RATING OF THE STEEL SECTOR

How we did it

Rating of Steel Sector

Used a rigorous, independent, participatory and transparent mechanism of assessment

- Quantitative assessment based on life cycle analysis

- Qualitative assessment of corporate environment governance

- Qualitative assessment of stakeholder perception and transparency

Rating of Steel Sector

1. **Collect data** from companies but also from other sources including pollution control boards, media reportage, legal cases, company publication etc.

2. **Survey of the plant** to verify data and to judge the environment impact

3. **Interaction with local community**, workers, NGOs, pollution control boards etc.

4. **Preparation of draft company profile** (report) which is sent to companies for comments

5. **Final company profile** (report) and rating

Technical Advise & Assurance

Technical advisory panel

To assist in rating methodology, assessment, data verification and provide independent assurance.

B SENGUPTA
Former member secretary, Central Pollution Control Board

A K GHOSE
Former additional director, environment, SAIL

R C GUPTA
Former professor and head of the department of metallurgical engineering (IT-BHU)

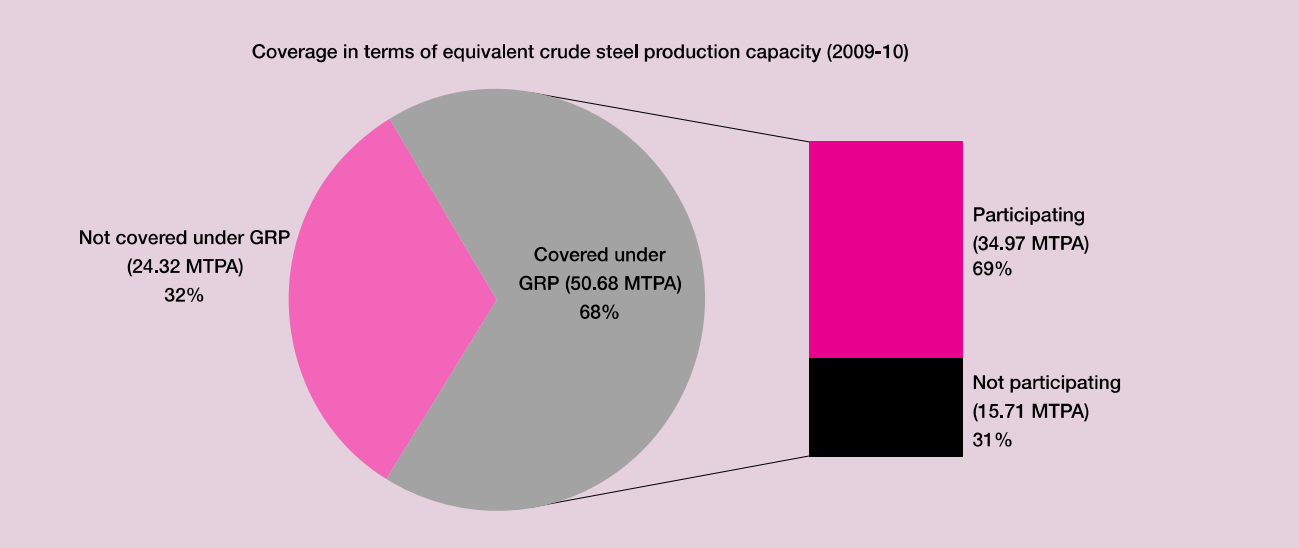
R P SHARMA
Former chief of the environment division, Tata Steel

Pushing for change

Scores	Awards Category	Criteria
Above 75%	5 Leaves award	Performance far exceeding compliance requirements **Global best** technology Best management practices
50% to 75%	4 Leaves award	Good Compliance **Good technology** and performance Strong management practices
35% to 49.9 %	3 Leaves award	**Average performance** of compliance Average technology and performance Average management practices
25% to 34.9 %	2 Leaves award	**Below average compliance** conditions Below average technology and performance Basic management practices
15% to 24.9 %	1 Leaf award	**Poor performance** Frequent cases of non-compliance In adequate management practices
Less than 15%	No award	**Regular non-compliance; non participation** Poor performance and management practices

The Rating of Steel Sector

- Sample size: 21 steel plants with annual capacity more than 0.5 million tonnes per annum as of 2009-10
- 68% of India's annual capacity installed
- 13 participated; 8 did not - rated based on information from RTI, public documents and site inspection
- Only one SAIL plant (Rourkela) out of 5 participated



Note: Capacity is computed as equivalent crude steel where only ironmaking was available. Total crude steel production capacity data sourced from the Ministry of Steel, Twelfth Five-Year Plan Working Group Report ; MTPA = million tonnes per annum
Source: 2012, *Green Rating of the Indian Iron and Steel Sector*, CSE, New Delhi

Boundary selection

- Our rating methodology accounts for the multiple process routes used for making steel
- We have considered production phase only and rating is site specific
- Raw material sourcing (mining) is not included as many plants do not own captive mines
- Product use and disposal phase not included because of wide applications, no data and because of 'low impact' due to recyclable nature of steel

Weightages

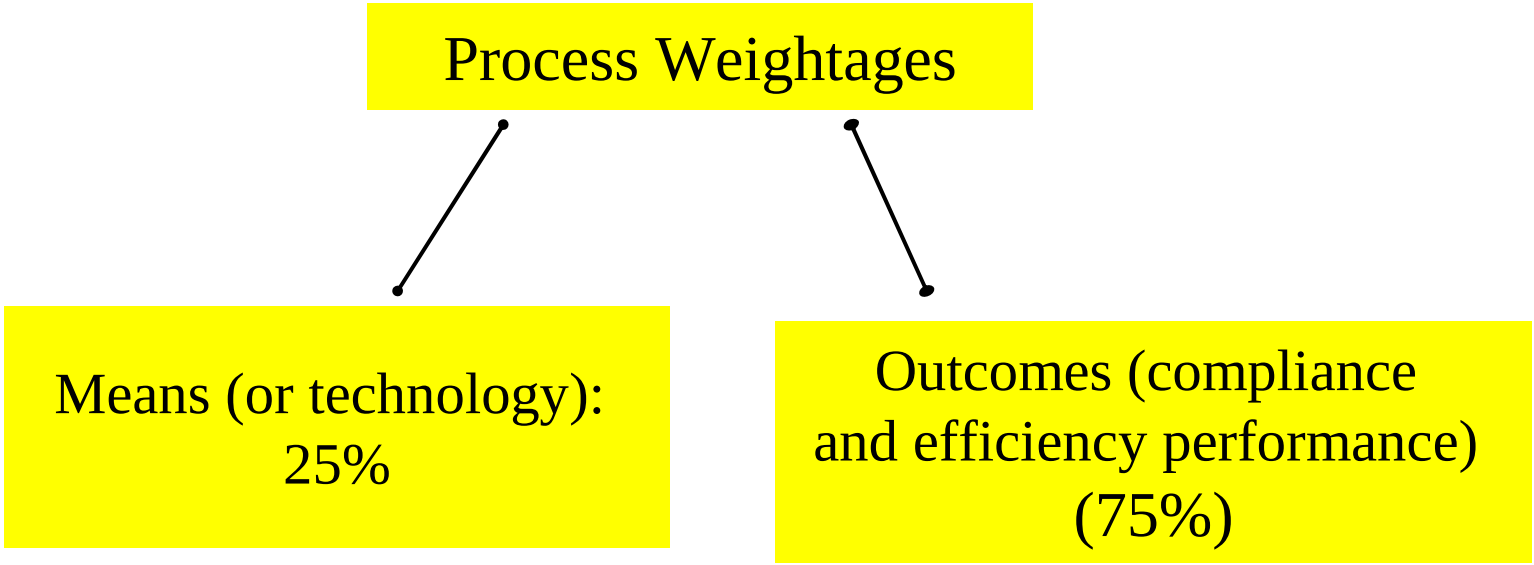
Process stage		%
Production phase		**82.5**
Iron making (all stages combined)	35	
Steel making	7.5	
Raw material handling and storage	6.0	
Resource Use (water, specific energy, land)	16.0	
Overall plant level pollution	18.0	
Safety and Environment Management Systems		**7.5**
Stakeholders' perception & disclosure		**10.0**
Total		**100.0**

Rating Weightages and Criteria

Technology Neutral

Apple to apple comparison:

- blast furnace to blast furnace best practice
- coal DRI to coal DRI best practice, and so on



Bottomline

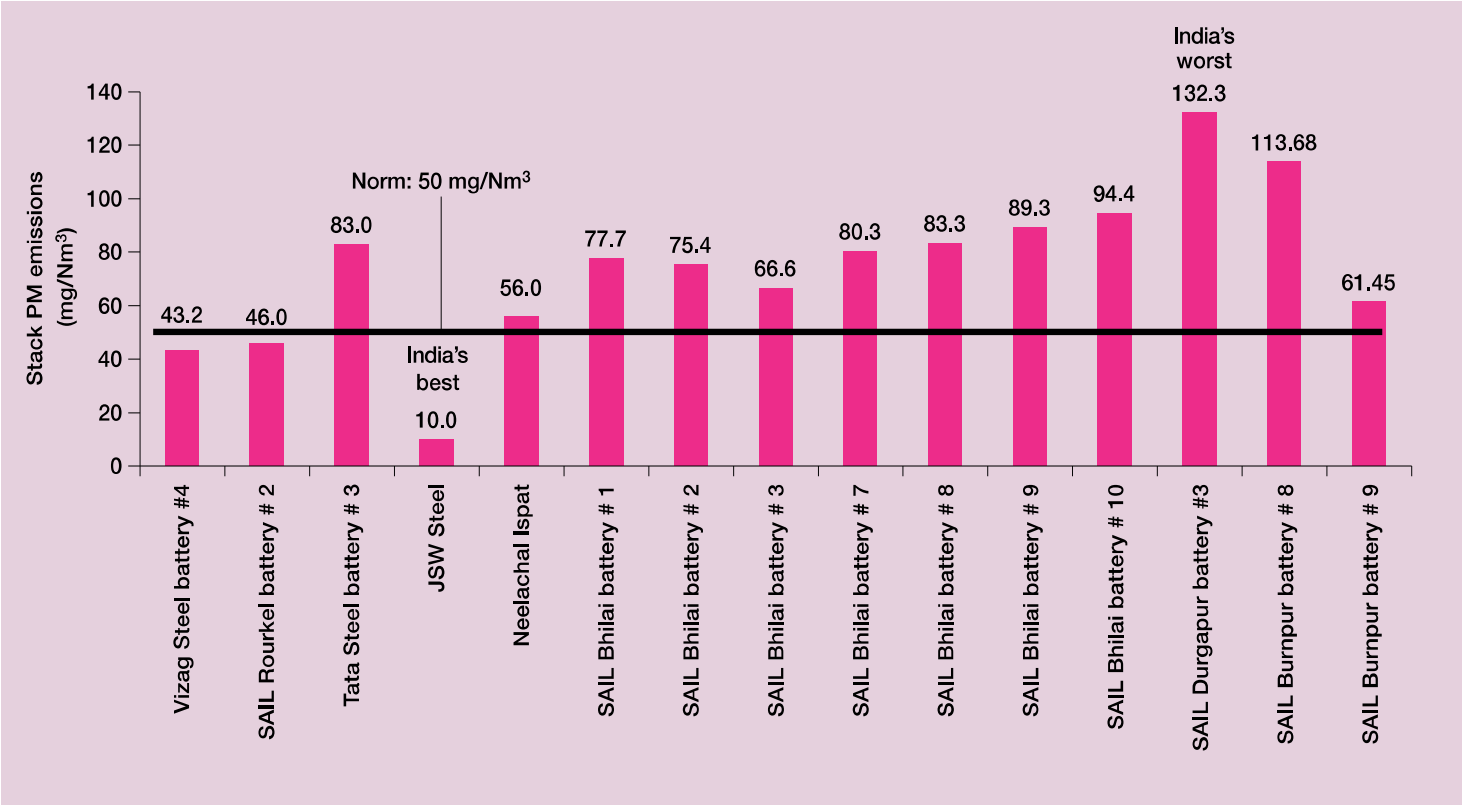
No matter what technology is adopted,
performance matters most

Iron making: BF-BOF

INDICATORS		%
Raw material preparation		**23**
• Coke making	14	
• Ore Agglomeration (Sinter/pellets)	9	
Blast furnace		**12**
Total		**35**

Raw material preparation - Indicator

- By-product coke ovens: Coke oven stack particulate matter emissions
- Non–compliance to norms



Note: SAIL Bhilai, SAIL Durgapur and SAIL Burnpur – information from state pollution regulatory agencies
Source: 2012, *Green Rating of the Indian Iron and Steel Sector*, CSE, New Delhi

Raw material preparation - Indicator

- Sinter plant productivity
- Reason – to assess energy efficiency

Sources: 2012, *Green Rating of the Indian Iron and Steel Sector*, CSE, New Delhi; *Anon 2011, '54th meeting of Blast Furnace and Sinter Plant Operating Committee', MECON, http://www.meconlimited.co.in/ocm54/sessions/index.htm (as viewed on March 21, 2012) – not verified under GRP; **SAIL Bhilai – information obtained under RTI (2011) – not verified under GRP

Raw material preparation - Scoring

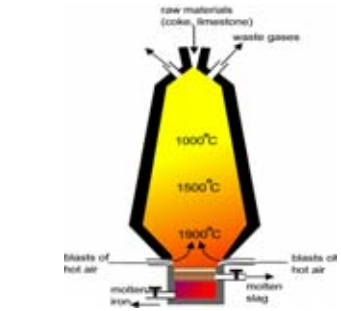
BYPRODUCT COKE OVENS

Plant	%
Vizag Steel	39.1
Tata Steel	34.5
JSW Steel	33.8
Neeclachal Ispat	29.9
SAIL Rourkela	21.5
SAIL Bhilai	9.7
SAIL Bokaro	6.6
SAIL Durgapur	5.9
SAIL IISCO Burnpur	5.9

SINTER PLANTS

Plant	%
Ispat Industries, Dolvi	33.2
Jindal Steel & Power, Raigarh	31.9
JSW Steel, Vijaynagar	28.8
Tata Steel	28.6
Bhushan Power, Sambalpur	25.6
Vizag Steel	24.8
Neelachal Ispat	23.2
SAIL Rourkela	17.4
Jai Balaji Durgapur	11.4
SAIL Bhilai	10.1
SAIL Durgapur	9.6
SAIL Bokaro	7.6
Bhushan Steel Dhenkanal	2.8
Jayaswal Neco	0.0

Iron process



Blast Furnace

Coal based sponge iron

Gas based sponge iron

Corex

IRON

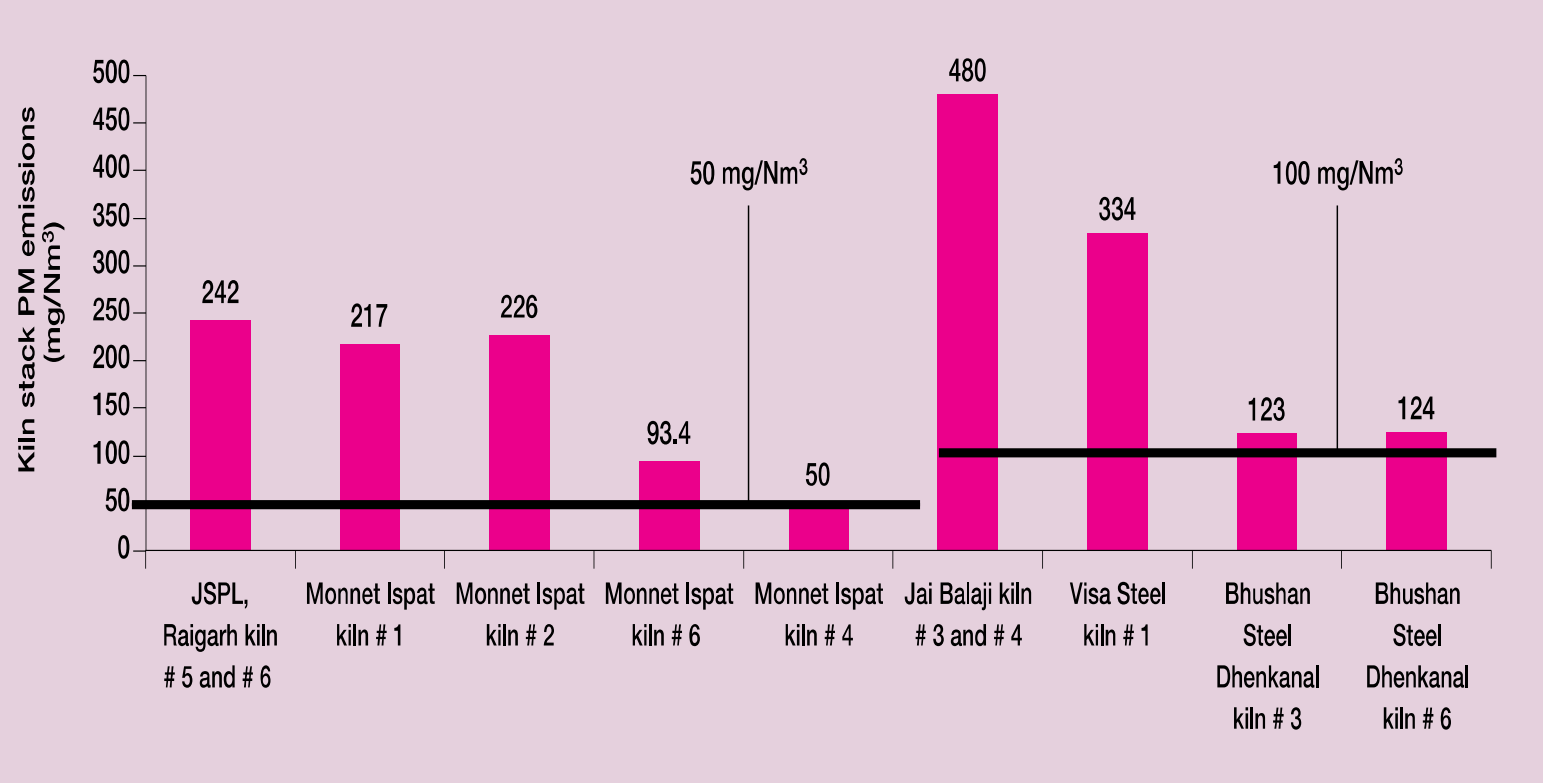
Iron process - Indicator

- Blast Furnace – Design top pressure
- Reason – to assess high productivity and energy efficiency

Sources: 2012, *Green Rating of the Indian Iron and Steel Sector*, CSE, New Delhi, *SAIL Bhilai and Burnpur – information obtained under RTI (2011), **Anon 2011, '54th meeting of Blast Furnace and Sinter Plant operating committee', MECON, http://www.meconlimited.co.in/ocm54/sessions/index.htm (as viewed on April 12, 2012), ***Company submission to BEE and EIA reports

Iron process - Indicator

- Coal DRI – Kiln stack PM emissions
- Reason – compliance to norms



Source: Inspection reports of state pollution control boards

Iron process - Scoring

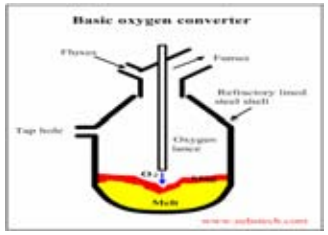
BLAST FURNACE

Plant	%
Bhushan Power, Sambalpur	44.6
Ispat Industries, Dolvi	44.5
Jindal Steel and Power, Raigarh	42.6
Tata Steel	38.0
JSW Steel, Vijaynagar	33.0
Jai Balaji Durgapur	32.3
Vizag Steel	29.1
Neelachal Ispat	20.7
SAIL Rourkela	15.2
Visa Steel	15.2
Usha Martin	12.0
Jayaswal Neco	<15.0
SAIL Bhilai	<15.0
SAIL Bokaro	<15.0
SAIL Durgapur	<15.0
SAIL IISCO Burnpur	<15.0
Bhushan Steel Dhenkanal	<15.0

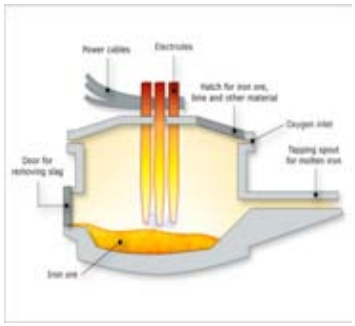
COAL DRI (SPONGE IRON)

Plant	%
Godawari Ispat	24.1
Visa Steel	17.9
Jindal Steel and Power, Raigarh	16.7
Bhushan Power, Sambalpur	13.2
Jai Balaji, Durgapur	11.0
Usha Martin	11.0
Jayaswal Neco	3.2
Monnet Ispat	2.4
Bhushan Steel, Dhenkanal	2.2

Steel Making



Basic Oxygen Furnace



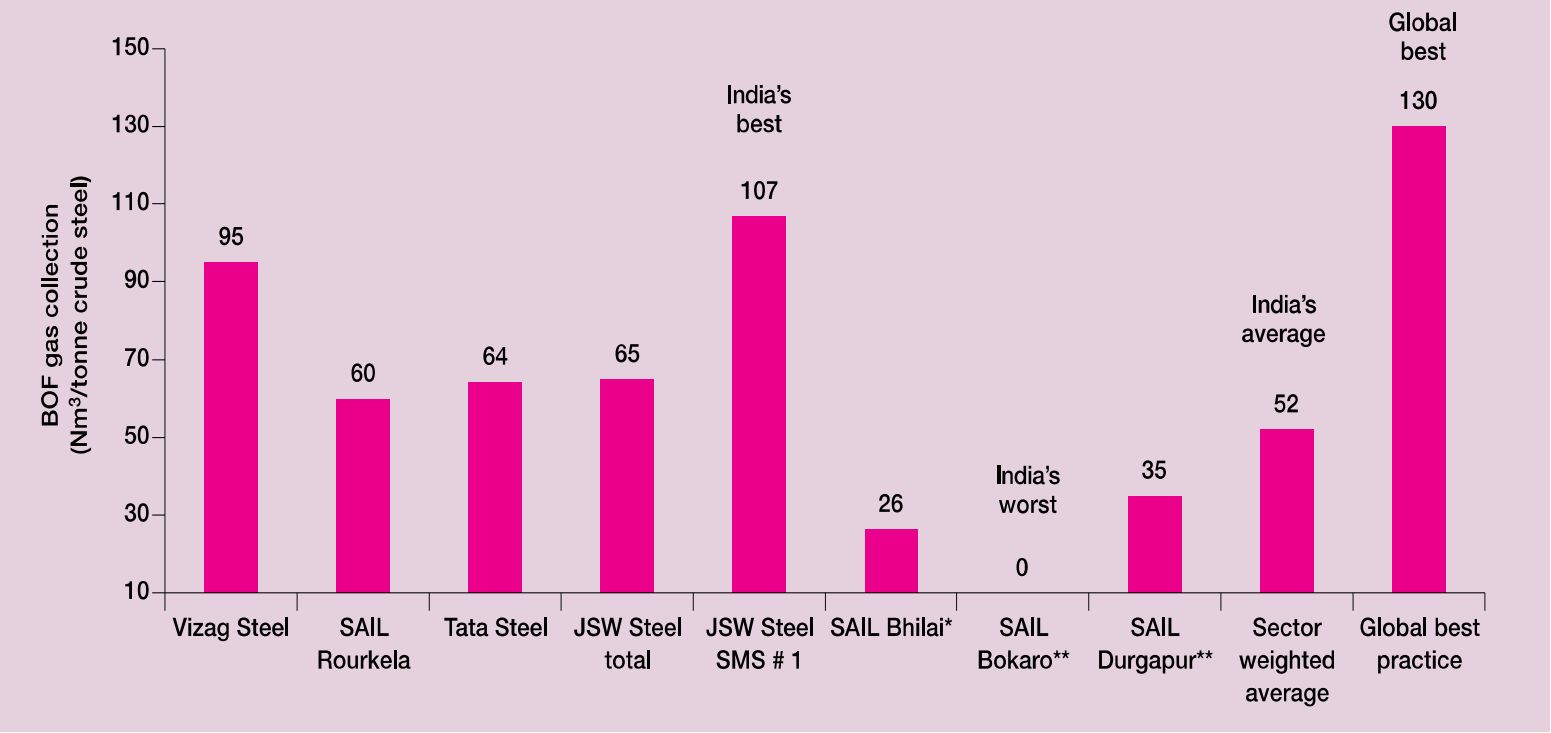
Electric Arc Furnace

Electric Induction Furnace

LIQUID STEEL

Steel making - Indicator

- Specific BOF waste gas recovery rate
- Reason – to assess energy recovery and use



Sources: 2012, *Green Rating of the Indian Iron and Steel Sector*, CSE, New Delhi; *SAIL Bhilai – information obtained under RTI (2011) – not verified under GRP; **SAIL Bokaro and SAIL Durgapur – SAIL Rourkela CDM project submission, http://cdm.unfccc.int/Projects/DB/DNV-CUK1169106251.8/ReviewInitialComments/78BVQ5C59EZKFLE2SKLVXD889FXD42 as viewed on April 16, 2012

Steel making - Indicator

- Electric Arc Furnace – Specific slag generation rate
- Reason – to asses process efficiency and solid waste generation

Source: 2012, *Green Rating of the Indian Iron and Steel Sector*, CSE, New Delhi

Steel making - Scoring

BASIC OXYGEN FURNACE

Plant	%
JSW Steel, Vijaynagar	34.2
Tata Steel	32.4
Vizag Steel	28.0
SAIL Rourkela	24.5
SAIL Bokaro	10.8
SAIL Durgapur	6.1
SAIL Bhilai	5.5
SAIL IISCO Burnpur	2.0

ELECTRIC ARC FURNACE

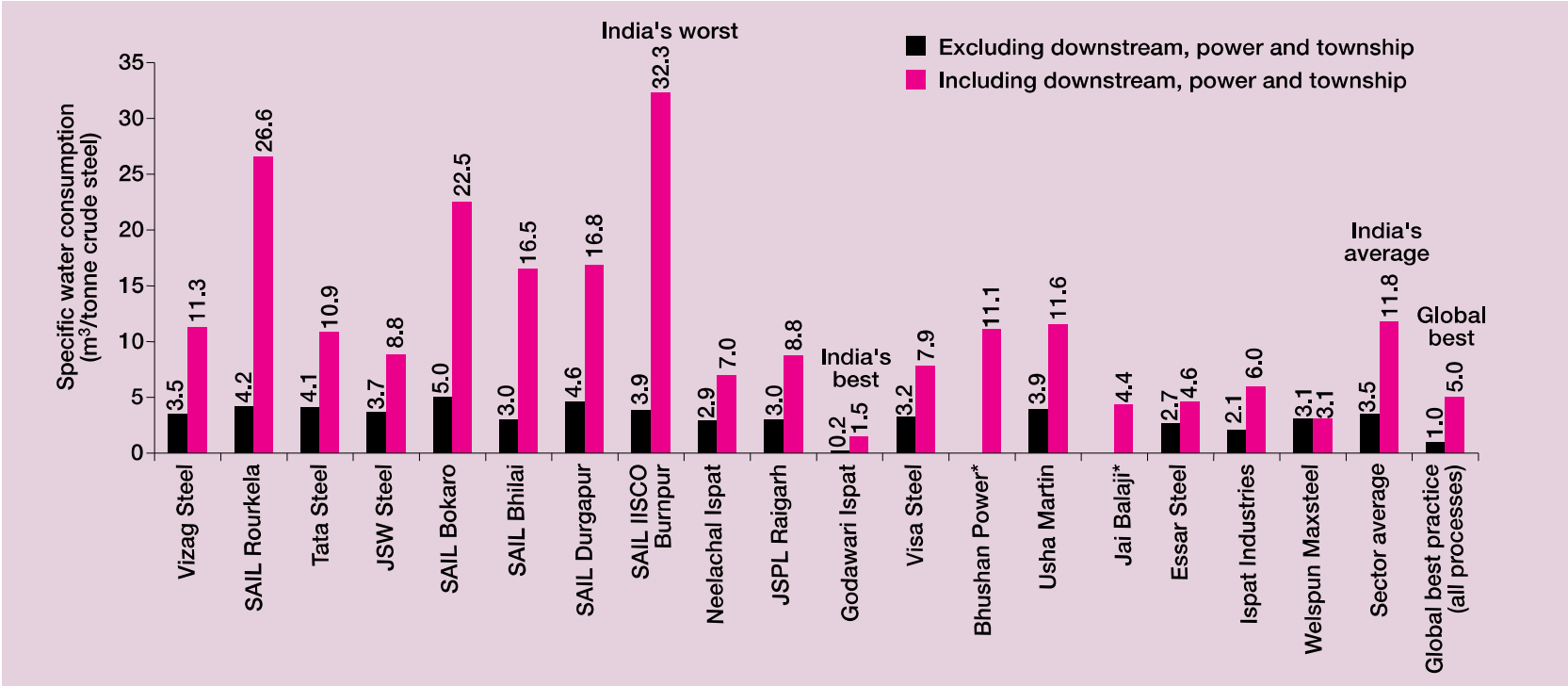
Plant	%
Essar Steel	27.0
Jindal Steel, Raigarh	26.3
Ispat Industries	25.9
Jai Balaji	23.7
Bhushan Power, Sambalpur	22.0
Usha Martin	14.1
Jayaswal Neco	5.1
Bhushan Steel, Dhenkanal	1.0

Resource Use

INDICATORS	%
Specific water consumption and water stress index	6.0
Land Use Efficiency	2.5
Specific Energy Consumption	5.0
Specific iron ore and flux consumption	2.5
Total	**16**

Resource use - Indicator

- Specific plant level water consumption
- Reason – to assess how water efficient are plants

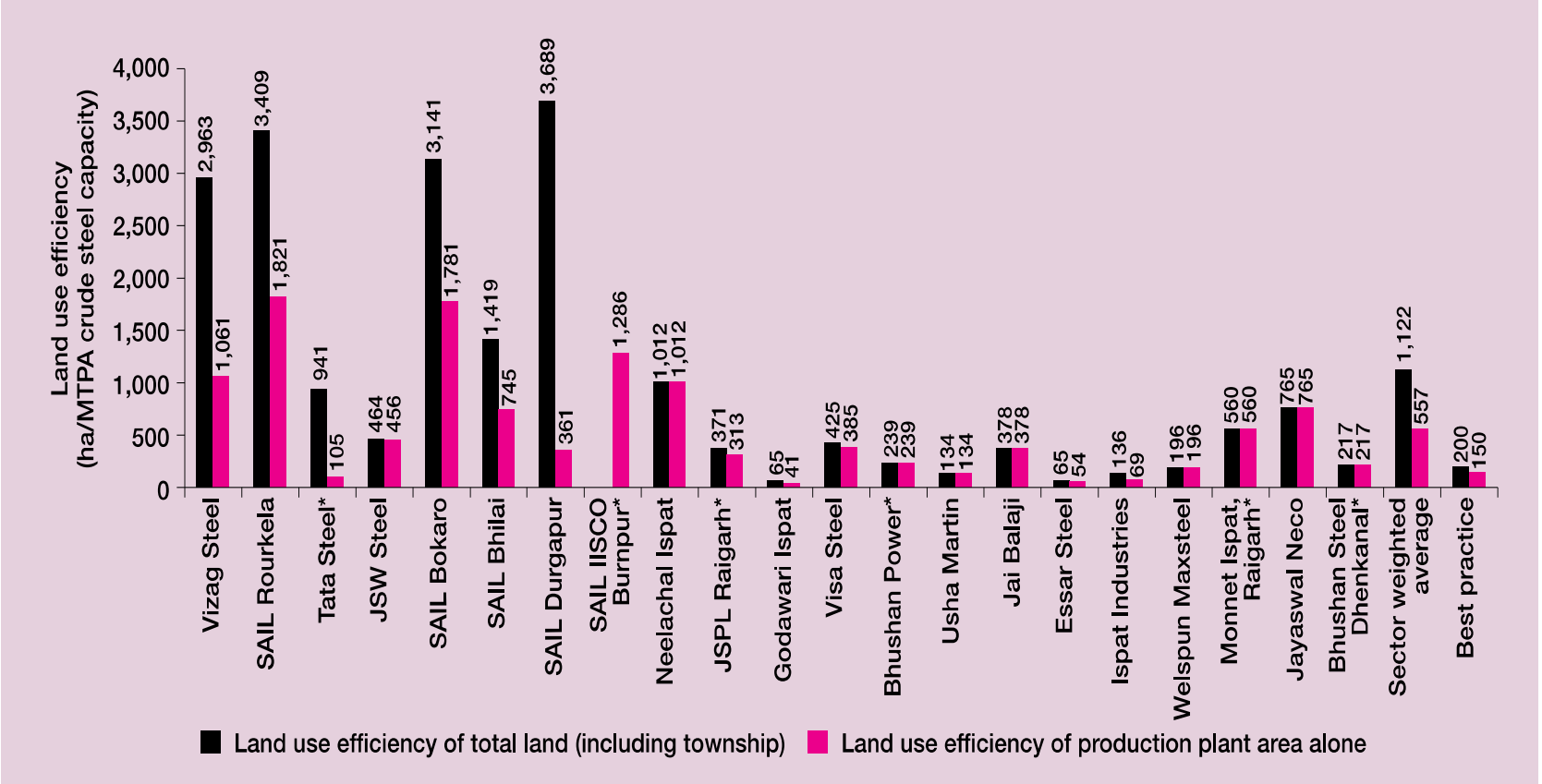


Notes: Information for non-participating plants is sourced from pollution control boards. For plants which import grid power, the equivalent water consumed @ 5m^3/MWh has been considered

Source: 2012, *Green Rating of the Indian Iron and Steel Sector*, CSE, New Delhi; *No data of specific water consumption excluding downstream, power and township available for Jai Balaji and Bhushan Power

Resource use - Indicator

- Land use efficiency
- Reason – is land being efficiently used



Note: *These plants dump significant solid waste outside production premises which has not been accounted here.

Source: 2012, *Green Rating of the Indian Iron and Steel Sector*, CSE, New Delhi.

Overall Pollution Impact

INDICATORS	%
Ambient Air Quality compliance and stack emissions management	6.0
Water Pollution management	4.0
Solid waste management	6.0
Carbon emissions intensity	2.0
Total	**18**

Safety and Environment Management systems

INDICATORS	%
Occupational Safety performance	3.0
Occupational Health measures	2.0
Environmental management systems, reporting and transparency and innovation	2.5
Total	**7.5**

Safety and Environment Management - Indicator

- Fatality Rate
- Reason – to assess how unsafe is a plant's working conditions

Plant name	2007-08	2008-09	2009-10	Total for three years
Vizag Steel, Visakhapatnam	2	5	3	10
SAIL Rourkela	2	3	6	11
Tata Steel, Jamshedpur	5	5	1	11
Neelachal Ispat, Kalinganagar	1	1	1	3
JSPL Raigarh	6	4	3	13
JSW Steel Vijaynagar	0	2	4	6
Ispat Industries, Raigad	5	2	2	9
Essar Steel, Hazira	2	0	3	5
Godawari Ispat, Raipur	8	0	4	12
Visa Steel, Kalinganagar	1	3	1	5
Usha Martin, Jamshedpur	3	0	1	4
SAIL IISCO Burnpur**	2	4	8	14
SAIL Bhilai*	4	6	2	12
SAIL Bokaro*	4	4	10	18
SAIL Durgapur*	0	1	1	2
Jai Balaji, Durgapur	0	0	0	0
Bhushan Steel, Dhenkanal*	NA	NA	9	9
Total	**45**	**40**	**59**	**144**

Note: NA = not available
Sources: 2012, *Green Rating of the Indian Iron and Steel Sector*, CSE, New Delhi. *Anon 2009, *Annual Report 2009*, Joint Committee on Safety Health and Environment in the Steel Industry – reported for 2007, 2008 and 2009 respectively, **SAIL IISCO Burnpur– information obtained under RTI (2011)

Stakeholders' Perception

INDICATORS	%
Pollution Control Board's perception	2.5
Local Community's perception on environment and sustainable development	3.0
Local Community's perception on rehabilitation and resettlement and other social concerns	2.0
Primary surveyor's perception, transparency during GRP survey and overall involvement	2.5
Total	**10.0**

Summary

- **More than 150 parameters; technology, process performance, efficiency, pollution, compliance, management systems etc.**
- **2 years of rigorous assessment**
- **With hope that this will drive the steel sector towards better social and environmental practices.**