



Nickel: The changing dynamics of supply

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Presentation outline

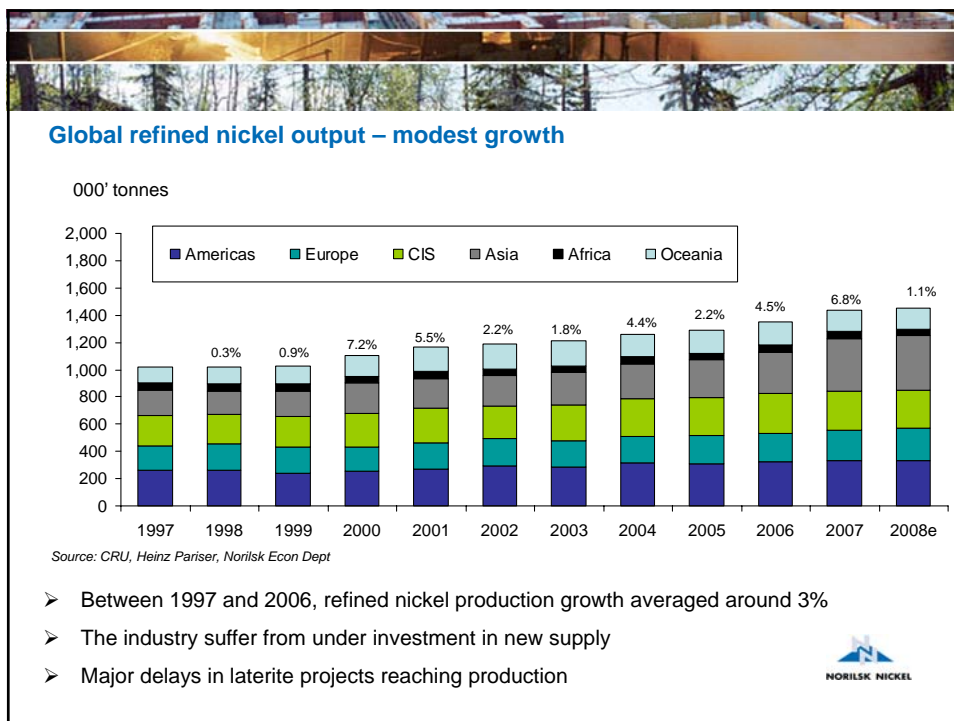
Nickel supply – recent trends

Outlook: from constraint to oversupply?

Nickel supply – costs and the implication for prices

Conclusions

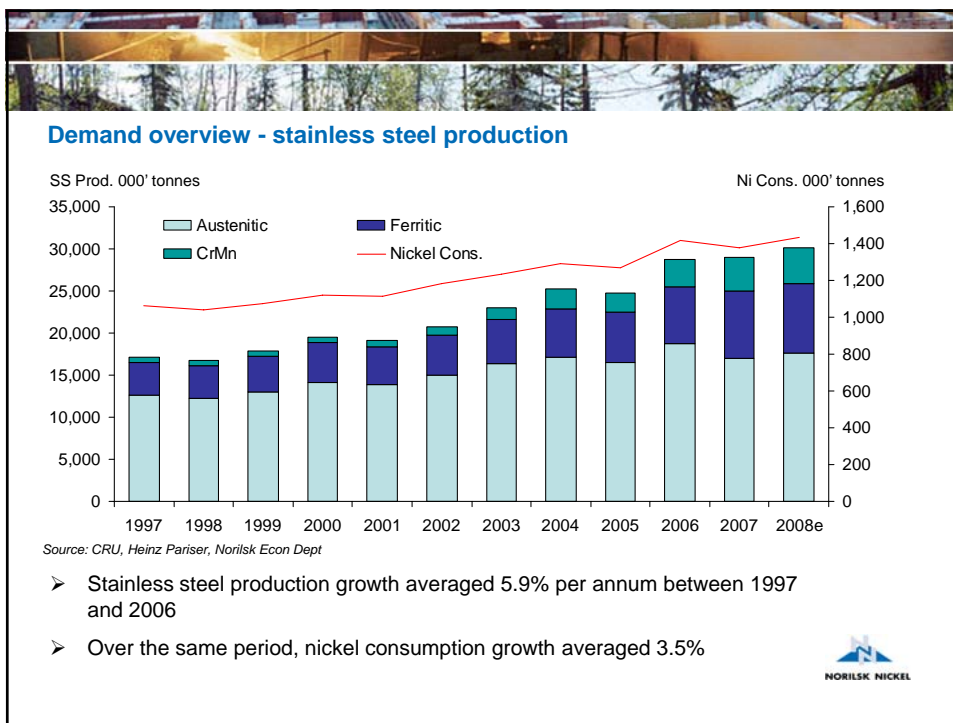
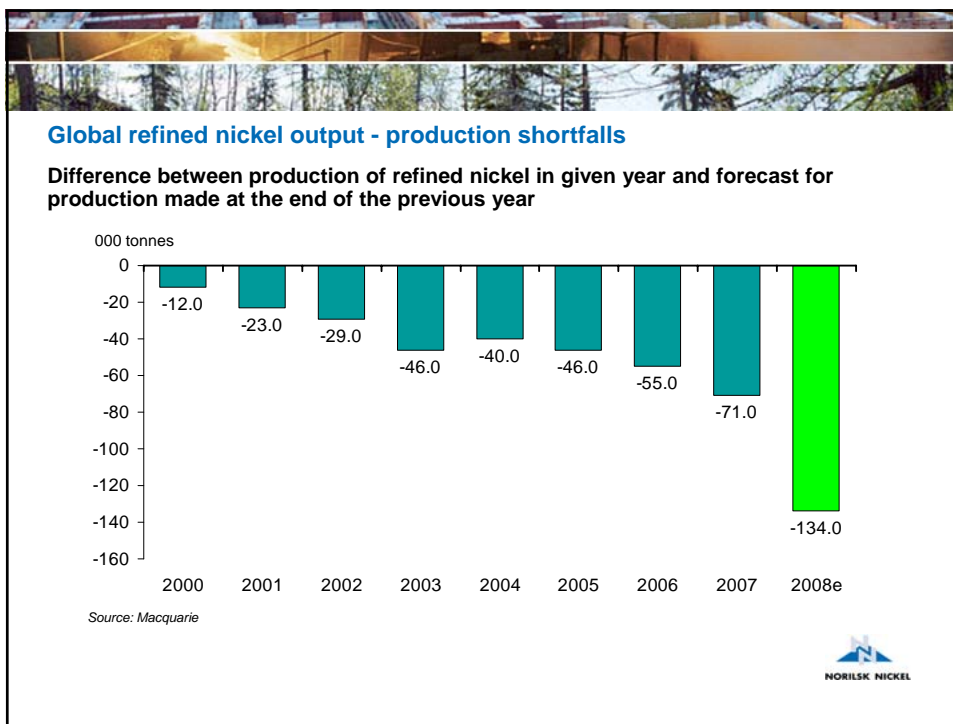


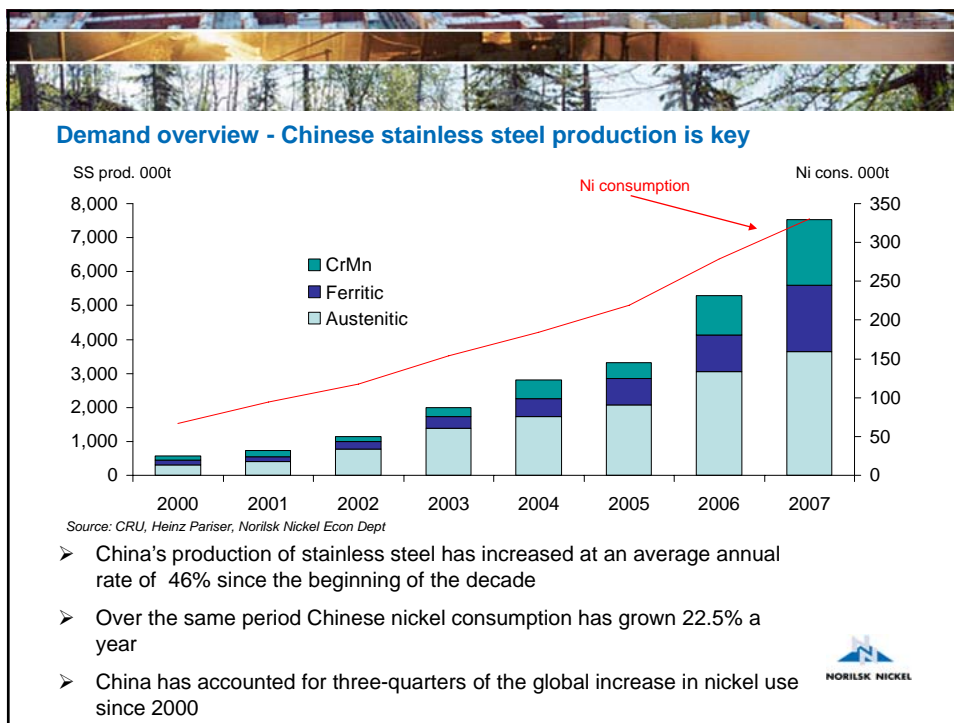
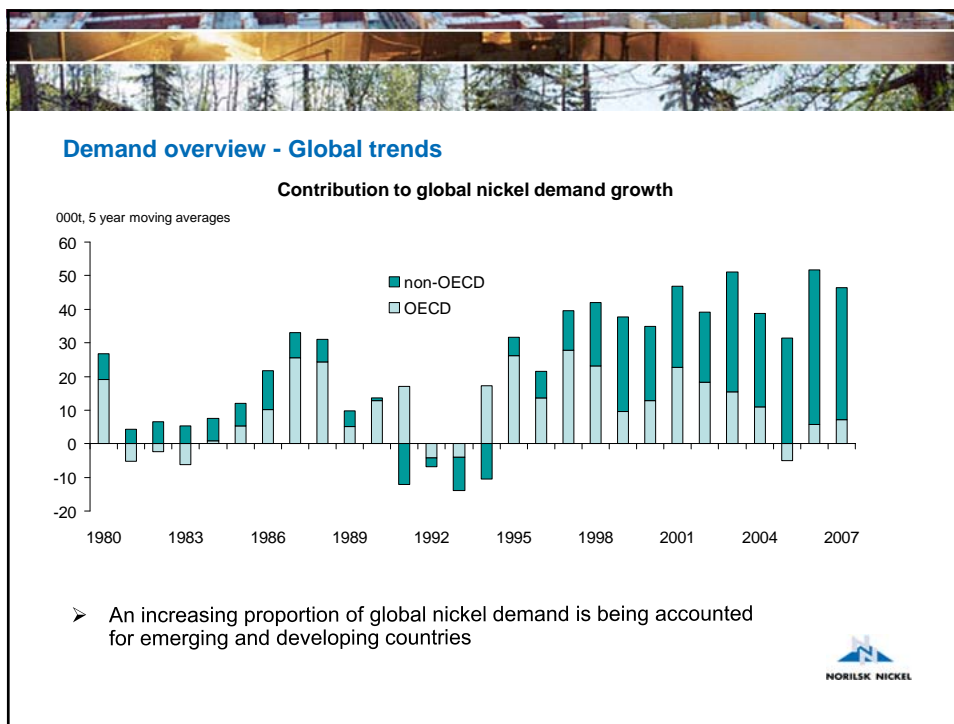


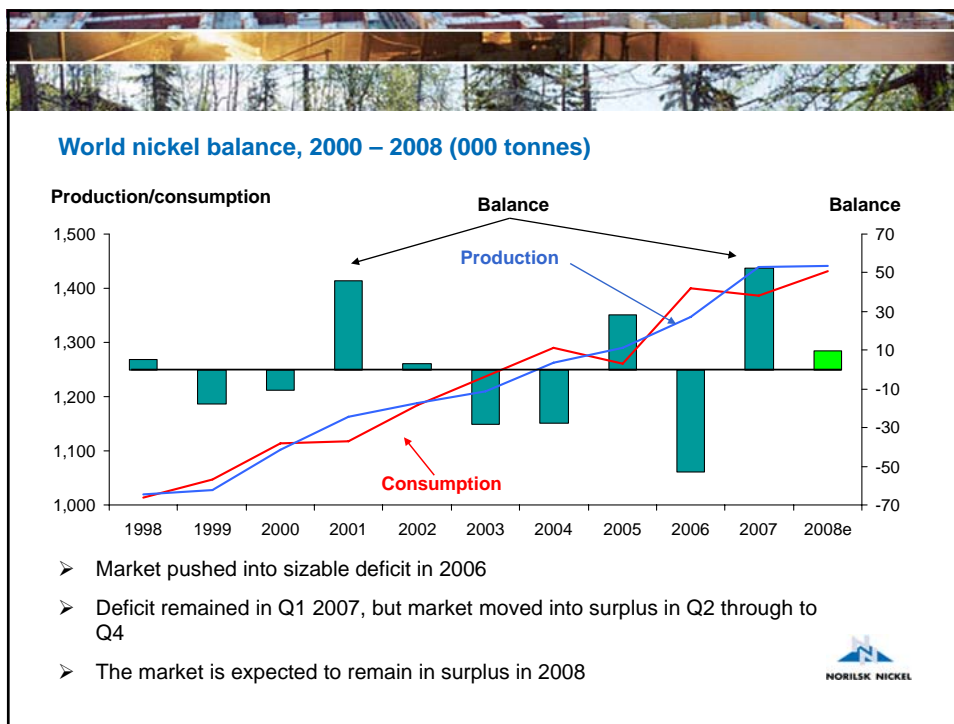
Global refined nickel output - modest growth

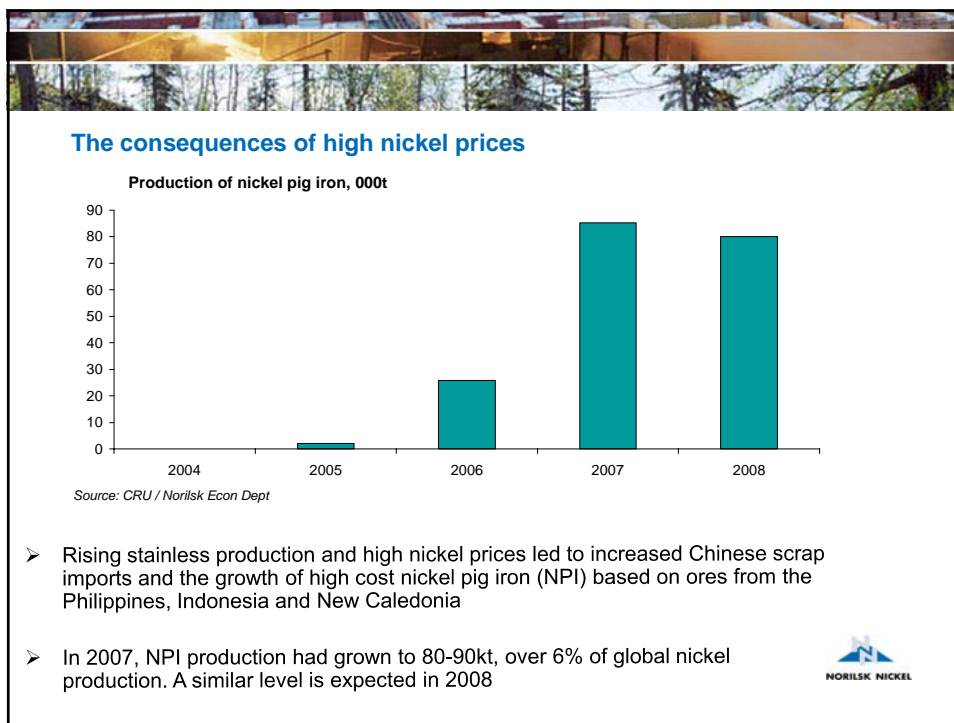
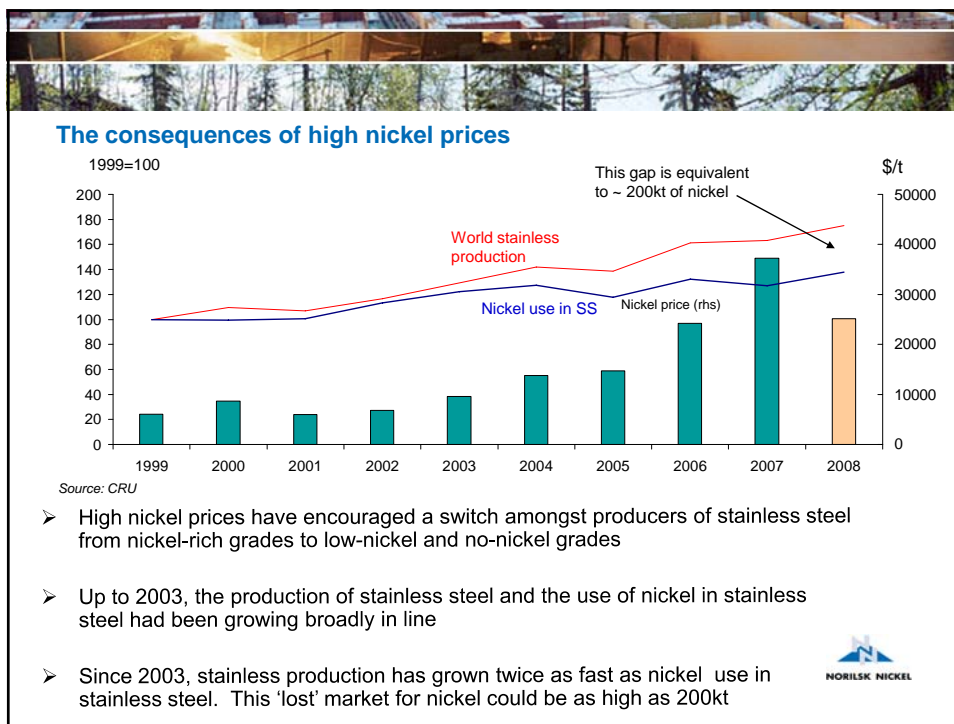
- Only two major mine-to-metal projects 'successfully' entered production in the decade prior to 2008:
 - Loma do Nickel - entered production in 2000
 - Murrin Murrin - entered production in 1999
- Increased nickel demand has largely been met by brownfield expansions
- Chinese nickel pig iron production – innovative response to meeting nickel supply needs:
 - 80 – 90 ktpa production in 2007 and similar levels expected in 2008, up from around 26 ktpa in 2006


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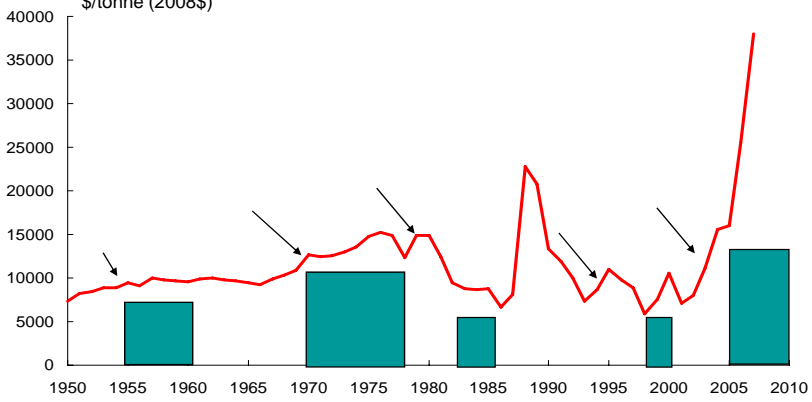
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- Outlook: from constraint to oversupply?**
- Nickel supply – costs and the implication for prices**
- Conclusions**


Nickel supply – the next wave

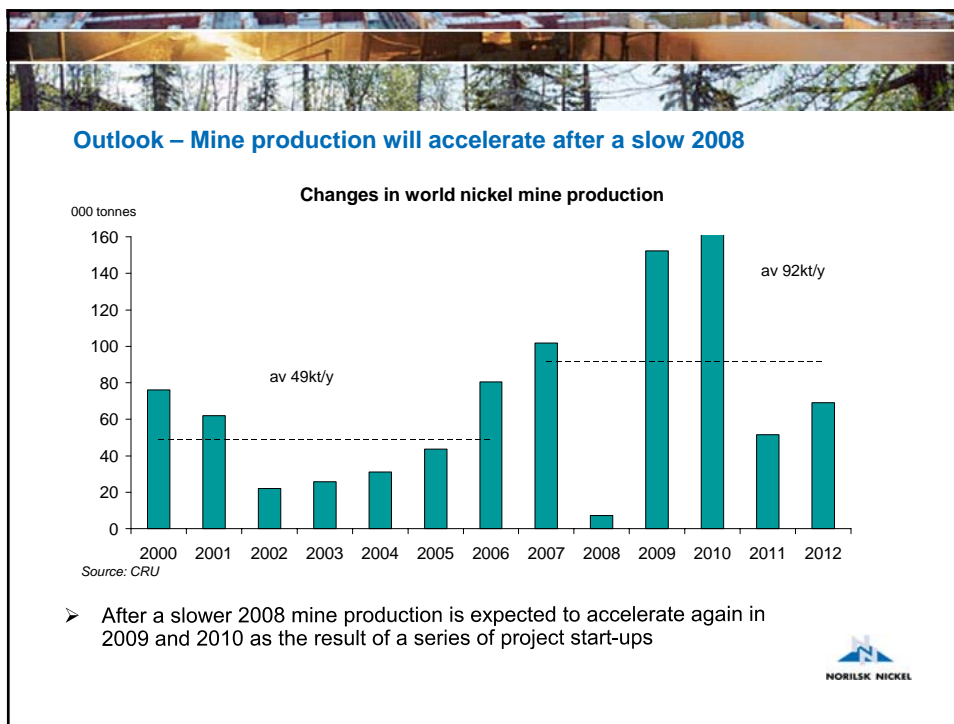
\$/tonne (2008\$)



Year	Nickel Price (\$/tonne)	Supply Project (Bar)
1950	~8,000	None
1955	~10,000	Yes (~7,000)
1965	~10,000	None
1970	~12,000	Yes (~11,000)
1975	~15,000	None
1980	~15,000	None
1985	~8,000	Yes (~5,000)
1990	~22,000	None
1995	~10,000	None
2000	~8,000	Yes (~5,000)
2005	~15,000	None
2008	~38,000	Yes (~13,000)

- Nickel projects come in waves in the wake of upswings in the price cycle
- Since the 1950s, there have been four of these waves and we are now entering a fifth





Outlook – Nickel production will accelerate after a slow 2008

Mine	Country	Contained Ni, 000 tonnes				
		2008	2009	2010	2011	2012
Tali	Botswana	3	8	8	8	8
Nkomati	South Africa	6	6	14	18	21
Albidon	Zambia	3	7	9	10	10
Mirabela	Brazil	0	6	17	20	25
Eagle	USA	0	1	14	16	16
Fraser Morgan	Canada	0	2	7	8	8
Nickel Rim South	Canada	0	4	7	10	15
Raglan	Canada	0	6	6	10	20
Nunavik	Canada	0	0	5	12	12
Various	Canada	3	8	9	9	6
Hitura	Finland	2	2	2	2	2
Taiivvaara	Finland	3	17	27	33	33
Avebury	Australia	2	9	9	9	9
Jubilee/Prospero	Australia	1	7	10	10	10
Forrestania	Australia	7	14	24	29	34
Total sulphides		29	94	167	203	227
Ambatovy	Madagascar	0	0	0	0	13
Niquelandia	Brazil	0	2	6	11	11
Barro Alto	Brazil	0	0	12	27	37
Onca Puma	Brazil	0	18	53	59	59
Fenix 1	Guatemala	0	0	0	2	9
Caldag	Turkey	6	8	15	20	20
Ferroukeli	Macedonia	6	10	11	12	12
Ravensthorpe	Australia	16	33	43	43	43
North Maluku	Indonesia	16	16	16	16	16
Soroako	Indonesia	0	0	0	4	15
Goro	New Caledonia	0	11	21	37	64
SLN/Eramet	New Caledonia	0	12	18	23	23
Various	New Caledonia	0	1	11	11	11
Ramu River	Papua NG	0	0	10	15	23
Moa Bay	Cuba	1	8	15	18	18
Total laterites		45	120	230	297	373
Nickel, all forms	World	74	214	396	500	600

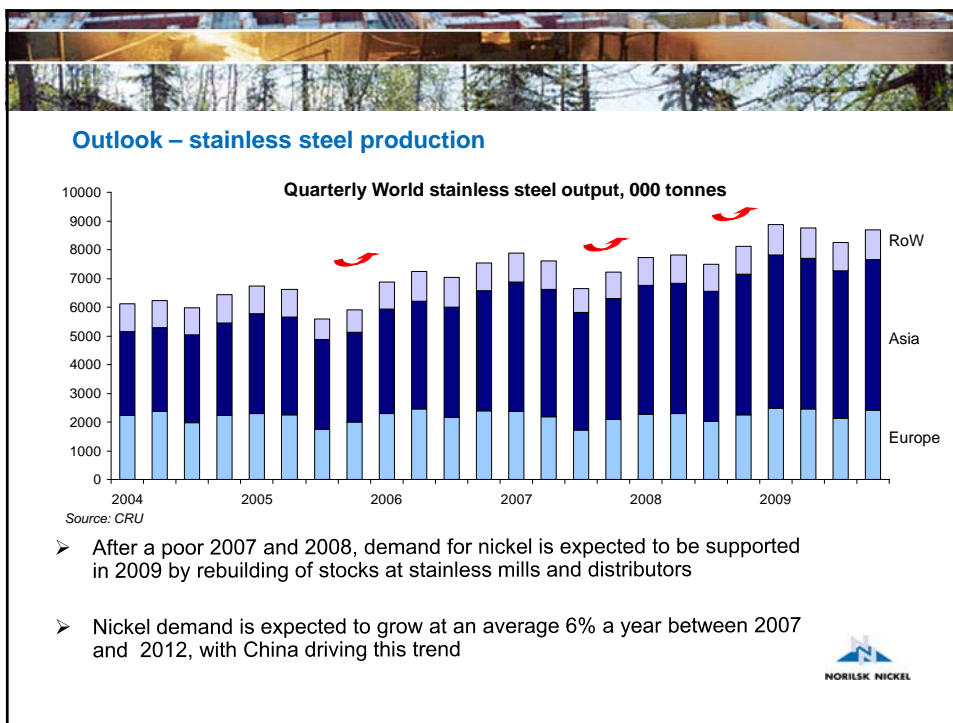
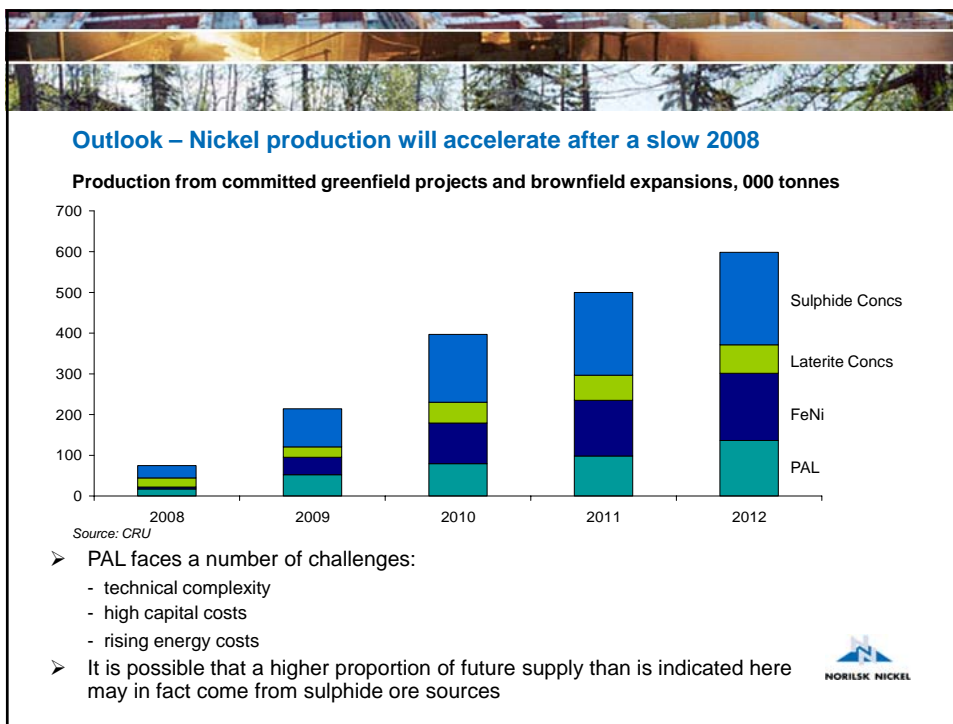
Source: CRU

➤ Mine production is expected to increase around 7% a year from 2007-2012, taking account of planned openings and expansions and netting out closures due to depletion

➤ New and expanded mine capacity currently under construction or committed shows planned growth of 600kt, with over 60% of this arising from laterite production

➤ Some of the bigger projects on this list use PAL, a technology which has a history of problems. This implies some uncertainty about production forecasts for these planned operations



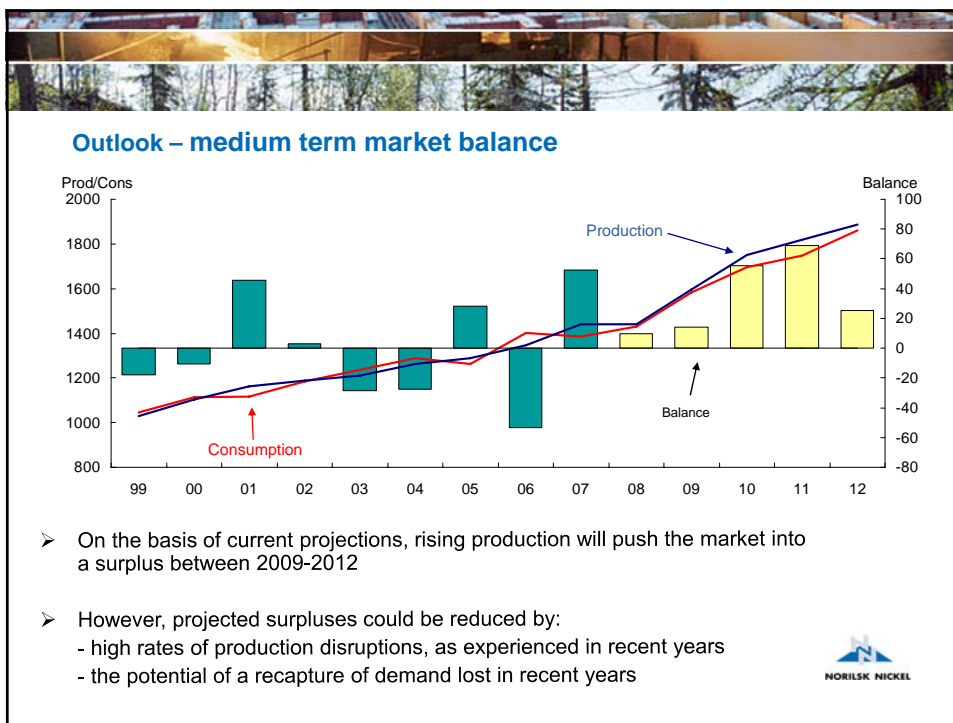


Demand Outlook - Changes in world stainless meltshop capacity, 000t/y

		<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>Total</u>
Baotou Huaye	China	300	0	0	0	0	300
LISCO	China	400	0	0	0	0	400
Southwest stainless	China	50	50	0	0	0	100
TISCO	China	500	0	0	0	0	500
ZPSS	China	300	200	0	0	0	500
Tangshan stainless	China	200	400	0	0	0	600
Fujian Fuxin	China	0	500	220	0	0	720
Other	China	0	0	80	500	0	580
Total China		1750	1150	300	500	0	3700
Various	Europe	-100	200	350	0	0	450
TKS-USA	USA	0	0	0	300	400	700
NS-SC	Japan	-50	0	0	0	0	-50
Various	India	300	230	770	0	0	1300
World		1900	1580	1420	800	400	6100

Source: CRU

- China is expected to dominate the growth in stainless steel production
- Growth in Chinese stainless production has implications for producers elsewhere who have in the past been suppliers of stainless steel to China, notably in Japan, Taiwan, Korea and Europe

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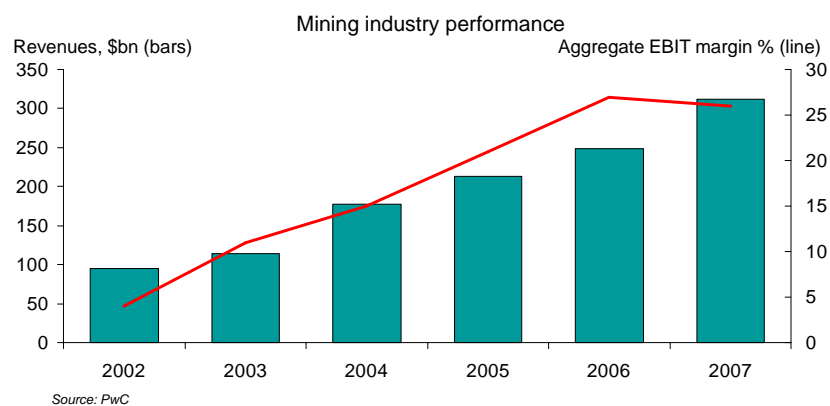
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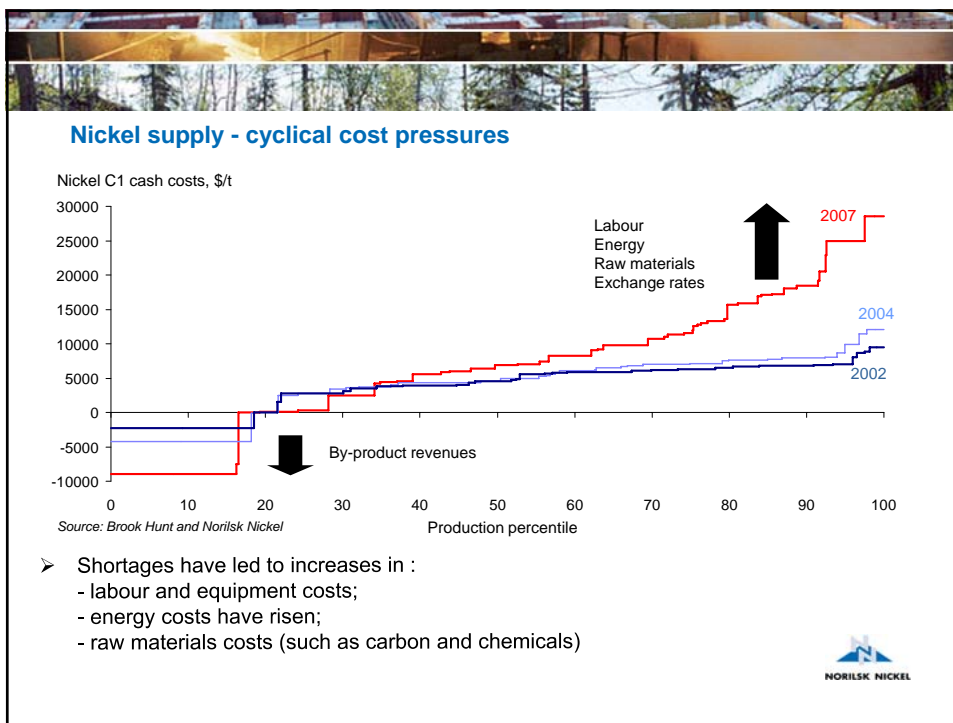
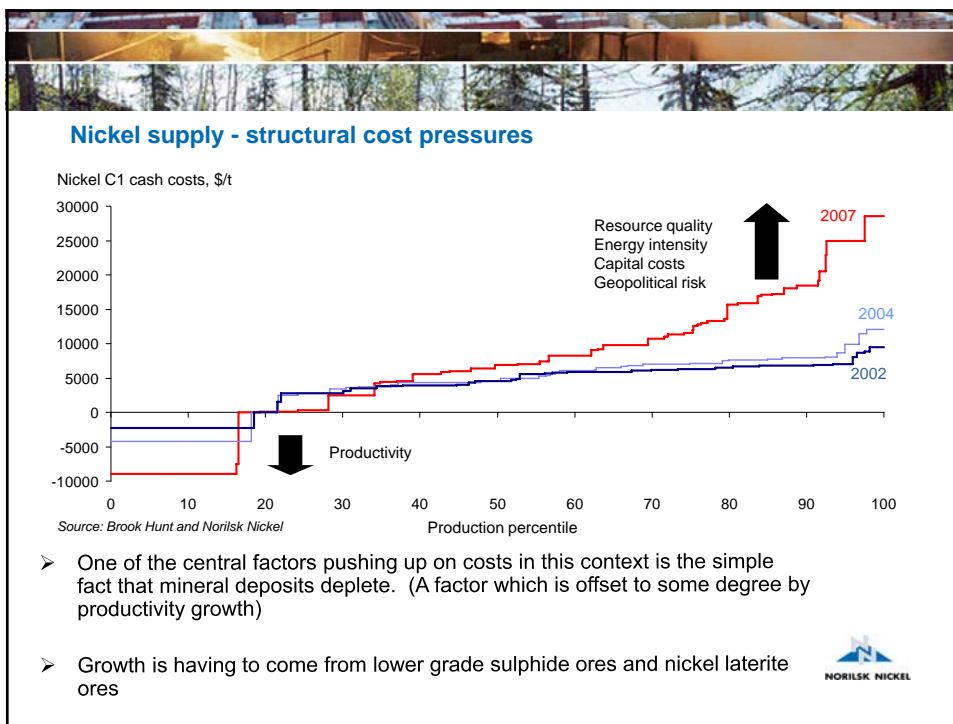


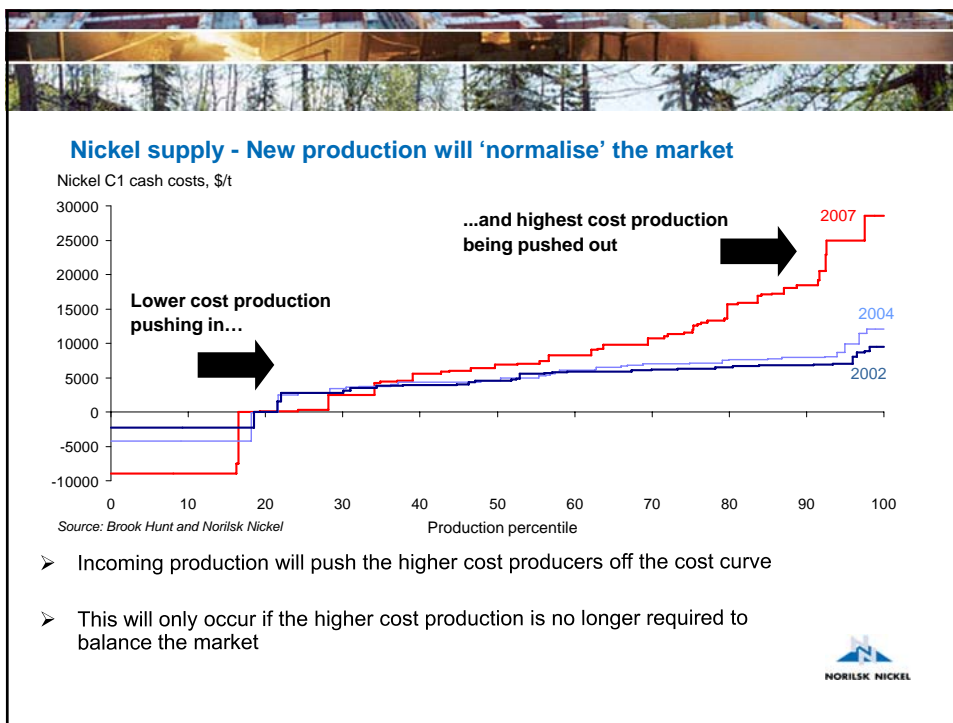
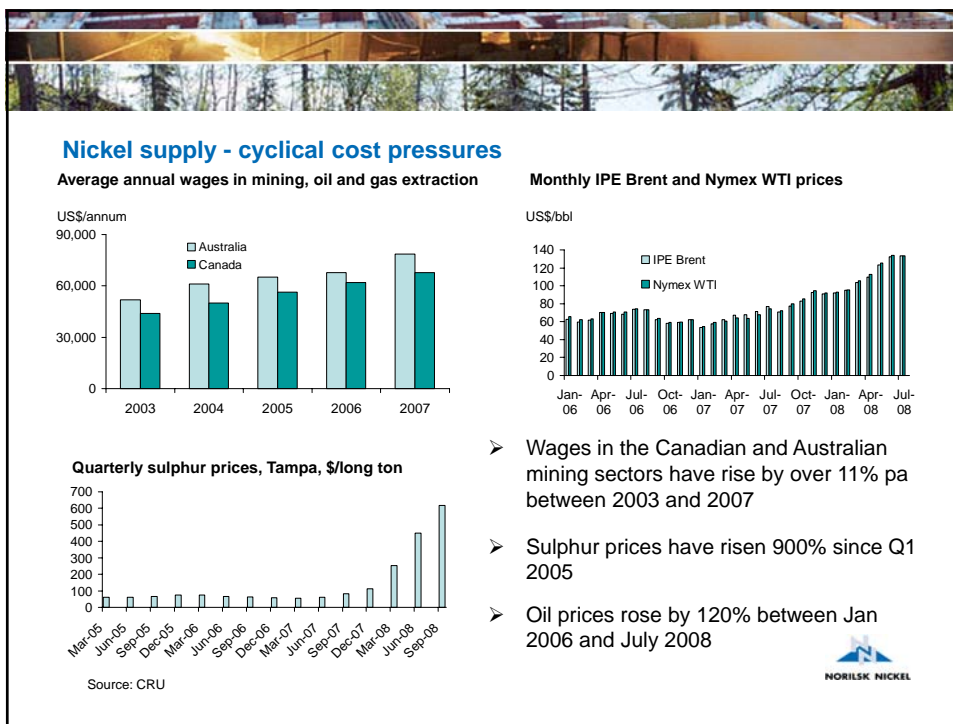
Nickel supply - cost pressures are squeezing margins

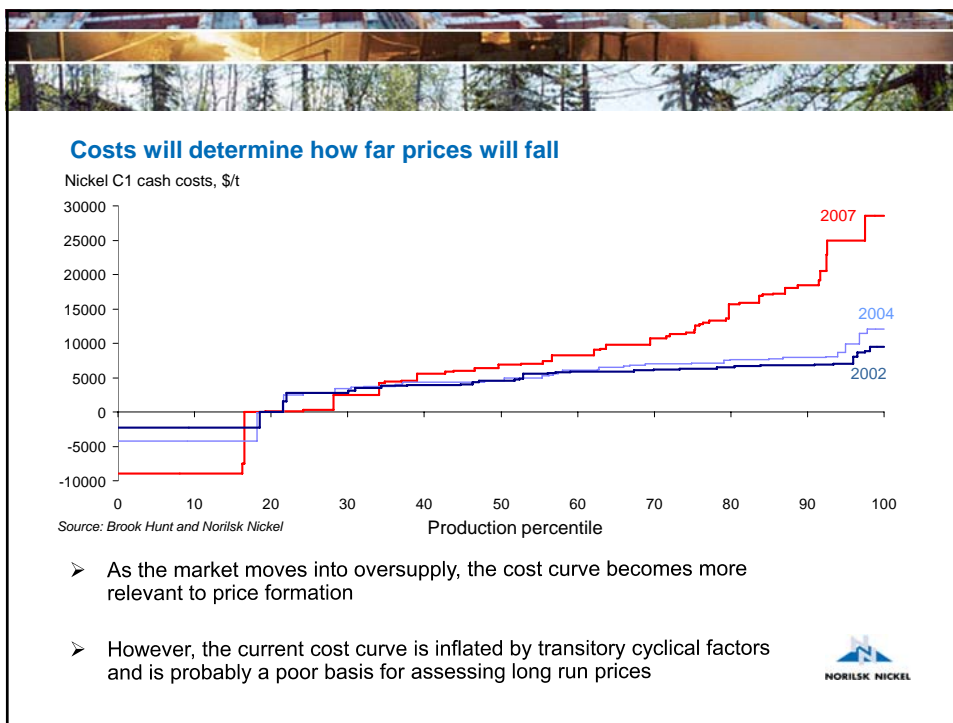


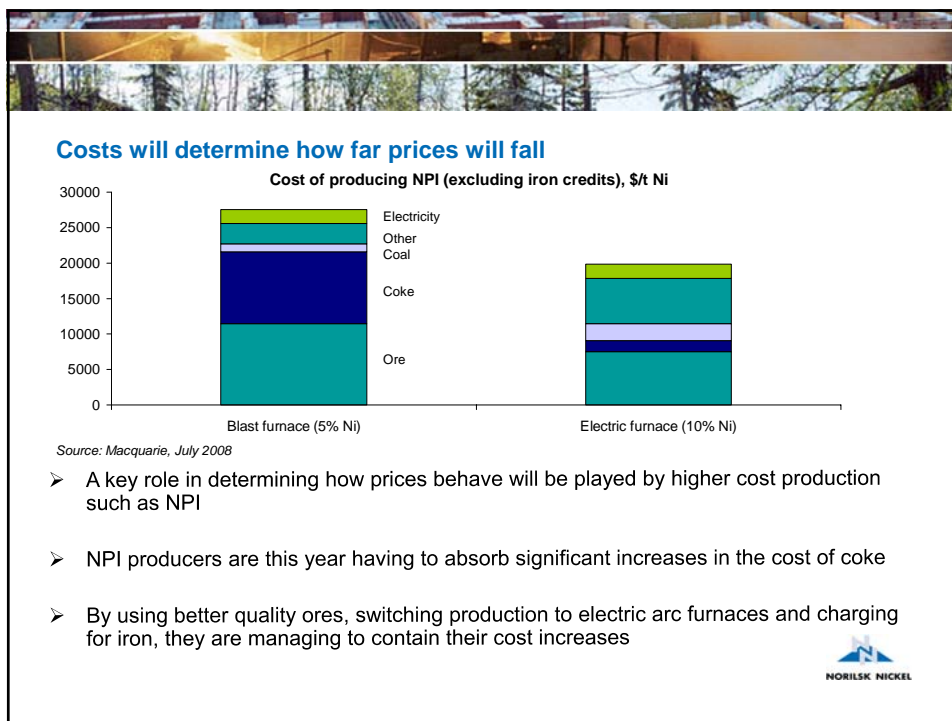
- Despite record commodity prices in 2007, mining company margins have been squeezed by a dramatic rising in operating costs
















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- Despite continuing supply upsets, rising production is projected to keep the nickel market in surplus in 2009 and 2010
- The growth in nickel production from laterites using PAL remains challenging given its energy intensity, its technical complexity and its capital requirements
- Production from low grade nickel sulphides is looking increasingly attractive relative to production from laterites and more future production may come from this source than is currently anticipated
- In a well supplied market, nickel prices are more likely to reflect marginal costs of production. However, given the structural changes in supply, marginal costs are likely to remain higher than in previous cycles





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