













Annual Report 2008 - 2009







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BOARD OF DIRECTORS

S. N. Ruia R. N. Ruia P. S. Ruia R. R. Ruia S. V. Venkatesan Jatinder Mehra V. G. Raghavan Vikram Amin Dilip Oommen Mahadev Iyer K. V. Krishnamurthy

Narottam B. Vyas

REGISTERED OFFICE

Post : Hazira Pin: 394 270 Dist : Surat Gujarat Tel. : 0261-668 2400 Fax : 0261-668 2796

CORPORATE OFFICE

Essar House, 11 Keshavrao Khadye Marg, Mahalaxmi, Mumbai - 400 034. Tel. : 022-66601100 Fax : 022-66602748

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Chairman Vice-Chairman

Director - Marketing Chief Executive Officer Director - Finance

Company Secretary

BANKERS

Allahabad Bank Andhra Bank Axis Bank Ltd Bank of Baroda Bank of India Canara Bank Central Bank of India **Corporation Bank** Dena Bank Export Import Bank of India Federal Bank Ltd. HDFC Bank Ltd. ICICI Bank Ltd. IDBI Bank Ltd. Indian Bank **Oriental Bank of Commerce** Punjab National Bank SBI Commercial & International Bank Ltd. State Bank of Bikaner & Jaipur State Bank of Hyderabad State Bank of India State Bank of Indore State Bank of Mysore State Bank of Patiala **UCO Bank** Union Bank of India United Bank of India

AUDITORS

M/s. S.R. Batliboi & Co. Chartered Accountants, Jalan Mills Compound, 95, Ganpatrao Kadam Marg, Lower Parel, Mumbai 400 013

SOLICITORS

M/s. Crawford Bayley & Co. State Bank Buildings, NGN Vaidya Marg, Fort, Mumbai - 400 023.

TRANSFER AGENTS

Data Software Research Co. Pvt. Ltd. Sree Sovereign Complex, No. 22, IVth Cross Street, Trustpuram, Kodambakkam, Chennai - 600 024. Tel. : 044-24834487/3738 Fax : 044-24834636 E-mail : dsrcmd@md3.vsnl.net.in

Visit us at our website http://www.essar.com

DIRECTORS' REPORT

To the Members of Essar Steel Limited

Your Directors have pleasure in presenting the 33rd Annual Report of your Company together with the Audited Statement of Accounts for the year ended 31st March, 2009.

FINANCIALS

The Financial Results

(Rs. in crores)

Particulars	Year ended		
	March 31, 2009	March 31, 2008	
Sales and other Income	11,873.48	10,786.43	
Profit before Finance Costs, Exchange variation and Derivative Losses, Depreciation / Amortisation, Exceptional Items and Taxation	2,625.05	2,353.12	
Less: Finance Cost	789.47	829.47	
Less: Exchange variation and Derivative Losses (net)	539.75	(74.25)	
Profit before Depreciation / Amortisation, Exceptional Items and Taxation	1,295.83	1,597.90	
Amortisation /	828.11	766.52	
Profit before Exceptional Items and Taxation	467.72	831.38	
Less: Exceptional Item	166.91	-	
Profit before Taxation	300.81	831.38	
Less: Provision for Deferred tax	104.99	267.97	
Less: Current Tax (MAT Payable)	-	108.88	
Add: Short / (excess) tax provisions related to earlier years (Net)	5.29	19.83	
Less: Provision for Fringe Benefit Tax	5.33	6.08	
Profit after taxation	185.20	428.62	
(Less)/Add: Balance brought forward from previous year	1673.90	1,444.29	
Add: Net Gain on adoption of AS-15 (Revised)	-	1.87	
Add: Transfer from Debenture Redemption Reserve	-	15.50	
Less: Transfer to Capital Redemption Reserve	-	202.92	
Less: Preference Dividend (including DDT)	-	13.46	
Balance carried forward to next year	1859.10	1673.90	

DIVIDEND

Your Directors do not recommend any equity dividend for the year.

GLOBAL SCENARIO

The world economy entered a major downturn during the second half of 2008-09 with all the advanced economies in the severest economic recession since the World War II. The demand in both advanced and emerging economies fell sharply resulting in production cuts, cost controls and lay offs. Governments and central banks around the world have responded to the crisis in an unprecedented show of policy force in form of various fiscal stimulus and monetary policy measures. With proper policy and structural reforms, various countries are trying to manage the global crisis in a coordinated manner.

INDIAN SCENARIO

The strong growth seen in India till the year 2007-08, lost steam in 2008-09 with the economy turning weak since November 2008 on account of this global turmoil. The impact of the global financial crisis has been deeper than anticipated earlier although less severe than in other emerging market economies.

The Government launched three fiscal stimulus packages between December 2008 and February 2009. These stimulus packages came on top of the expanded safety-net programme for the rural poor, the farm loan waiver package and payout following the Sixth Pay Commission report, announced earlier, all of which too added to stimulating demand.

The Reserve Bank shifted its policy stance from monetary tightening for controling inflation in the first half of 2008-09 to monetary easing in the second half of 2008-09 to facilitate revival of the economy and to stimulate further economic growth.

STEEL INDUSTRY

A) Global Overview

The steel industry was riding high at the beginning of 2008-09. Steel prices witnessed an unprecedented rise on the back of high demand from all sectors and high input material cost. However with the effects of the global crisis showing across all sectors, mainly construction, automotive and consumer durables, the real demand for steel started drying up towards the second half of 2008-09. This also led to sharp correction in the steel and raw material prices in the same period. The prices of Hot Rolled Coils corrected by more than 55-60% from the peak levels of USD 1100-1150 per metric tonne to around USD 500 pmt during the last six months. Prices of key raw material like coking coal, iron ore, thermal coal and scrap also crashed by nearly 60% to the current levels where they seem to have stabilized.

Companies world wide responded to the slowdown through means of controlled production levels and production cuts in the developed world have been in the range of 35-50%.

China, the key driver for the global steel industry also witnessed a dip in the production and consumption of steel on the back of slow demand from construction and manufacturing industries.



B) Domestic Overview

Steel demand in India depends mainly on the construction and auto sectors. Both sectors have shown phenomenal growth over the past few years and were on an upswing till mid 2008 when the effect of the global liquidity crunch led to a massive slowdown in these two sectors causing the demand for steel to slacken. Apart from this, the Indian Flat Steel industry which exports nearly 20% of its production, suffered nearly 38% dip in exports during October-December 2008 resulting in an overall dip in production of nearly 9% amongst the Flat Steel producers.

The outlook for the Indian steel industry in 2009-10 remains optimistic with GDP growth estimated to be around 5-7%, high thrust on infrastructure in the 11th Plan and continuation of lower inflation.

OPERATIONS



Manufacturing:

Your Company has made efforts to increase the operational efficiency and quality of products produced at Hazira during FY 2008-09.

The major steps taken in this regard were:

- Improvement in physical property and chemistry in the quality of pellets at the pelletisation plant.
- Increase in usage of Hot DRI by 11% resulting in energy savings at Steel Melt Shop.
- Quality improvement programme was implemented by entering into an umbrella agreement with Kobe Steel, Japan.
- Development of Neural Network Model for Property Prediction of HR coils was taken up. Trials conducted for grades like LNC56, LNP46 and LNP54 with modified chemistry. This will help in reducing grade extra cost without affecting chemistry/physical properties of the product.



The Major benefits derived from the above steps are:

- Natural gas consumption in the HBI process was reduced by 2 Sm3/tonne compared to the last financial year.
- Power consumption in the HBI process was reduced by 3 KWH/tonne compared to the last financial year.
- Overall, power consumption was reduced by 65 KWH/ tonne compared to the last financial year
- Liquid Steel yield was improved by 0.65% compared to what was achieved in last financial year.
- Cost saving to the tune of Rs. 13 crore achieved by way of optimization of ferro-alloy consumption grade.





Sales and Marketing

The financial year 2008-09 was indeed a year of contrasts and some performance parameters need to be highlighted. Revenues were up 10.08% to Rs.11,873 crore and net sales realization per tonne was up 24% y-o-y. As much as 52% of sales were made in the value-added segments - up from 35% in 2007-08. This was largely due to increased emphasis on value-added products, like Electrical, Auto Hi-strength grade, PEB, API above 12.5 mm X-70, TMBP, etc. Your Company gained in market share (domestic) - from 12.9% in 2007-08 to 13.6 % in 2008-09. Steel Hypermart sales in 2008-09 grossed 0.61 million tonnes, thus registering a 17% growth in volumes. Revenues grew 28% to Rs. 2,541 crore. Increase in revenues was achieved mainly because of higher sales volume and better realization.

Your Company is aiming to widen its geographical reach and further strengthen its distribution network in FY 2009-10 with the addition of more Hypermarts and Expresssmarts. The four Service Centres at Hazira, Pune, NCR (National Capital Region) and Chennai are now fully operational; they provide just-in-time delivery to retail and OE customers in the automotive and white goods segments.

Domestic sales at 2.46 million tonnes, fell 4.45% y-o-y. However, this drop was considerably lower when compared to the 8% fall in the combined domestic sales volume of the top five producers in the country.

Export volumes, at 0.64 million tonnes, dropped 21% on account of the depressed steel demand globally. In spite of this, the realization in flat products increased by 33%. Your Company increased its market penetration by entering new markets, like Sudan, Nigeria, Angola, Brazil, Peru, etc.

Overall sale of flat rolled products was down 9% y-o-y to 3.06 million tonnes, largely because of the economic slowdown witnessed in the second half of FY 2008-09. However, the Government of India has come out with a stimulus package which is likely to provide the much-needed impetus to infrastructure, construction and automobile industries.

Better planning and inventory management led to a 15% reduction in year-end closing stocks on y-o-y basis.

Finance:

During the current financial year, your Company focussed its efforts on providing finances for expansion, strengthening of marketing network through Service Centres, Hypermarts etc. and strategic investments. Furthermore, your Company also focussed on maintaining sufficient liquidity at all times to ensure smooth operations of the Plant at higher capacity levels.

In spite of the slowdown in the steel markets in the second half of the current financial year and the financial crisis witnessed in the global markets, your Company was successful in progressing with its capital expenditure programme and strategic investments, meeting all its payment obligations in a timely manner and retaining adequate liquidity within the Company to meet its operational requirements and withstand the downturn.

During the year your Company successfully concluded the enhancement of its working capital limits from Rs.2,600 crores to Rs.3,150 crores. Financial tie ups for the service centres concluded in this year along with the commissioning of the 3 service centres at Pune, NCR and Chennai.

Your Company's established position in the value added segments in the steel industry, a diversified distribution network, integrated nature of operations, and improved capital structure ensures operational flexibility and maximization of profits. The financial health of your Company continues to be robust, with comfortable levels of gearing ratio and coverage ratio. It is reflected in the following ratings published by ICRA Ltd. (an Associate of Moody's Investors Service):-

 - 'LA' rating to the fund based bank facilities and to the Rs. 6,000 crore Long Term Debt programme of the Company, recognising the improvement in the credit quality of the Company's Long Term Debt

 - 'A1' rating to the non fund based bank facilities of the Company, indicating highest credit quality in the short term

SUBSIDIARIES

As on March 31, 2009 the Company had following two subsidiaries:

- Essar Steel Jharkhand Ltd.
- Essar Steel Trading FZE, Dubai

A statement pursuant to Section 212 of the Companies Act, 1956, and also a copy of each of the audited accounts and other documents referred under Section 212 of the Companies Act, 1956, of the abovementioned companies is attached to this report. During the year under review Essar Steel Orissa Ltd ceased to be subsidiary of the Company.

HOLDING COMPANY

Essar Steel Holdings Ltd (which in turn is a subsidiary of Essar Global Ltd, Cayman Islands – the ultimate holding Company) continues to be the Holding Company of your Company. The ultimate holding company viz. Essar Global Ltd, along with its other subsidiaries, now holds 93.21% equity shares in the total paid up equity capital of the Company

DIRECTORS

In accordance with the requirements of the Companies Act, 1956 and the Articles of Associations of the Company, Shri S.N.Ruia, Shri P.S.Ruia and Shri V.G.Raghavan retire by rotation at the forthcoming Annual General Meeting and, being eligible, have offered themselves for reappointment. Shri Robin Banerjee, Director (Finance) ceased to be Director of the Company w.e.f February 16, 2009. The Board wishes to place on record their sincere appreciation for the contribution made by Shri Robin Banerjee during his tenure as a Director of the Company.

Shri Mahadev Iyer has been appointed as an Additional Director on wholetime basis for a period of three years w.e.f. February 16, 2009 and would hold office as a Director up to the date of this Annual General Meeting. Necessary resolution for his appointment as wholetime director of the company forms part of the notice of the Annual General Meeting.

DIRECTORS' RESPONSIBILITY STATEMENT

Pursuant to the requirements under Section 217(2AA) of the Companies Act, 1956, the Board of Directors of the Company hereby state and confirm that

- i. In the preparation of the Annual Accounts for the year ended March 31, 2009, applicable accounting standards have been followed along with proper explanation relating to material departures.
- ii. They have selected accounting policies and applied them consistently and made judgements



and estimates that are reasonable and prudent so as to give a true and fair view of the state of affairs of the Company at the end of the financial year and of the profit of the Company for the year under review.

- iii. They have taken proper and sufficient care for the maintenance of adequate accounting records in accordance with the provisions of the Companies Act, 1956, for safeguarding the assets of the Company and for preventing and detecting fraud and other irregularities.
- iv. They have arranged the preparation of the accounts for the year ended March 31, 2009, on a "going concern" basis.

AUDIT COMMITTEE

The Audit Committee of the Board comprises four nonexecutive directors, viz. Shri S.V.Venkatesan, Shri J. Mehra, Shri V.G.Raghavan and Shri K.V.Krishnamurthy. The Chairman of the Audit Committee is Shri S.V.Venkatesan. The Company Secretary Shri N.B.Vyas acts as the Secretary of the Company. The terms of reference of the Audit Committee are as per Section 292A of the Companies Act, 1956.

AUDITORS

Your Company's auditors, M/s S.R.Batliboi & Co., Chartered Accountants, will retire at the conclusion of the ensuing Annual General Meeting. M/s S.R.Batliboi & Co., Chartered Accountants have informed the Company that if appointed, their appointment will be within the prescribed limits under Section 224(1B) of the Companies Act, 1956. Accordingly, members' approval is being sought for their appointment as the Auditors of the Company at the ensuing Annual General Meeting.

ENERGY, TECHNOLOGY & FOREIGN EXCHANGE

Details of energy conservation and research and development activities undertaken by the Company along with the information in accordance with the provisions of Section 217(1) (e) of the Companies Act, 1956, read with the Companies (Disclosure of Particulars in the Report of the Board of Directors) Rules, 1988, are given in the Annexure A, forming part of this report.

PERSONNEL

As per the provisions of Section 217(2A) of the Companies Act,1956, read with Companies (Particulars of Employees) Rules, 1975, as amended the name and other particulars of the employees is separately attached, as Annexure 'B' forming part of this Report.

ACKNOWLEDGEMENT

Your directors would like to express their grateful appreciation for the assistance and co-operation received from the Financial Institutions, Banks, Government Authorities and Shareholders during the year under review. Your Directors wish to place on record their deep sense of appreciation to all the employees for their commendable teamwork, exemplary professionalism and enthusiastic contribution during the year.

For and on behalf of the Board

Date: 19th May, 2009 Place: Mumbai

Shashi Ruia Chairman

Annexure - 'A' to Directors' Report

A. CONSERVATION OF ENERGY:

a) Energy Conservation measures taken:

- Increment in HOT DRI charging at SMP has resulted in power reduction of 57 Kwh/t of liquid steel. Total energy saved - 1882.75 lac units.
- Hot DRI charging: 2.45 million MT of HBI plant products was discharged in the form of Hot DRI during the FY 2008-09 resulting in savings of about 245 lac electrical units.
- Energy savings due to converting Metallic fan blade to FRP blade in HBI Cooling tower. Power saved - 3.4 lac units.
- 4. Modification in Exhaust Steam fan resulted in energy saving of 5.6 lac units and savings of Rs. 23.69 lacs at Caster.
- 5. Stoppage of idle running of equipments during shutdown and down time. Energy saved about 18.43 lac units at HSM.
- 6. Modification in DC motor field economy circuit has resulted in energy saving of 0.35 lac units at HSM.
- 7. Lighting network by PLC control, Auto sensor and timer. Energy saved - 1.3 lac units at MH.
- 8. Modification in Conveyor has stopped one motor. Hence energy savings of 1.9 lac units at MH was achieved.
- 9. Optimization in idle running of conveyor has saved 1.7 lac units of enerty in MH.
- 10. Energy savings due to VVVF drives and delta-Star conversion at MH 0.17 lac units.
- 11. Optimization of SVC operation during idle condition of EAF has saved 42.6 lac units of energy at MRSS.
- 12. Cooling tower operation optimization and pumps automation at MRSS. Energy saved 0.2 lac units.
- 13. Drives up gradation from DC to AC in PKL-2 has saved 0.97 lac units.
- 14. Stoppage of idle running of equipments during shutdown and down time at CRM and DSC has saved 6.18 lac units.
- 15. Lighting transformer voltage reduction at MSS has saved 7.78 lac units.
- 16. Electronic Ballast installation at CRM and DSC has saved 0.95 lac units.
- 17. Stopping pump motors at Module-3. Energy saved 10.37 lac units.
- Stopping Auxiliary air blower motor at Module-5. Energy saved - 6.9 lac units.
- 19. Utilities-Condensate recovery at CRM steam system, NG saved.
- 20. Removing orifice plates from cooling water headers. Energy saved - 8.26 lac units at utilities.
- 21. Energy conserved by utilising of power plant blown down water.
- 22. Reduction in Argon losses from 12% to 7% and increase in liquid build up, resulting in savings of Rs. 61 lacs / annum at Oxygen Plant.

- 23. Replacement of electrical ballast with electronic ballast, resulting in energy cost saving of Rs. 68,000 / annum.
- b) Additional Investments and proposals being implemented for reduction in consumption of energy:
- 1. To generate 19MW power from flue gas waste heat recovery by power plant.
- 2. Removal of heavy hydrocarbon by PSA system to avoid carbon deposition in catalyst tubes. This will avoid carbon burnout requirement, which consumes both natural gas and power during each carbon burn out without production.
- 3. Use of Corex gas and VPSA system: Corex gas consumption saves natural gas which can be used for reformer burner.
- Implementation of VVVF drives in mesh belts for reducing moisture in briquettes saving power for vaporisation of moisture at EAF.
- 5. Implementation of VVVF drives in HT motors to reduce power consumption.
- 6. Up gradation of lime dosing system for high temperature operation to reduce specific natural gas and power consumption.
- c). Impact of measures at (a) and (b) above forreduction of energy conservation and on the cost of prodution of goods:

As mentioned in (a) & (b) above

B. TECHNOLOGY ABSORPTION:

Your Company has fully absorbed the MIDREX technology obtained from Voest Alpine, Austria for the production of HBI. It has also absorbed technology supplied by METCHEM for HRC plant including DC-Electric Arc Furnace (EAF), Continuous Casters and the Hot Strip Mill. Your Company has emerged as the largest user of HBI in DC EAF and developed satisfactory technology for the same.

C. FOREIGN EXCHANGE EARNINGS AND OUTGO:

 Activities relating to exports, initiatives to increase exports, developments of new export markets for products and services and export plan.

Activities relating to exports

Your Company has always had a long term perspective regarding exports. We have been exporting to various destinations right from the start of commercial production in 1995. We have always endeavored to maintain our export volumes in all market conditions and we have been the largest exporters of flat products from India for the past several years.

We have the unique distinction of being present in all markets such as EU, USA, Middle East, ASEAN and Africa.

We have consistently focused on the high end of the market with value added grades. Over the years we have built up our sales to segments like automobile,



white goods, ship building, yellow goods, boilers and pressure vessels and API (American Petroleum Institute) line pipe.

With our consistent export presence and thrust on high end grades we are able to effectively compete globally with premium steel mills like the European, Japanese and American mills in their respective domestic markets. This has enabled us to evolve into a supplier of choice for several high end clients and helps us offer an effective alternative for these customers.

We have also had long term contracts with buyers which assures them of a steady supply. This helps us both to have an element of price and volume stability in a volatile market. We have managed to enter into annual sales contracts with buyers like JCB, CAT etc.

Specific initiatives undertaken to increase exports

Regular suppliers to OEM's like JCB, Ahwaz Pipe Mill, Carl Spaeter, Vosta Stahlhandel and others.

Acquired logistical competitiveness by getting into Charter of Affreightment with shipping companies. This helped to achieve competitive freight rates on a long term basis and ensure availability of vessels availabilities to regular destinations like US and EU ports.

Developed containerized shipments. This provides us the flexibility of shipping to destinations like Myanmar and various smaller markets like Oman, Bahrain, Angola, Nigeria, Ghana Brazil, Peru etc. in the Middle East, Africa and South America.

Successful trials have been developed with large OEM's like Saipa, Iran Khudro, Steam Co., Sadid Jahan Sanat, LUK GMBH (Schaeffler Group). We have also received global approval from M/s Volkswagon.

Commenced supplies of GI and hot rolled sheets to markets like Myanmar and several, African countries.

Regular supplies of slabs to several long term clients in South East Asia like Canadoil, LPN and P T Gunung. We have also supplied ship building quality plates to clients like Vinashin Shipyards in Vietnam.

a)	Fore thro	eign exchange directly earned ugh export	2,761.64
b)	Othe	ers	202.69
	Tota	Il foreign exchange earned (a + b)	2,964.33
c)	Total foreign exchange used		
	i)	For import of plant and machinery/ technical know-how	147.47
	ii)	Others including raw materials and interest	1353.44
Total foreign exchange used (c)		1500.91	

II) Total Foreign exchange used and earned (Rs. in Crores)

Particulars with respect to Conservation of Energy: FORM A

A. Power and Fuel Consumption

Sr.	Particulars	Current	Previous
No.		year	year
1.	Electricity		
a)	Purchased		
	Unit (Lakhs)	2,750.41	2,951.98
	Total Amount (Rs. in crores)	126.10	127.17
	Rate/Unit (Rs.)	4.58	4.31
b)	Own generation		
	(i) Through diesel generator		
	Unit (Lakhs)	24.78	47.63
	Unit per ltr. of diesel oil	2.50	3.32
	Cost/Unit (Rs.)	22.50	13.30
	(ii) Through steam turbine / generator		
	Unit (Lakhs)	1790.55	1003.94
	Units per ltr. of Fuel oil/Gas/		
	SteamCoal	0.77	1.25
	Cost/Unit (Rs.)	3.95	3.44
	(iii) Through gas turbine /		
	generator		
	Unit (Lakhs)	646.00	1,756.54
	Units / SM3 of gas	3.45	3.26
	Cost of fuel/Unit (Rs.)	4.96	3.67
	(iv) Through third party on conversion basis		
	Unit (Lakhs)	29,963.22	33,562.97
	Units / Ltr of NGL/HSD/NG	4.67	4.47
	Cost of fuel/Unit (Rs.)	5.10	3.60
2	Coal (specify quality and where		
	a) Steam Coal for power		
	Quantity (topos)	1 18 427	08 7/6
	Total Cost (Rs. crs)	51 56	30,740
	Average Bate (Bs.)	4354	3100
	b) Anthracite Coal consumed		0100
	as fuel for induration		
	Quantity (tones)	88,252	85,816
	Total Cost (Rs. crs)	87.46	37.88
	Average Rate (Rs.)	9910	4414
3	Furnace Oïl		
	Quantity (k. Itrs)	81,130	88,706
	Total Cost (Rs. Crs)	216.22	173.74
	Average Rate (Net of		
	Modvat)	26,651	19,586
	Others		
	Quantity.(NG) - '000 SM3	1,69,722	178,850
	Total Cost (Rs. Crs)	267.42	189.07
	Rate/Unit	15.76	10.57

Particulars	Standard	Current	Previous
	(If any)	year	Year
Product: Beneficiated	Unit Per	Unit Per	Unit Per
Concentrate	MT	МТ	MT
Electricity (Kwh)	40.00	31.50	35.00
Others (Specify)	N.A.	N.A.	N.A.
Product: Iron Oxide Pellets	Unit Per	Unit Per	Unit Per
	MT	MT	MT
Electricity (Kwh)	40.14	35.81	41.12
Furnace Oil / LSHS (Ltrs)	16.00	14.99	16.54
Anthracite Coal (Kgs)	16.00	16.31	16.00
Coal (Steam coal on net	0.72	0.73	0.77
generation) (Kgs)			
Others (Specify)	N.A.	N.A.	N.A.
Product: Hot Briquetted Iron	Unit Per	Unit Per	Unit Per
	MT	МТ	MT
Electricity	125	111	115
Furnace Oil			
Coal (Specify quality)			
Diesel Oil			
Others - Natural Gas (SM3)	325	291	293
Others - Naptha (Kg)			
Product: Hot Rolled Coils & Cold	Unit Per	Unit Per	Unit Per
Roll/Galvanizing	MT	MT	MT
Electricity		834	887
Furnace Oil			
Coal (Specify quality)			
Diesel Oil			
Others – NGL (Ltr)			
Other – NG (SM3)		54	53

B. Consumption per unit of Production

FORM B

RESEARCH AND DEVELOPMENT (R & D):

Your Company has a well equipped R&D centre with state-ofthe-art facilities and a highly qualified team of engineers and technologists who are constantly engaged in developmental activities.

1. Specific areas in which R & D carried by your Company:

R&D is involved in the activities of product research and development. The major thrust areas include:

- Product development
- Modeling and Simulation
- Initiate R & D in processes
- Material characterization

These four areas have been modified and expanded in the past. In the coming years these will be directed and adapted in response to new challenges. R & D is involved in providing prompt, innovative and costeffective means in the processes and products.

Benefits derived as a result of the above R&D:

A) Product Development in HR and CR:

- API 5L X-80 in higher thickness (14.30mm)
- High strength steel as per DOMEX 650 for automobile chassis application
- HR-80 grade steel in size 9.50 x 1230mm for Mahindra for chassis application
- High strength steel plates in thickness 16.0-20.0mm (IS 2062 E410 Fe540) with through thickness properties
- Pressure vessel quality plates as per EN 10028-2 Grade 16Mo3 with elevated temperature properties
- HSLA 340 grade CRCA steel for auto structural application
- SPRC 35 / IFHS 340 in higher thickness upto 1.25mm
- SPRC 440 (Non-IF based for Hyundai Motors) in thickness 1.00-1.40mm
- High strength steel for tubing for auto application for Caparo UK in thickness 1.40 and 1.60mm
- SPRC 440E / IFHS 440 (IF based CRCA steel for automobile application)

B) Modeling and Simulation:

Following models were developed:

- Neural network model for prediction of Mechanical Properties of hot rolled coils.
- Mathematical Model for CGL-1 (Pre-heater, DFF, RTF, JC)
- Mathematical Model to predict the temperature evolution of coil in Batch Annealing Furnace.
- Mathematical Model to predict the temperature evolution during cooling of Hot Rolled Coil.
- Model for Prediction of TTT & CCT diagrams.

C) Cost reduction (By way of ferro-alloy optimization):

The expected cost saving amounts to Rs. 14,165 crores for this year by optimization of ferro-alloy consumption and replacement of costly alloys with less expensive ferro-alloy without affecting the final quality of the steel.

D) Others:

- Commissioning of VPSA system to study the impact of specific natural gas consumption.
- Trial with less BG methane to arrive at minimum specific natural gas consumption.
- Cold briquette trial to explore the disintegration during transportation.
- Plate life enhancement by 6-8months
- Implemented tailings recovery through SLON system: initial results show a recovery of 10%

2. Future plan of action:

R&D efforts are always directed towards new product development, as well as improvement in the existing products to suit customer requirement. It will also get involved in the areas of developing mathematical models for simulation of



critical areas of the production process for improvement in quality, and production. It also focuses on cost reduction, quality improvement and value-addition to products and providing application engineering support to products for end-customers.

Product development: (plan for 2009-10)

Product name: Hot rolled Products:

- Dual phase steel (F+M) DP-600 of thickness 3.00-4.50mm
- Boron steel for auto applications of thickness 3.00-6.00mm
- HR-60 for wheel Disc in thickness 2.40mm
- Grade SPFH 540 in thickness 2.00mm
- IRSM 41 grade in normalized condition
- DOMEX 650 grade of thickness 4.00-7.00mm for commercialization
- Ultra high strength steel as per S700MC thickness 3.00-5.00mm for commercialization
- S700MC for auto application in thickness 3.00-6.00mm for commercialization
- API 5L X-70, thickness 15.88mm with DWTT for commercialization
- SAE 1541 in thickness 3.00-4.50mm. for commercialization
- API 5L X-80, Thk <12.70mm for commercialization
- API 5L X-65 Sour service thickness <10.0mm for Commercialization
- HR-80 for chassis long member for commercialization

Product name: CRCA Products:

- BH 220 in thickness 0.70-1.00mm
- HSLA -260 grade steel for auto application (thk: 0.80-2.00mm)
- HSLA -380 grade steel for auto application (thk: 1.00-1.80mm)
- HSLA -420 grade steel for auto application (thk: 1.00-1.50mm)
- ST 52 in thickness 1.00-1.50mm
- TMBP steel with temper 4 grade (thk: 0.20 / 0.22 / 0.24mm)
- SPRC 440E / IFHS 440 (IF based) in thickness 0.80-1.00mm for commercialization
- SPRC 440 (LC based) in thickness 0.80-1.50mm for commercialization
- EDD / IF for Skin panels Process Development
- Electrical Steel in different grade (EL01, EL03, EL04 & EL05), for commercialization
- CRCA steel for electrical panel application in D grade for commercialization
- TMBP steel with temper 3 grade (thk: 0.26 / 0.28 / 0.30 / 0.32 / 0.41mm) for commercialization
- CRCA steel for White good application in grade DD, for commercialization

Product name: GALVANISED Products:

• GPSP (crush spangle) in thickness 0.25-1.20mm for commercialization

Product Development plan for Plate Products:

- Boiler quality plates as per SA 515 Gr 55, 60, 65 and 70
- SA 516 Gr 55, 60, 65 and 70 grade plates for pressure vessel application
- Boiler quality plates as per SA 285 Gr A, B and C
- SA 537 Cl. 1 grade plates for pressure vessel application
- Normal strength ship building plates in grade A, B, D and E
- High strength ship building plates in grades AH32 / DH32 / EH32, AH36 / DH36 / EH36.

Product Development plan for Pellet Products:

• Beneficiation Process, further recovery of Fe units from Tailings by adopting Column Flotation Process.

Simulation and Modeling:

- Development of Chemistry design and optimization system for all grades of steel.
- Development of mathematical model for BAF 1 and BAF 2.
- Development of heat transfer mathematical model for Continuous Galvanizing Line.
- Development of Property prediction model for Batch Annealing Furnace.
- Development of Property prediction model for Continuous Galvanizing Line.
- Development of CFD Model for Ladle Tundish Mould system.
- Establishment of Water model system for Tundish design physical simulation.
- Reuse of effluent after treatment to reduce specific water consumption.

TECHNOLOGY ABSORPTION, ADAPTATION AND INNOVATION:

- 1. Efforts towards technology absorption, adaptation and innovation:
 - (a) The unit has fully absorbed the LURGI GmbH technology for manufacture of Iron Oxide Pellets.
 - (b) Required plant modifications have been carried out to produce pellets using Organic Binder.
 - (c) Your Company has fully absorbed the MIDREX technology obtained from Voest Alpine, Austria for the Production of HBI.
 - (d) Your Company has fully absorbed the METCHEM technology obtained from METCHEM Inc. Canada for the Production of HRC.

2. Imported technology

Product	Technology from	Year of import	Status of absorption/ adaptation
Pellets	Lurgi Traveling Grate Process	1993	Fully absorbed
HBI (Sponge Iron)	MIDREX Corpn. U.S.A./Voest Alpine, Austria	1989-90	Fully absorbed
HRC	METCHEM Inc. Canada	1991-94	Fully absorbed