World steel demand and supply dynamics

Implications for metallurgical coal and coke

23rd October 2006

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Hatch Beddows

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- Hatch, Hatch Consulting and Hatch Beddows
- Purpose of this presentation
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- Hatch supplies business, process and technology consulting, design and engineering and construction, operations and project management to the mining and metals, energy and infrastructure industries worldwide
- Established 1955 and employee owned
- 7300 highly skilled people serving clients worldwide
- US$16BN of projects now under management in 60 countries

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- Safety
- Quality
- Innovation
- Sustainable development
- Effective risk management

We deliver unprecedented and sustained results for our clients

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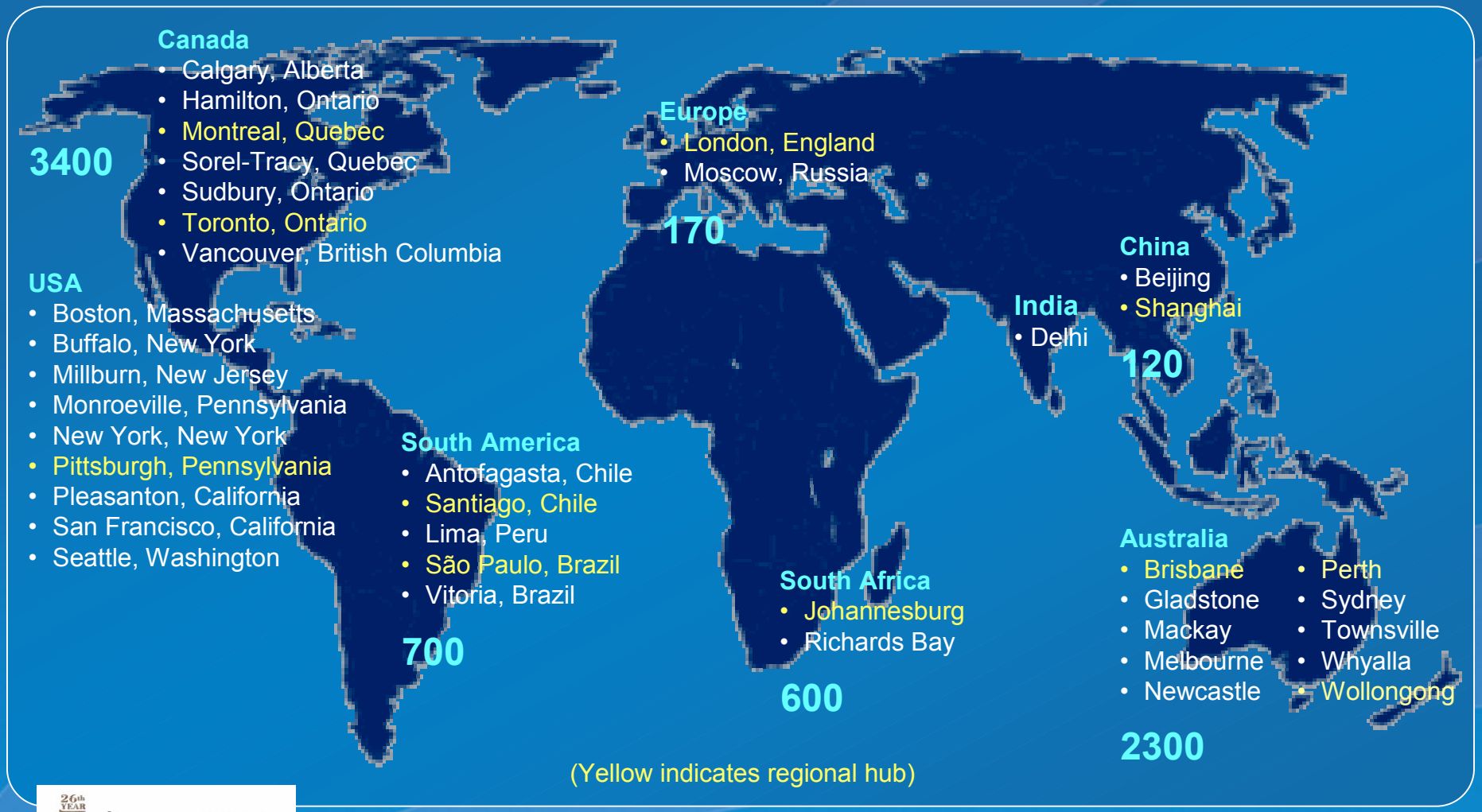
7300 people Oct. 2006



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- **Hatch Consulting** is the world's leading management consultancy specialising in the mining and metals industries and provides high level support services, ranging from corporate and business strategy development through strategic market studies to implementation of new technologies, management and operating practices
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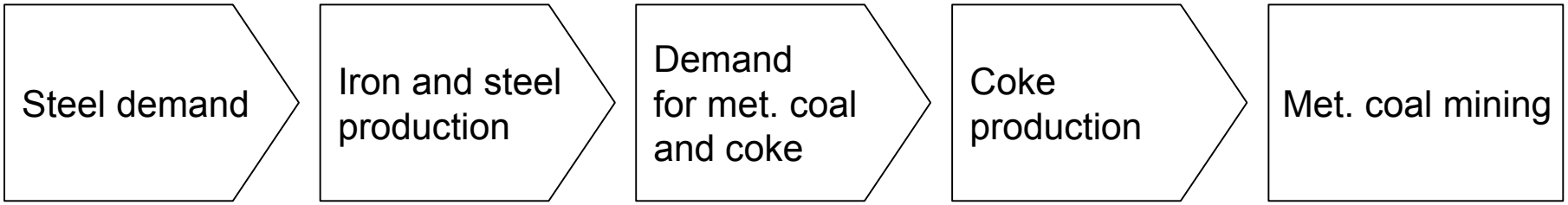
THE PURPOSE OF THIS PRESENTATION

We should like to share some of our thoughts on the future outlook for the iron and steel industry and implications for met. coal and coke

"Consumption is the sole end and purpose of all production"

Adam Smith, 1776



Change in the iron and steel industry will lead to new challenges and opportunities for suppliers

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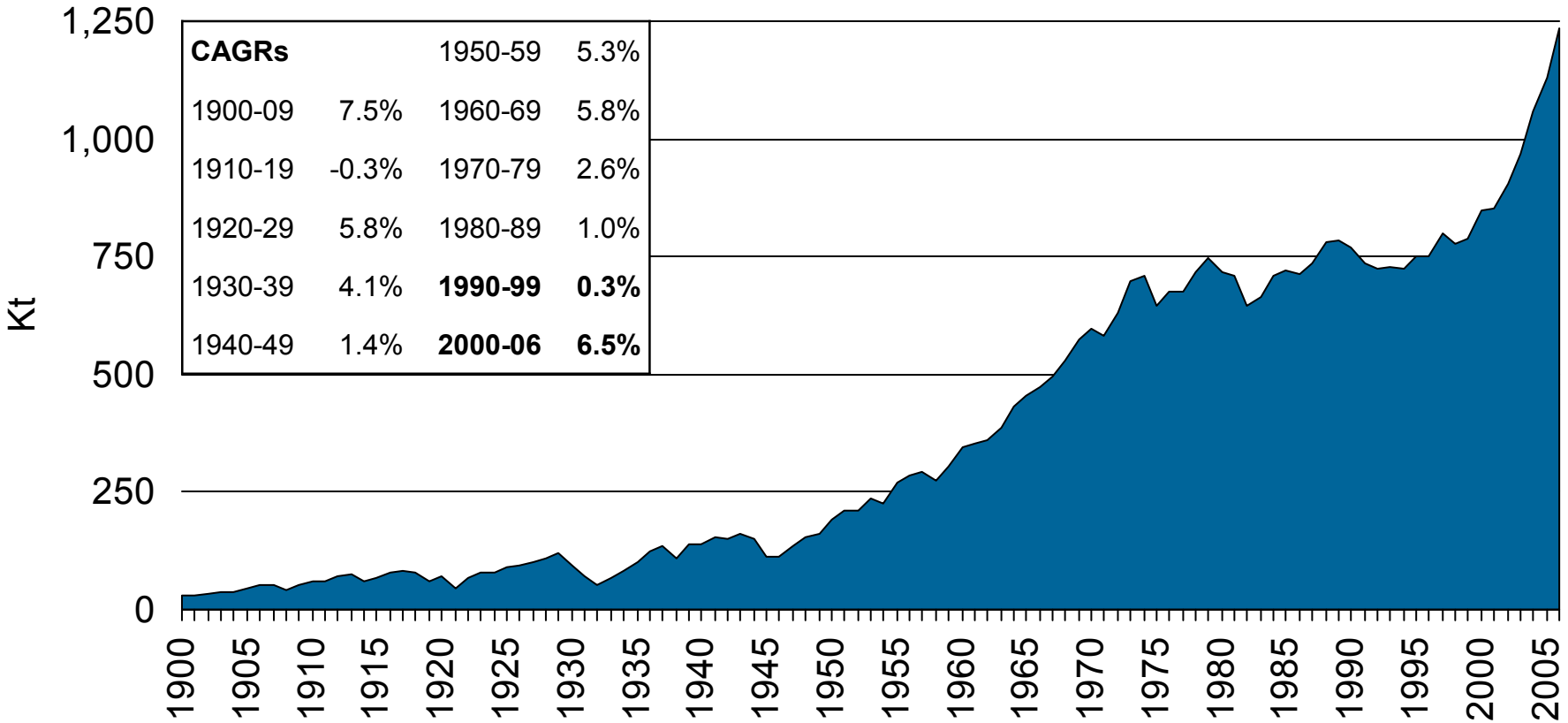
STEEL DEMAND

Strong growth in steel demand has attracted much attention in recent years. It is not unprecedented but stands in stark contrast to the 1990s

Global crude steel production



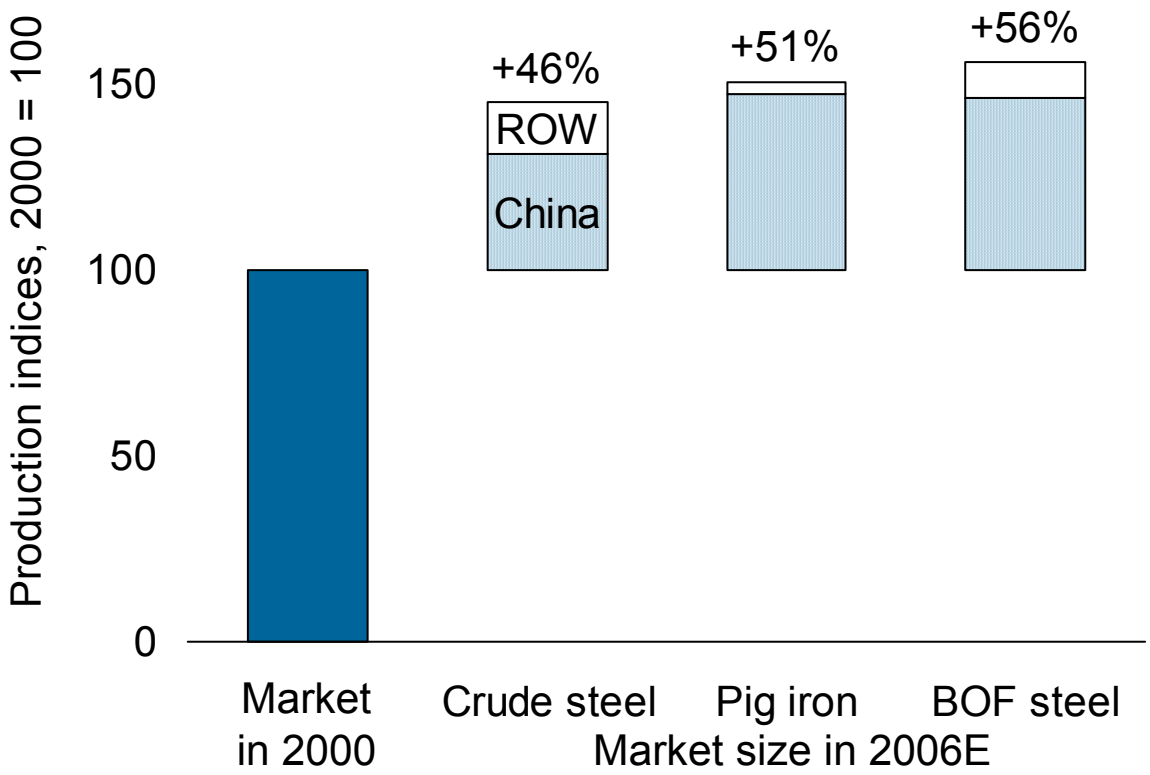
CAGRs		1950-59	5.3%
1900-09	7.5%	1960-69	5.8%
1910-19	-0.3%	1970-79	2.6%
1920-29	5.8%	1980-89	1.0%
1930-39	4.1%	**1990-99**	**0.3%**
1940-49	1.4%	**2000-06**	**6.5%**

Data: Hatch Beddows, IISI

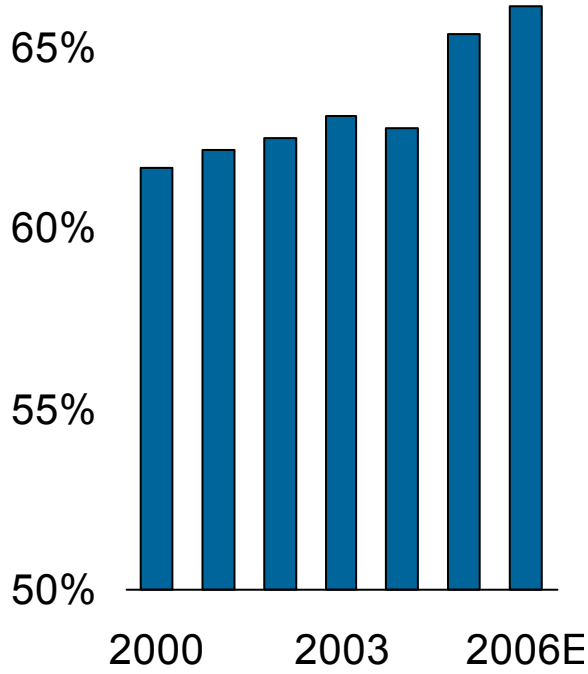
STEEL DEMAND

Met. coal-based steel production has been rising at an even faster rate as BF / BOF-based steelmaking has increased its share of the total

World crude steel and pig iron production



BOF share of steel output



Data: Hatch Beddows, IISI. Note: Hatch Beddows' estimates for 2006

STEEL DEMAND

The short-term cyclical outlook for steel demand remains strong

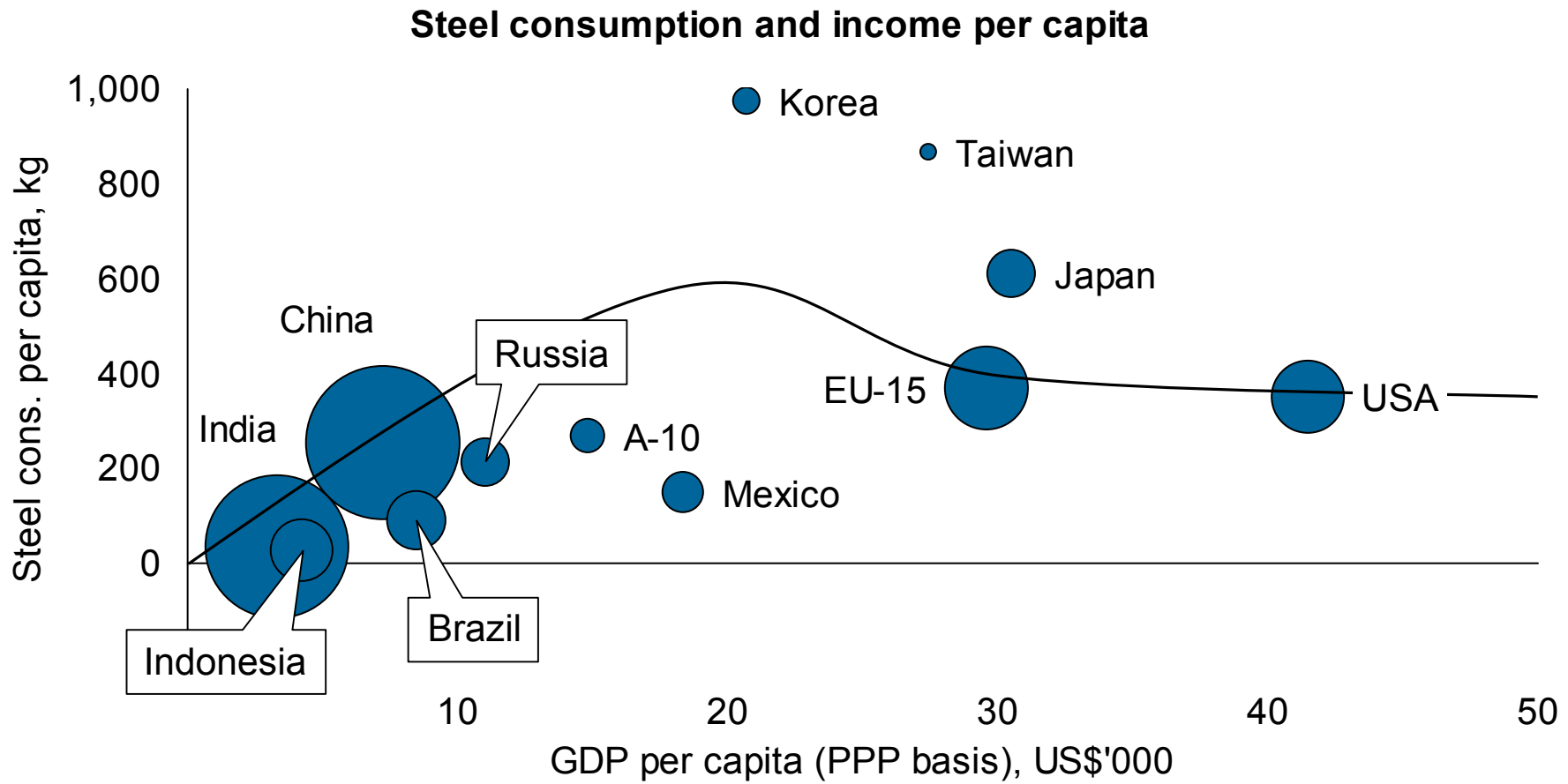
World steel demand, 2005-07

	Finished steel consumption, Mt			YoY changes	
	2005	2006E	2007F	2005-06	2006-07
North America	140	152	151	8.7%	-0.7%
South America	32	36	39	11.5%	7.2%
Europe	170	184	185	8.4%	0.4%
CIS	44	47	51	6.9%	9.5%
China	327	374	413	14.4%	10.4%
India	38	42	46	10.0%	9.1%
Japan	78	79	81	0.8%	2.8%
Other Asia[1]	144	146	149	1.3%	1.8%
Middle East	34	37	41	9.7%	8.8%
Africa	22	25	26	9.8%	4.5%
Total	1,029	1,121	1,179	8.9%	5.2%

Data: Hatch Beddows, IISI. Note: 1. Includes Oceania

STEEL DEMAND

Steel demand is driven by population, economic growth and development. Half of the world's population lives in high growth, developing countries



Data: Hatch Beddows, IISI, IMF, UN. Note: 2005 data. Size of bubbles is proportional to size of population in each country or region

STEEL DEMAND

The inherent potential for long-term growth in steel demand is substantial… Maybe ~500Mt in the next ten years or so…?

Long-term perspective on potential steel demand, Mt[1]

Region	2005	LT CAGR[2]	~2015	Key differences
North America	140	1.5%	162	
South America	32	4.0%	48	
Europe	170	1.5%	197	
CIS	44	4.0%	64	
China	327	6.0%	586	**259**
India	38	8.5%	86	**48**
Japan	78	0.5%	82	
Other Asia[3]	144	4.0%	211	**67**
Middle East	34	5.5%	58	
Africa	22	3.5%	32	
Total	1,029		1,525	**496**

Data: Hatch Beddows, *Strategic examination of the future of steel and steelmaking raw materials;* IISI
Note: 1. Finished steel consumption. 2. Long-term compound annual growth rate. 3. Includes Oceania

But where steel is wanted is *not* necessarily the same as where it will be made

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Future patterns of iron and steelmaking will reflect a number of factors

- Distribution of steel demand
- Costs of iron and steelmaking
- Availability of alternative raw materials and energy supplies
- De-integration of iron and steelmaking and rolling
- Consolidation of ownership and control
- Backward integration by steelmakers into raw materials
- Impact of environmental controls and government industrial policies
- Introduction of leading-edge technology in iron and steelmaking, casting and rolling

Costs of iron and steelmaking vary widely by region, with important implications for the location of new iron and steelmaking capacty

- De-integration of steelmaking and rolling may be viable where the difference in cost is > US$70-75/tonne
- De-integrated operations may be at an advantage with the flexibility to better respond to changing patterns of steel demand around the world

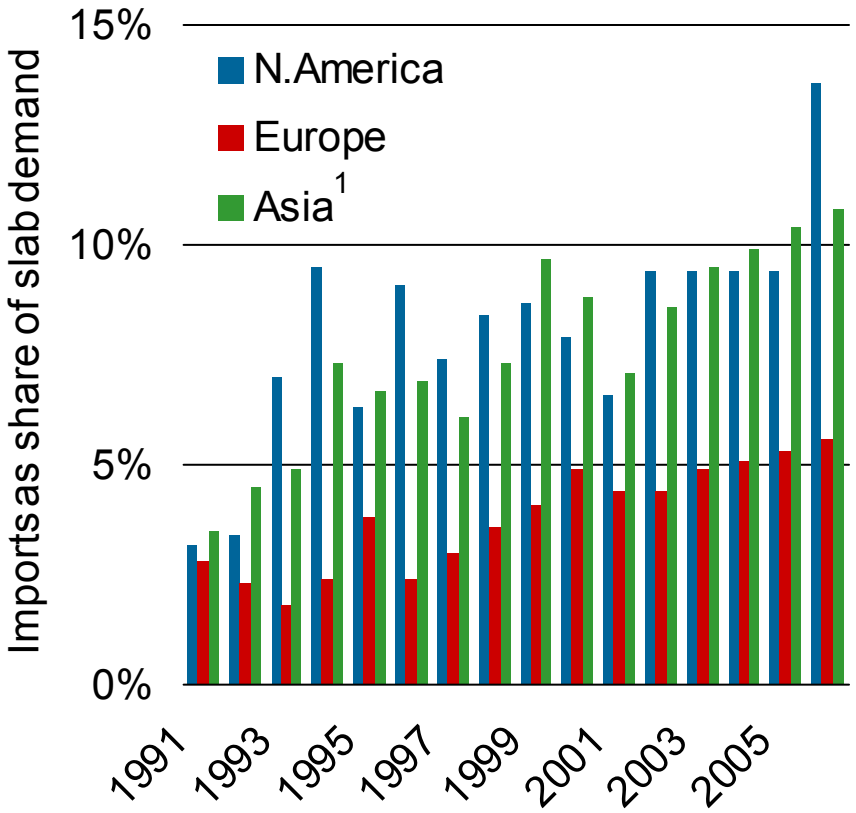
Cross-matrix comparison of indicative regional slab production costs[1]

	Brazil	Russia	India	US EAF	China	Japan	E.Eur	W.Eur	US BOF
Brazil	-	-15	-25	-55	**-70**	**-85**	**-90**	**-95**	**-105**
Russia	15	-	-10	-45	-60	**-70**	**-75**	**-85**	**-95**
India	25	10	-	-30	-45	-60	-65	**-70**	**-80**
US EAF	55	45	30	-	-15	-25	-35	-40	-50
China	70	60	45	15	-	-15	-20	-25	-35
Japan	85	70	60	25	15	-	-5	-15	-20
E.Eur	90	75	65	35	20	5	-	-5	-15
W.Eur	95	85	70	40	25	15	5	-	-10
US BOF	105	95	80	50	35	20	15	10	-

Data:Hatch Beddows, WSD. Note: 1. 2005 data. Calculations are based on regional average costs. Table reads right to left and a negative number signals a comparative cost saving and competitive advantage

A number of low cost steelmakers have already moved to acquire rolling operations in industrialised regions; other projects are under construction

Rising demand for traded slab

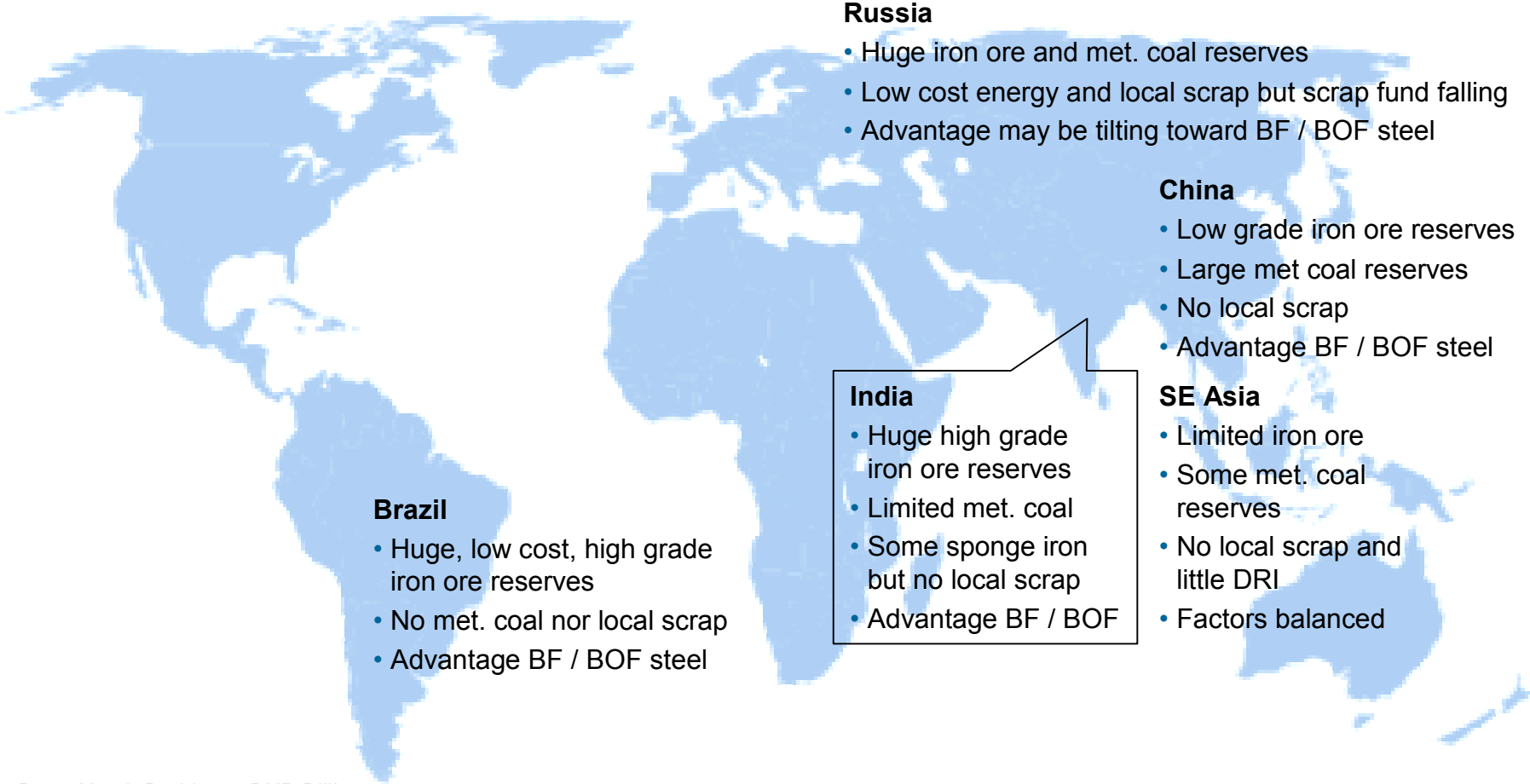


De-integration: some examples

Company	Steel plant	Overseas rolling
Evraz	NTMK, Russia	Palini e Bertoli, EU
ISD	Alchevsk, Ukraine	Czestochowa, EU DUNAFERR, EU
NLMK	Lipetsk, Russia	DanSteel, EU Duferco, EU / US
Severstal	Cherepovets, Russia	Rouge Industries, USA
SCM	Azovstal, Ukraine	Ferriera Valsider, EU

Data: Hatch Beddows, IISI, ISSB. Note: 1. Excluding China

Key factors of production in major growth markets and low cost steelmaking locations tend to favour BF / BOF process route



Russia
- Huge iron ore and met. coal reserves
- Low cost energy and local scrap but scrap fund falling
- Advantage may be tilting toward BF / BOF steel

China
- Low grade iron ore reserves
- Large met coal reserves
- No local scrap
- Advantage BF / BOF steel

India
- Huge high grade iron ore reserves
- Limited met. coal
- Some sponge iron but no local scrap
- Advantage BF / BOF

SE Asia
- Limited iron ore
- Some met. coal reserves
- No local scrap and little DRI
- Factors balanced

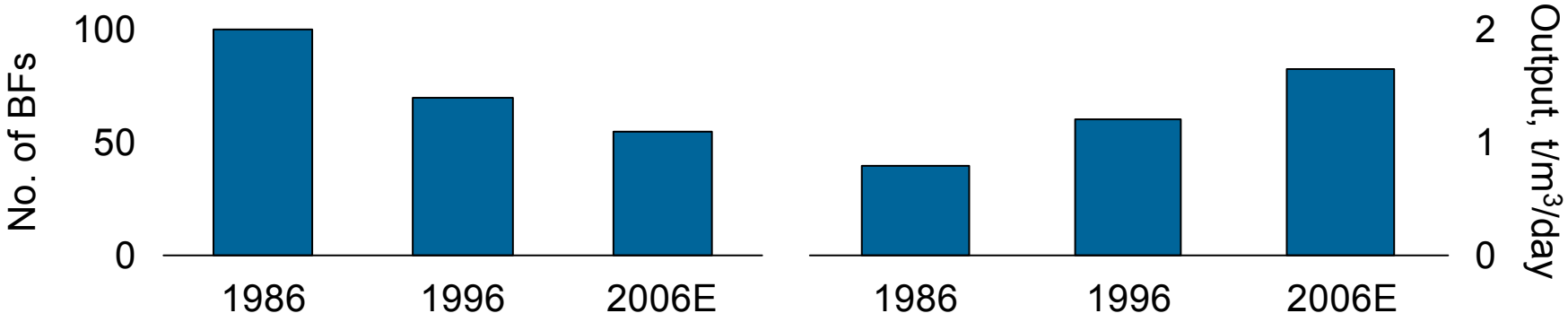
Brazil
- Huge, low cost, high grade iron ore reserves
- No met. coal nor local scrap
- Advantage BF / BOF steel

Data: Hatch Beddows, BHP Billiton

Operating trends in blast furnace iron output have important implications for the quality of met. coal and coke that the market demands

- Competitive pressure to improve productivity is the driving force for blast furnace operators
- An important input into blast furnace productivity is the quality of the coke and continuing pressure to improve productivity is likely to lead to larger quantities of high quality hard coking coal in the coal blend as well as increasing rates of pulverised coal injection
- Rising PCI rates may flatten the total demand curve for met. coal and coke but will further increase demand for high quality hard coking coals

West European blast furnace population and productivity

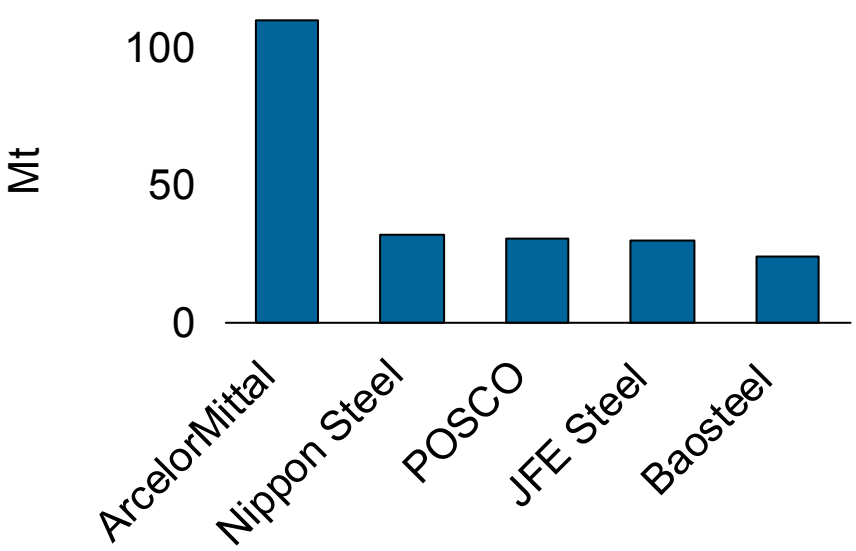


Data: Hatch Beddows, European Ironmaking Committee, VDEh

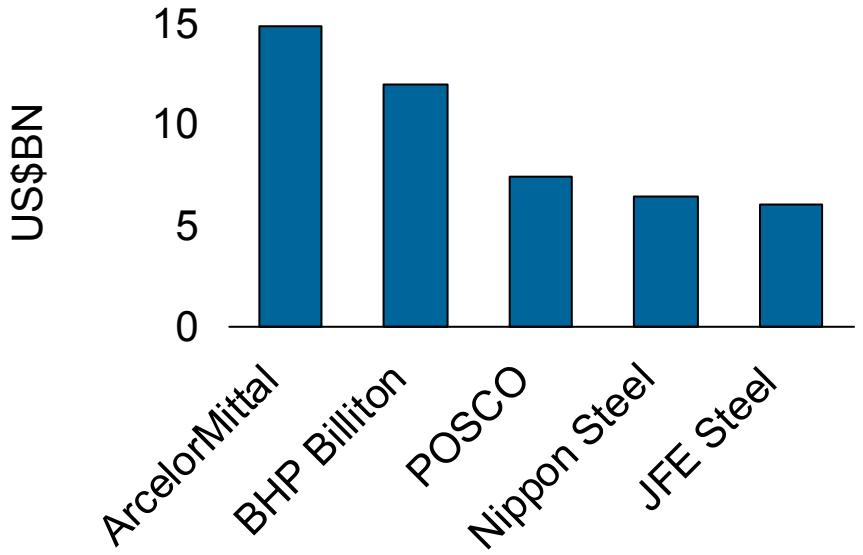
The Arcelor-Mittal merger creates a steel company on an entirely new scale…

- In 2005, ~110Mt crude steel produced proforma, almost four times that of its nearest rival
- 2005 EBITDA ~US$15BN, which outstrips the earnings of any mining company and is greater than the total revenues of many other steelmakers

Crude steel output in 2005



EBITDA in 2005



Data: Hatch Beddows, ArcelorMittal, Factiva, IISI. Note: ArcelorMittal data are proforma

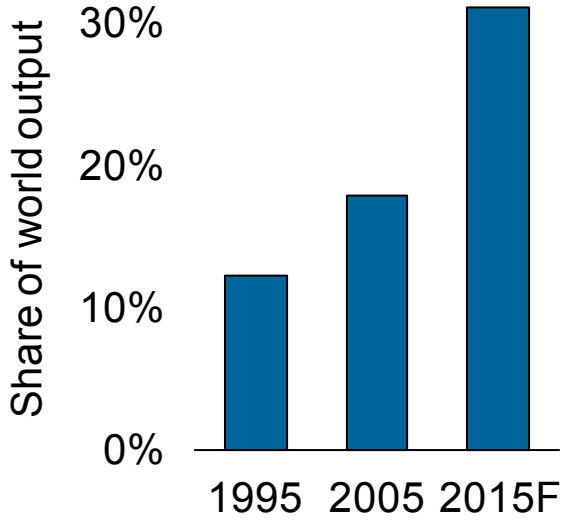
With significant strategic consequences for the ongoing consolidation of the steel industry

- ArcelorMittal is close to 50% self-sufficient in iron ore and 20% in met. coal and continues to seek opportunities to increase its coverage
- If ArcelorMittal's flat-rolled assets in Europe become self-sufficient in iron ore it would pose a threat to commercial product producers (Corus, Riva, Salzgitter)
- Steelmakers self-sufficient in iron ore and partially in coking coal command a clear advantage over their competitors and are likely to become increasingly dominant
  - Steelmakers in Russia, most in India, some in Brazil and Ukraine and maybe ArcelorMittal
- Probable strategic responses to this challenge
  - BOF steel producers backward integrate into iron ore and coking coal
  - Non-integrated BOF producers push for price reductions from suppliers
  - Steelmakers seek new commercial relationships with suppliers
  - Consolidation continues

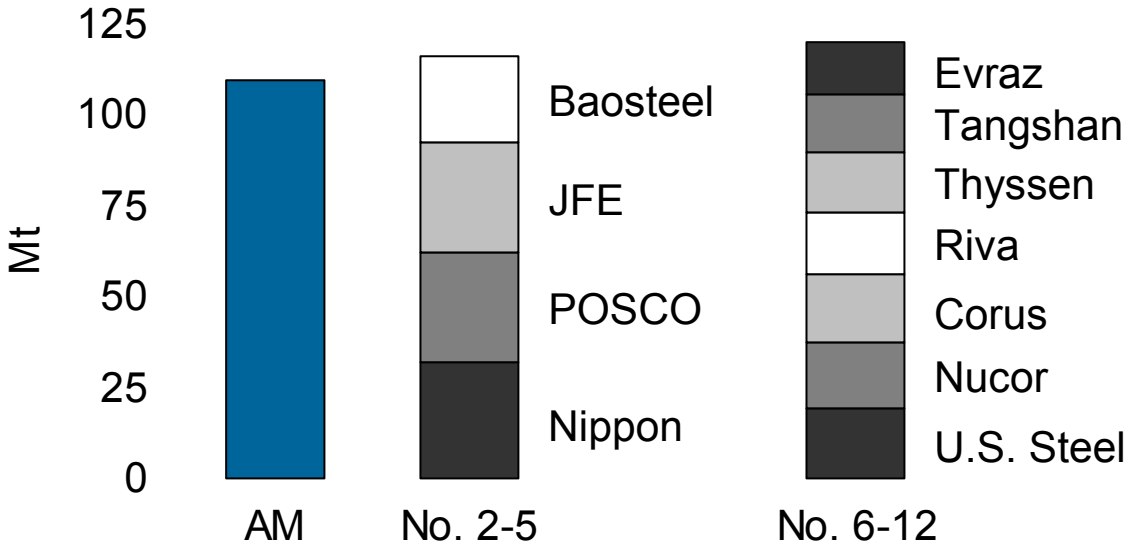
ArcelorMittal has opened the final chapter in the consolidation story as the steel industry goes global

- Regional consolidation reaching its limits in many product markets in Europe and USA
- If consolidation is to continue it must involve leading companies integrating internationally
- Strong companies will attract capital to become stronger; weaker ones will be acquired

Top five steelmakers



Crude steel production in 2005



Data: Hatch Beddows, IISI. Note: 2015 forecast share of top five steelmakers based on historic trend in steel industry consolidation

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IMPLICATIONS FOR METALLURGICAL COAL AND COKE

The steel industry is the main consumer of met. coal and coke and future demand seems set for strong growth

- Steel demand seems set for substantial growth over the next decade, driven by the development dynamic of a number of large, populous countries – but there are risks
- Coke-based BF / BOF steelmaking will probably retain, if not raise, its share of world steel output for at least the next ten years
- PCI rates seem set to rise, which will moderate growth in total met. coal demand
- Demand for high quality hard coking coals is likely to grow at a still faster rate than total met. coal demand in substituting for lower quality coking coals
- Low cost steelmaking locations are likely to take a leading share of new steelmaking and associated coking capacity; some high cost capacity is likely to close in other regions
- The customer base for suppliers to the steel industry is likely to change due to:
  - Consolidation leading to a smaller number of larger, global steel companies
  - Backward integration by steelmakers into major raw materials

IMPLICATIONS FOR METALLURGICAL COAL AND COKE

Potential for substantial growth in steel demand points towards significant increase in world met. coke and coal requirements

Perspectives on potential world coke and coking coal requirements, Mt

	2005	~2015	Assumptions
Finished steel demand	1,029	1,525	~12% yield loss from crude to finished steel
Crude steel production	1,130	1,710	
Pig iron production[1]	786	1,170	~65% of crude steel output by the BF / BOF route
Sized coke consumption	334	468	~400 kg sized coke / tonne hot metal (2005: ~425)
Required coke production	371	520	~10% fines produced in coke making
Required met. coal production	493	692	~1.3 tonnes met. coal / tonne of coke

Data: Hatch Beddows, IISI. Note: 1. Includes merchant pig iron

Some sensitivity analyses

Change	Coke consumption	Coke production	Met. coal production
+/- 1% in BOF share of steel output	+/- 8Mt	+/- 9Mt	+/- 11Mt
+/- 10 kg in the coking rate	+/- 12Mt	+/- 13Mt	+/- 17Mt

Data: Hatch Beddows

IMPLICATIONS FOR METALLURGICAL COAL AND COKE

Supplying the potential growth in demand for met. coal and coke will be a large-scale, long-term challenge

- World trade in met. coal seems set for strong growth and trade patterns set to change
  - Advantage – and challenge – Australia
- Structural balance between demand and supply of high quality met. coal looks tight for the long-term
  - Limited reserves and current shortage of resources for developing new projects
  - Positive implications for long-run met. coal prices, despite recent softness, but steelmakers using merchant raw materials under rising pressure to contain costs, which they will try to pass back to suppliers
  - Risk of price spikes due to short-term supply-side disruptions
- Change in the steel industry is likely to lead to new commercial relationships between steelmakers and their suppliers
- Ultimately, the potential growth that underpins the strong outlook for steel demand could be compromised if supply-side challenges are not met

Thank you for your attention

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