year was sold to customers in neighboring countries, such as Iraq, Afghanistan and Pakistan. at about \$300 per tonne. Steel is delivered to these countries is 30-40% by rail.

The cost to ship from the Iranian port to Southern Europe is about \$18 per tonne. The shipments are often made in a 40,000 tonne vessel.

If Mobarakeh sells steel products to India, the freight cost is about \$15-20 per tonne. There are no sales to Japan. The freight to the UAE is \$13 per tonne.

Payment terms:

- On domestic sales, it's three months, at an interest rate of 1% per month.
- For exports, they receive a 10% advance payment and 90% at time of shipment (???)

At the ports, the facilities can load 8-9,000 tonnes per day. At 20 tons per coil, this is 450 coils per day. It costs about \$3 per tonne to load the steel in the ship. Currently, Iranian ports are not busy with other products because of the recession.

Mobarakeh's exports make use of international traders and, as well, the company's own sales force. Direct sales, for example, are made to owners of welded pipe mills in the UAE, of which there are about five. In Europe, Salzgitter and Marcegaglia are customers.

## **HOT STRIP MILLS IN IRAN**

Hot strip mills in Iran operated by competitors include:

- Ferro Gilan Complex Co. = about 600 km distant from Esfahan near Tehran. 15 years old – a private company. They buy slab and produce HRB 1.5-16mm. Width is 600-1,450 mm. The company also has a cold rolling mill.
- National Rolling and Pipe in Ahvaz = 800 miles away. 30+ years old. 2-10 mm thickness 280-600 mm of width.

Mobarakeh's new Hormozgan hot strip mill will be a conventional unit that rolls roll from 1.2 mm to 25.4 mm thick. The width will be 800 mm. They are currently receiving tenders from equipment vendors for this mill.



Currently, Mobarakeh has 5.2 mmpy of slab capacity, plus 1.5 mmt at the Hormozgan plant. Exports of slab are about 700,000 tpy largely from Hormozgan.

When the new HSM is built at Hormozgan, the EAF will be modified to have an additional two million tonnes per year of capacity.

In Esfahan, Mobarakeh has a new slab caster under construction with a capacity at 2.0 mmpy. It will be a 200-250 mm thick slab.

## **IRON ORE PELLETS**

The best quality pellet comes from OMAN. Also, some pellet has been purchased from Essar and Kodermo (sp?) of India. The Oman quality is the best in part because it's produced from VALE iron ore.

The pellet from Bahrain is 66-66.5% Fe. It has 0.005 sulfur. The Indian DERI pellet is 60% Fe with more sulfur and gangue.

The import price for iron ore pellet is \$80-85 per tonne.

The current global premium for DRI pellet is about \$40 per tonne.

If natural gas in Iran is priced at \$0.045 per cubic meter X 29 (assuming about 34,500 BTU per cubic meter) = this works out to \$1.31 per million BTU. For one tonne of DRI, the company needs 270 cubic meters of natural gas – or  $270 \times 34,540 = 9.3$  million BTU. The operating cost is  $270 \times \$0.045 = \$12.15$  per tonne.

(Note: The Mobarakeh cost figures in this report are based on the company's results in December 2015.)

Pellet is received in vessels that carry 50,000-70,000 tonnes. The import price C&F the port is about \$83 (for DRI pellet).

The cost of electricity is about 1.6-1.8 cents per kWh, on average. The price varies during the day, night and evening.

## **RAW MATERIAL PRICES**

Mobarakeh's ex-works usage of key types of iron ore is as follows:

- For 66% concentrate, it's \$47 per tonne at the steel plant. Usage is about 5 mmt per year.
- For 66% coarse concentrate, it's about \$43 per tonne ex-works. It uses 3 mmtpy.
- The expense to ship from the mine to Mobarakeh is about \$15 per tonne.
- The ex-works cost of pellet, from the internal market, is \$72 per tonne. This includes transport costs of about \$15 per tonne.
- The cost of imported pellet is about \$80 per tonne, FOB the port of import. The port is Bandar Abbas. The freight cost from the port to the plant is about \$20 per tonne.

The company's pellet cost is 2,298 Rial per tonne, or \$66 per tonne.

The cost of DRI is 4,247 per tonne, or \$121 per tonne. (Note: Using the current Rial Black Market figure of 35,000 Rias per tonne.)

At Saba Steel Complex, the cost of HRB is 16,117 (\$460) per tonne versus only 9,908 (\$283) at Mobarakeh. The cost is higher because of the lower capacity and they are using primarily purchased DRI pellet (true?). At this plant, there's one Midrex "Mega-Mod" with a capacity of 1.5 mmtpy. There's no pellet plant. These figures include the depreciation expense at both plants.

One cubic meter of natural gas contains 34,524 BTU (which compares to the 37,000 BTU figure that WSD used earlier in this report). The usage factor per tonne of DRI at Mobarakeh is 270 cubic meters. Hence, the usage is 9.321 million BTU per tonne.

The usage of water for DRI is 1.6 cubic meters per tonne. The price of water was \$0.20 per cubic meter. If so, the cost of the water is \$0.32 per tonne.

The usage of energy is 525 Rias per tonne, including electricity, water and NG???

When the government, via IMIDRO, sets a price for iron ore of different grades as a share of the billet price, this locks in a profit for the iron ore provider. Hence, there's an incentive in Iran to own low cost iron ore mines and pellet plants.

Mobarakeh produced 8.84 mmt of DRI in 2015. Also, the pellet plant at Sangan produced 5 mmt. The Saba plant's steelmaking units is being expanded by 1.5 million tonnes to 3.0 mmtpy.

At Sangan, concentrate capacity is 5 mmtpy, which is not enough to support the DRI plant.

If Mobarakeh boosts steel production at Esfahan some day to 12 mmtpy, the goal is to not increase the number of workers.

Iranian iron ore often has too much sulfur, silica and phosphorus. Hence, this adds to the expense to produce good quality sinter.

There are 30 DRI plants in Iran – all are Midrex and some have the latest technology; and, produce 170 tonnes per hour.

The bottleneck in Iran is good IO pellets. Mobarakeh produces 7.2 mmtpy of pellet. Also, Indian and Bahrain pellet quality is not so good.

Mobarakeh operates a 5.0 mmtpy Lurgi pellet plant that's being expanded in 2016 to 7.4 mmtpy. An insufficient supply of pellets is the current major bottleneck for the company. Its DRI capacity is about 7.2 mmtpy at present. Capacity will be the same for the fiscal year ended March 21, 2017.

At Esfahan, there are 8 200-tonne EAFs in same steelmaking shop. The KWH/tonne per tonne of liquid steel about 620; plus, another 200 KWH/tonne for downstream operations – for a total of 820 KWH/tonne.

Steel scrap currently amounts to about 5% of the metallics charge versus 15% in the past. This is home scrap. The company in 2015 used about 265,000 tonnes of home scrap and 30,000 tonnes of purchased scrap.

DRI output consists of six Midrex units with a capacity of 4.6 mmtpy and two Mega-Mod units with a capacity of 2.35 mmtpy.

Output of steel (product) at Mobarakeh will be about 5.6 million tonnes, plus 600,000 tonnes of slab. Slab production in the 2016 fiscal year may drop to 5.8 mmt from 6.2 mmt. because of the weaker market.

Output of hot-rolled band will be about 4.85 mmtpy in fiscal 2016 versus capacity of 5.2 mmtpy. 25% of the HRB output is for thin gauge product that's a minimum of 1.5 mm thick. 25% of output is less than 2.5 mm thick. The width of the HRB is up to 1260 mm (50 inches). The coil weight is a maximum of 25 tonnes.

Mobarakeh's deliveries of HRC to the market will be 2.52 mmt this fiscal year, plus 0.344 mt of cut sheet. *(Note: Please see the accompanying steel product and shipment matrix that was provided.)* About 694,000 tonnes of CRC is sold to markets such as automotive and housing.

In the current fiscal year, steel production out will be 5.9 mmt, including exports of 1.5 mmt.

The Saba thin-slab/HRB plant is 15 years old. It has a Danieli caster and HSM. Output this fiscal year will be about 750,000 tonnes of HRB at a typical width of about 1.6 mm. This plant requires 1,150 mmt of DRI pellet for its DRI unit – which is a 1.5 mmt Mega-Mod. The plan is to install a #2 thin-slab caster in the current fiscal year ended March, 2017. The number of finishing stands at the plant be boosted from 6 to 7. The current bottleneck is the 150-ton EAF.

At Hormozgan, slab output is 1.5 mmt. There are two CCs at 200 and 250 mm thick.

At Esfahan, the Mobarakeh slab is 200 mm thick with a width of 1.88 meters.

Mobarakeh needs 4.9 mmt of concentrate in the forthcoming fiscal year –i.e., this includes 2.5 mmt of iron ore fines that are less than 45 microns; and, 2.4 mmt of larger fines less than 40 microns. This supports the 7.2 mmt of pellet production.

The company also purchases 2.5 mmt of DRI from others.

The price of pellet is 21% of the price of billet sold in the domestic market by Khoustan Steel. If the price of the billet is \$300 per tonne, this comes to a pellet price of \$85 per tonne.

The cost of internal pellet is \$63 at the mine, plus about 3%, or \$2 per tonne, for transport to the steel plant, for a total of about \$68 per tonne.

The import price is \$85 per tonne at the port of Bandar Abbas, plus about \$10 per tonne for the railroad expense (a trip of about 1,000 km.).

The iron ore fines price is set at 13% of the billet price of smaller fines and 11% of the billet price for larger fines. There is no lump ore.

Mobarakeh Steel was already planning to be a steel producer even before the Iranian revolution in 1979. After the revolution, the plant was constructed; and, it began to make steel about 1992. Current Mobarakeh's capacity is 5.2 mmt; and, its being boosted to 7.2 mmt this summer.

The company uses no coking coal. Although, it injects a coal powder to add some carbon to the EAF.

Unemployment in Iran is about 12-14%. Hence, the country needs to create an immense number of jobs given that the population is continuing to grow. When a worker retires, depending on the final wage, he or she may get an annual retirement payment equal to 50-60% of their wage.

There's no labor union. The government protects the workers.

The workers are loyal because they get more than double, at times, what they might be paid elsewhere. Also, they make use of sports complexes, good schools and hospitals. If they buy a house, the company helps with the loan. They also buy food at a discount and get a discount card to use in restaurants.

There are two kinds of taxes. The income tax is at 25% and the VAT is 9% of the sales price. It was noted that the cities close to Mobarakeh are rich because they receive 3% of the VAT. A municipality also wants hand-outs from the company, such as funding for a gala party. These social costs amount to 0.1% of income.

The Mobarakeh retirement age is 60, or 30 years with the company. Bahram Sobhani is 64 years old.

Perhaps wages will rise only 12% in the forthcoming year – which is probably a dream.

The price of met coal is about \$150 per tonne. And, the quality is not great – need to check this out.

The Khuzestan SC profit margin has been reduced to about 5% from 30% in the past 18 months.

The slab operating cost for KSE may be about \$310 per tonne, with the billet at \$300+/- \$10 per tonne of this. It has a railroad (it's own??) to carry slab or billet to the port of export, which is 100 km, at a cost of about \$6 per tonne.

The price of billet is \$280 per tonne for domestic sales and \$245-250 per tonne for export. The price for slab is only \$220-230 per tonne (now up about \$30 per tonne) for export and \$260-20 per tonne for domestic.

Steel prices in Iran don't appear to be too excessive. Rebar seems to range about \$390 per tonne (assumed to be ex-works – need to check this out). Blooms sells for \$331 per tonne. Slab sells for \$375 per tonne – an important price because the price of iron ore concentrate and pellet is measured as a percent of the slab price.

## **MOBARAKEH STEEL: SELECTED TO BE A WSD WORLD-CLASS STEELMAKER**

WSD's World-Class steelmaking list after the addition of Mobarakeh Steel amounts to 37 companies. Of these, it appears that about 8 are in financial duress at the present time, including AK Steel, ArcelorMittal, Angang, CSN, Essar, Maanshan, Wuhan and Usiminas. China's BaoSteel and Shagang are in better shape than the other Chinese companies reflecting product mix factors, especially for BaoSteel, and low operating costs and the delivery of most products by barge in the Yangtze River Delta for Shagang.

Mobarakeh, based on our rating system, comes out #13 of 37 companies. It gets high ratings for expanding capacity, location in a high-growth market, location close to customers, pricing power in home market, energy costs, cost cutting efforts, harnessing steel's technological revolution, iron ore mines, profitability and no major threat from nearby competitors.

Please note that, for all companies, we give a similar environmental and safety factor rating of "9," WSD does not consider itself qualified to make a judgment which companies are less safe and/or are taking lesser actions than the others to promote safety and implement environmental remedies.

Mobarakeh comes out with relative low ratings versus the others for value added product mix, conversion costs and yields independent of the cost of raw materials and energy items, skilled and productive workers, downstream businesses and country risk factor. *(Note: We need to boost M&A to a 9 based on its history but to reduce the country risk factor to 3.)*

On a average score basis, Mobarakeh comes out #12, while on a weighted average basis, its score makes it #13. As indicated, there are many companies not far from a weighted average score of 7.00 including ArcelorMittal, China Steel, CSN, Erdemir, Evraz, Hadeed, Hyundai, JFE, Jindal, NLMK, SAIL, SDI, and Tata/Corus.