

World Steel Dynamics (WSD) is a leading steel information service in Englewood Cliffs, N.J.

WSD's steel experience, steel database and availability of steel statistics are the principles for performing steel forecasts, studies and analysis for international clients. WSD seeks to understand how the "pricing power" of steel companies the world over will be impacted by changes in the steel industry's structure.



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Q. If the spot price of ore remains below \$120 per tonne delivered to China, will Chinese domestic iron ore production fall sharply?

A. WSD believes that a price of \$120 per tonne delivered to the Chinese mill, excluding value-added tax (VAT), is still higher than most Chinese iron ore mines' marginal cost. In fact, even when the iron ore price drops below an iron ore mine's marginal cost, it may take several months before there is a cutback due to a backlog of deliveries at a higher price.

Capital spending in the Chinese iron ore industry has been reported at \$6 billion in 2007, \$10 billion in 2008, \$12 billion in 2009, \$16 billion in 2010 and about \$19 billion in 2011. Yet, in these five years, only about five large-sized iron ore mines have been developed in China. Much of the capital spending has been targeted to replace depleting mines, which explains why concentrate production from 2006 to 2011 has risen by only about 137 million tonnes to about 437 million tonnes in 2011 — which is a small amount relative to capital spending. Concentrate capacity in 2011 is estimated at 550 million tonnes on a 62% Fe content basis.

Through the first nine months of 2011, concentrate iron ore production was up 17.1% on a year-over-year basis. It is estimated that 2.85 tonnes of gross ore is required per tonne of concentrate. In 2011, Chinese concentrate production is expected to have amounted to 437 million tonnes. WSD estimates that the average production cost in China for iron ore concentrate in 2011 may have been \$84 per tonne (excluding financial and overhead costs), up from \$75 in 2006. These cost estimates exclude the marketing cost, which may be several dollars per tonne, and the cost to deliver the concentrate to the steel plant, which may be \$10–30 per tonne.

Analysis shows that only about 11%, or 47 million tonnes, of the iron ore mines currently operating in China have an operating cost to produce iron ore concentrate in excess of \$100 per tonne before the sales expense and the cost of shipment to the steel plant.

Many Chinese iron ore mines located far from the coast are dedicated to serving nearby steel plants; hence, the production of the mine is tied directly to the production of the steel plant. When a steel plant cuts its output and reduces iron ore usage, it is difficult for the plant's regular iron ore supplier to shift production to another steel plant, which is probably also reducing its output.

Assuming a price of \$150 per tonne (66% Fe content, excluding the 17% VAT) in Hebei Province includes the cost of transporting the iron ore concentrate to the plant and the profit for iron ore traders; and, if an average transportation cost of \$20 per tonne, a selling expense of \$2 per tonne and a steel trader's profit of \$7 per tonne (ranging from \$3 to \$10 per tonne depending on the market price) are assumed, the FOB price at the iron ore concentrating plant would be about \$121 per tonne (see Table 1) — a figure that leaves a sizable profit for the average iron ore mine even after financial cost of perhaps \$10–15 per tonne. The cost to ship the iron ore from the Chinese port to the steel mill in Hebei province is estimated at \$15–25 per tonne. (Note: There are no separate figures published on the profits generated by the Chinese iron ore industry). ♦

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Comments are welcome. To submit your questions for WSD, email WSD@aist.org. Please include your full name, company name, mailing address and email in all correspondence.

Table 1

Global Metallics Balance: Pig Iron Coal Requirements

	2006	2007	2008	2009	2010	2011	2012e	2013e	2014e	2015e
China's imported iron ore prices (\$ per tonne, with VAT)										
Benchmark 63.5% Fe contract price, FOB Brazil	47	51	89	61	117 ⁽²⁾	105 ⁽³⁾	110 ⁽⁵⁾	80 ⁽⁶⁾	75 ⁽⁶⁾	75 ⁽⁶⁾
Delivered to Chinese port from Brazil	98	170	160	108	172 ⁽⁴⁾	159 ⁽⁴⁾	165 ⁽⁴⁾	127 ⁽⁴⁾	121 ⁽⁴⁾	121 ⁽⁴⁾
Delivered to Chinese port from Western Australia	115	99	128	90	155 ⁽⁴⁾	142 ⁽⁴⁾	159 ⁽⁴⁾	111 ⁽⁴⁾	105 ⁽⁴⁾	105 ⁽⁴⁾
Delivered to Chinese port from India	144	221	171	112	164 ⁽⁴⁾	152 ⁽⁴⁾	162 ⁽⁴⁾	118 ⁽⁴⁾	112 ⁽⁴⁾	112 ⁽⁴⁾
China domestic market price (\$ per tonne, with VAT)	85	176	184 ⁽¹⁾	116	160	148	156	120	115	115
Capital outlays on iron ore (US\$ billion)	4.6	5.9	9.6	12.3	15.7	18.7	14.0	10.0	8.0	6.0
Y-to-Y% change		28.3%	62.7%	28.1%	27.6%	19.1%	0.0%	-46.5%	-42.9%	-40.0%

China iron ore production capacity

Cost: \$120 per tonne and up	—	—	—	5	20	40	60	60	60	60
Cost: \$110 to \$120 per tonne	—	—	5	20	30	50	60	80	80	80
Cost: \$100 to \$110 per tonne	—	10	15	25	50	70	80	90	100	100
Cost: \$90 to \$100 per tonne	30	35	45	55	70	110	120	120	120	120
Cost: \$70 to \$90 per tonne	90	95	110	120	115	105	95	90	85	85
Cost: less than \$70 per tonne	180	195	195	190	185	175	165	160	155	150
Total	300	335	370	415	470	550	580	600	600	595

Chinese iron ore production by cost⁽⁶⁾

Cost: \$110 and up	—	—	—	—	2	7	0	0	0	
Cost: \$100 to \$110 per tonne	—	10	5	0	19	40	60	70	70	70
Cost: \$90 to \$100 per tonne	30	35	30	30	72	110	120	120	120	120
Cost: \$70 to \$90 per tonne	90	95	110	120	110	105	95	90	85	85
Cost: less than \$70 per tonne	180	195	195	185	180	175	165	160	155	150
Total	300	335	340	335	383	437	440	440	430	425
Average production cost, US\$ per tonne	75.5	76.9	76.2	76.3	81.1	84.3	88.5	89.8	90.1	90.4

(1) September 2008.

(2) Benchmark price up 90% in 2010–2011.

(3) If average price of imported ore is down 10% in 2011.

(4) Includes \$11 (from Western Australia to China) or \$26 (from Brazil to China) per tonne in ocean freight and insurance expense, \$6 per tonne in ship unloading fees, and 17% VAT. Does not include the estimated \$13-per-tonne transportation fee from Chinese port to the steel mill.

(5) If average price of imported ore is down 27% in 2013, down 6% in 2014 and no change in 2015.

(6) If average price of imported ore is up 5% in 2013.

Source: WSD estimates.