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The Future of Steel:

How will the industry evolve ?

73rd Session of the OECD Steel Committee

Paris, 6-7 December 2012

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OECD BETTER POLICIES FOR BETTER LIVES

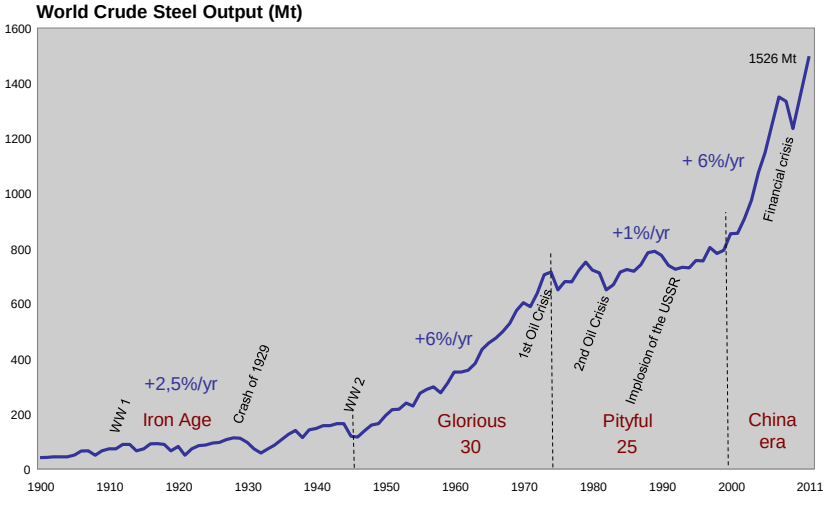
How will the industry evolve ?

- Introduction : The world of steel has already changed profoundly
- Trade : OECD still a net exporter : import vigilance and export prom.
- Excess capacity in OECD : Where is it ?
- Energy and Environment challenges = Scrap + Shale Gas/DRI
- Strategy, governance and social relations : Accelerate evolution.
- Implications for organisations, governments and associations.

The world of steel has changed profoundly

- Since 2000, global steel demand is growing at a rate of 6%; 80% of that growth is due to the phenomenal expansion of the Chinese economy, which today represents 46% of global steel production and consumption, that is more than twice its share of the global population.
- Globally, steel is the largest construction material (market value over USD 1 trillion) and is substituting far more for traditional materials (wood, brick) than it is losing share to lighter products (aluminium, plastics). For many applications steel simply has no substitutes.
- Steel technology keeps changing and, in OECD countries where demand is stable, the traditonal blast furnace integrated plants are challenged by more nimble minimills that recycle scrap. Having captured the long product market, they are now attacking the flat product sector.
- Large integrated companies keep closing plants and loose jobs, a painful and inevitable evolution that result in a poor perception of the industry in economic and political circles as well as in the media.
- It is therefore important to distinguish between the future of steel, which is bright, and the future of the integrated sector, which is more cloudy in Europe and North America.

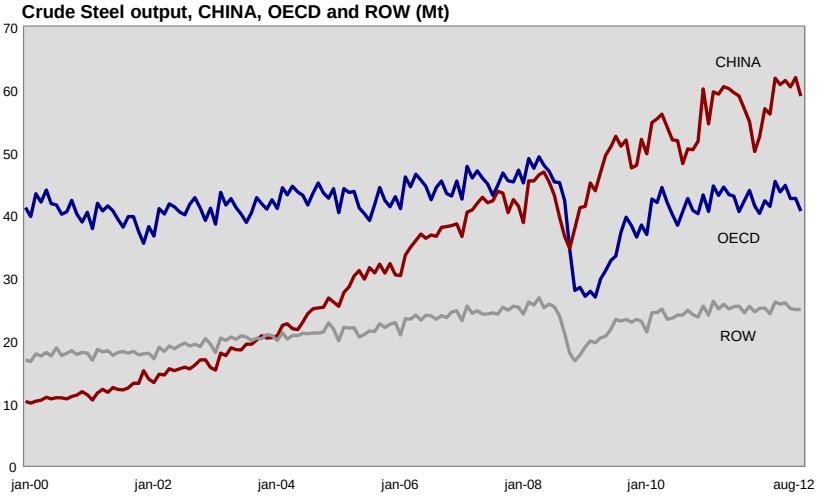
Since the beginning of this century, the steel industry has entered a new era



Source : WorldSteel, Laplace Conseil analysis

In 12 years, China production has sextupled, while OECD was stable and ROW grew slowly

Crude Steel output, CHINA, OECD and ROW (Mt)



Source : WorldSteel, Laplace Conseil analysis

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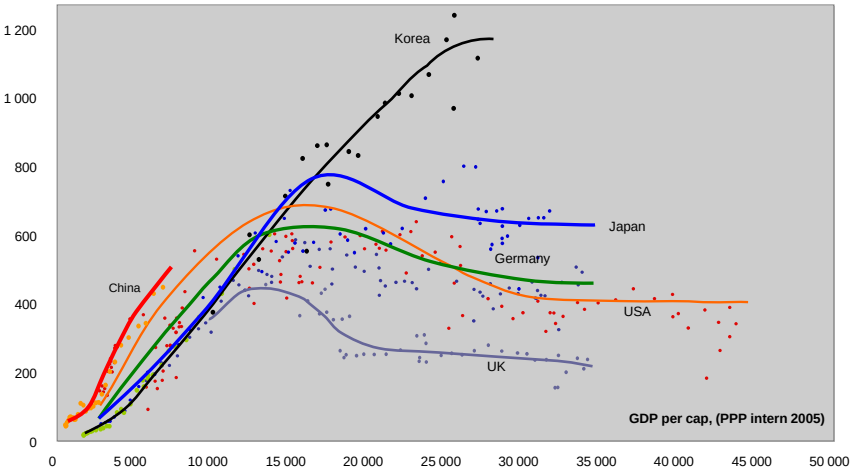
China rate of steel development is much faster than the rate of more mature economies

Consumption per cap / GDP per cap, PPP intern. 2005



Source : WorldSteel, Worldbank, Laplace Conseil analysis

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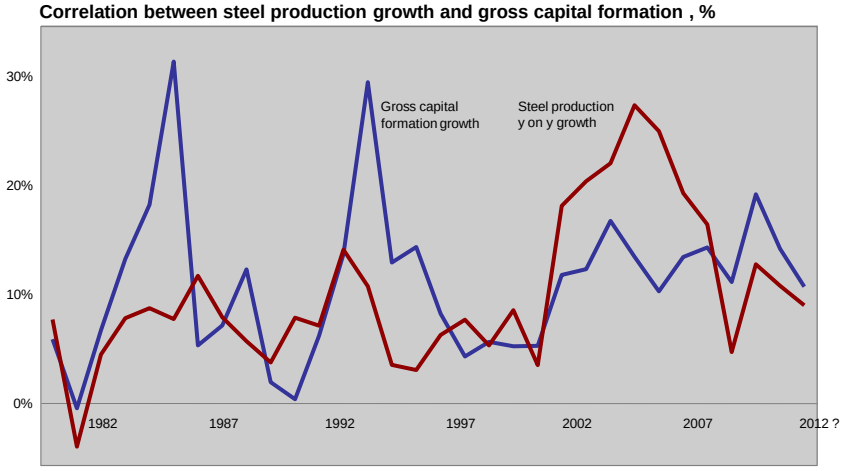
China has known regular five years cycles for capital investment, hence steel production

Correlation between steel production growth and gross capital formation , %



Source : WorldSteel, Financial Times, analysis Laplace Consei

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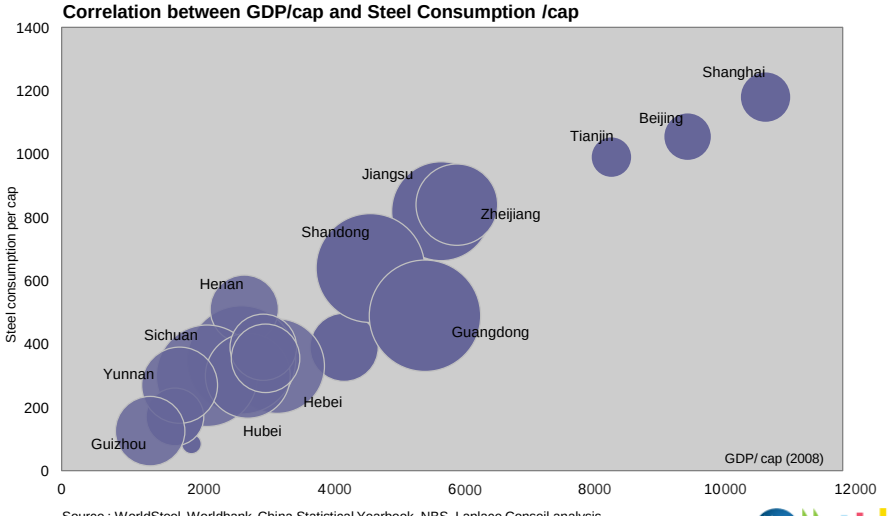
Shanghai, Beijing and Tianjin are both the richest areas and the most steel intensive

Correlation between GDP/cap and Steel Consumption /cap



Source : WorldSteel, Worldbank, China Statistical Yearbook, NBS, Laplace Conseil analysis

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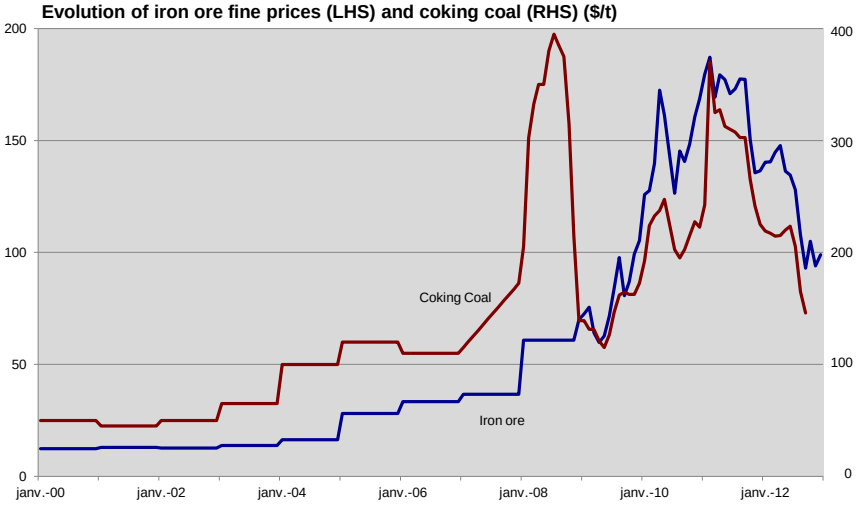
Raw material prices are the "canary in the coal mine". Is steel heading in a new bearish direction ?

Evolution of iron ore fine prices (LHS) and coking coal (RHS) ($/t)



Source : Steel Business Briefing,Bluescope, Laplace Conseil analysis

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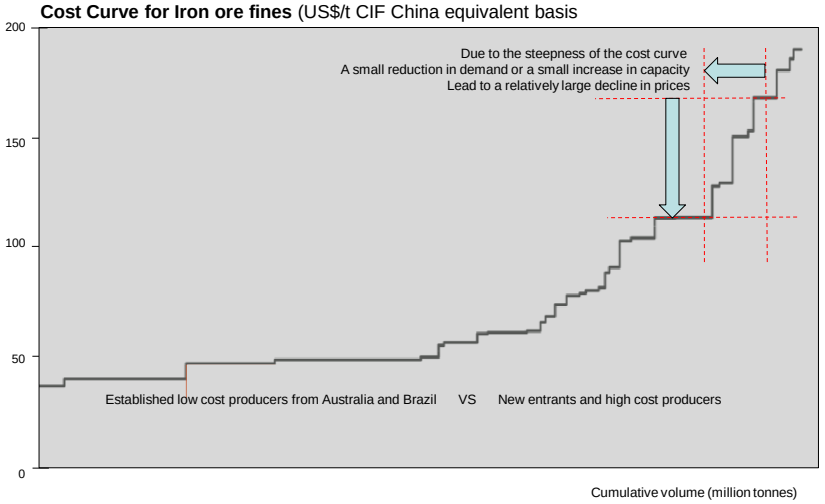
The iron ore cost curve is very steep with many high cost producers, leading to price instability

Cost Curve for Iron ore fines (US$/t CIF China equivalent basis



Source : Macquarie Research March 2012, Laplace Conseil analysis

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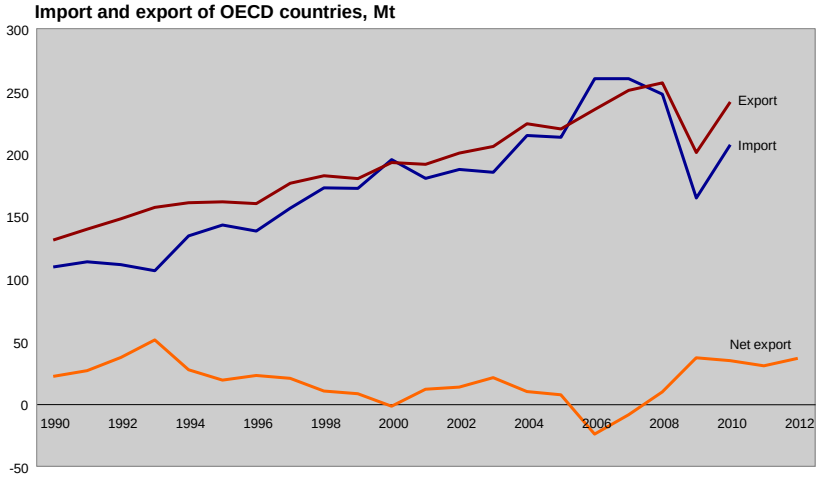
Until 2008, international trade has grown steadily in the OECD countries

Import and export of OECD countries, Mt



Source : WorldSteel, Laplace Conseil analysis

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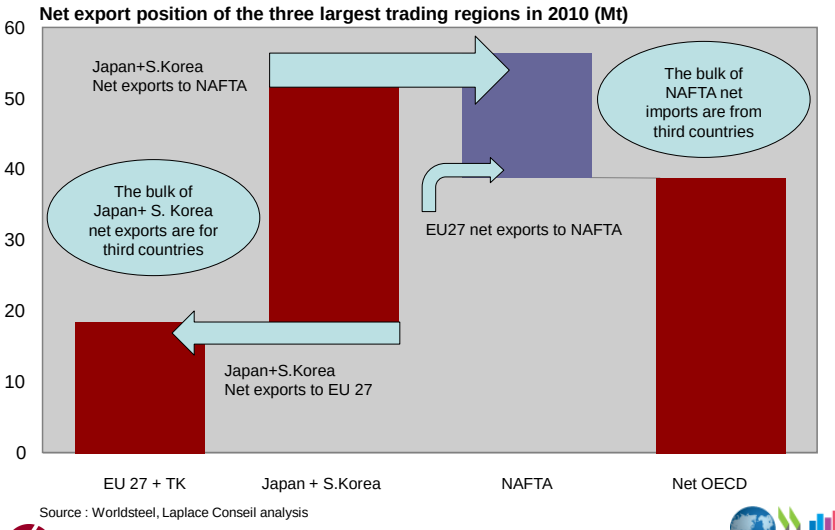
Japan and Korea are large net exporters, mostly to ROW. NAFTA is the only net importing region



Source : Worldsteel, Laplace Conseil analysis

Global trade disputes have been recurrent, but OECD has usually fared fairly well.

- Since 1990, OECD was always a net exporter of steel, except when the industry was running practically at full capacity due to strong domestic demand (for example from 6/2006 to 6/2008).
- Moreover, exports were usually for high value added products, while imports were for semis and common grades steel.
- Nevertheless, import pressure often had a negative impact on price and profitability, particularly in the US.
- With the advent of shale gas, the US has all the ingredients to become low cost producers and can become net exporters as well.
- Import vigilance remains « de rigueur » for risk of unfair trade, but focus should shift on export promotion.

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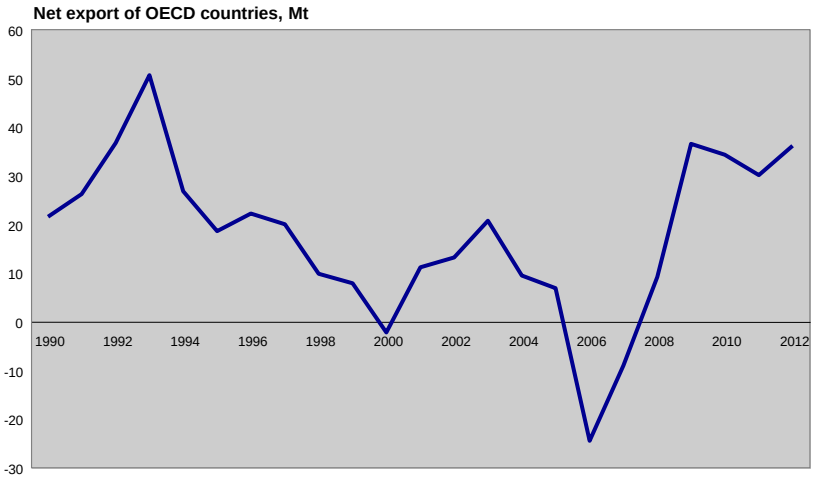
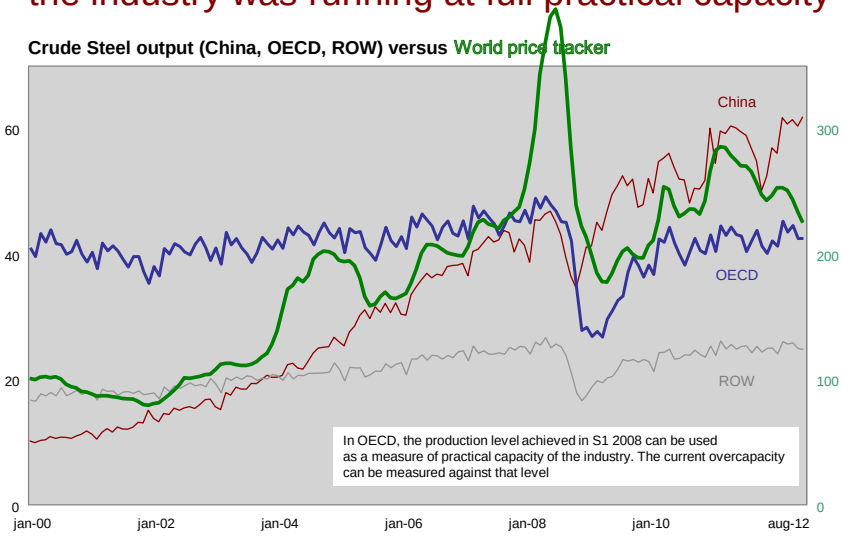
Except in 2008, when the industry was running at full capacity, OECD was always a net exporter



Source : WorldSteel, Laplace Conseil analysis

A sharp price increase in S1 2008 shows that the industry was running at full practical capacity

Crude Steel output (China, OECD, ROW) versus World price tracker



Source : WorldSteel, SBB, Laplace Conseil analysis

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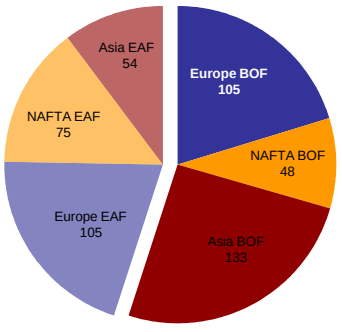
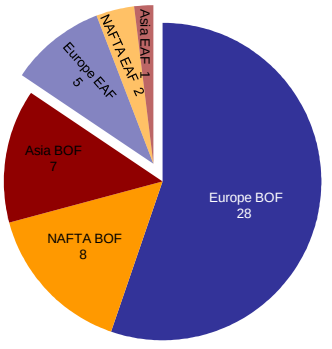
Based on 2012 production level, integrated mills represent 85% of OECD overcapacity

Share of Capacity and excess capacity by process and region (Mt)

2012e Capacity in OECD
Total = 520 Mt



2012e estimated overcapacity in OECD
Total = 51 Mt



Source Worldsteel, Laplace Conseil analysis

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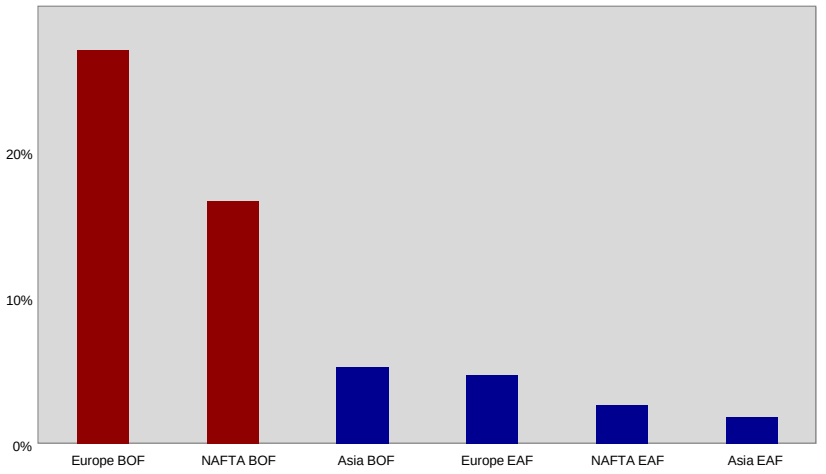
Most of the current OECD overcapacity is concentrated in integrated mills in Europe and USA

Rate of overcapacity by process and region (% of installed capacity)



Source Worldsteel, Laplace Conseil analysis

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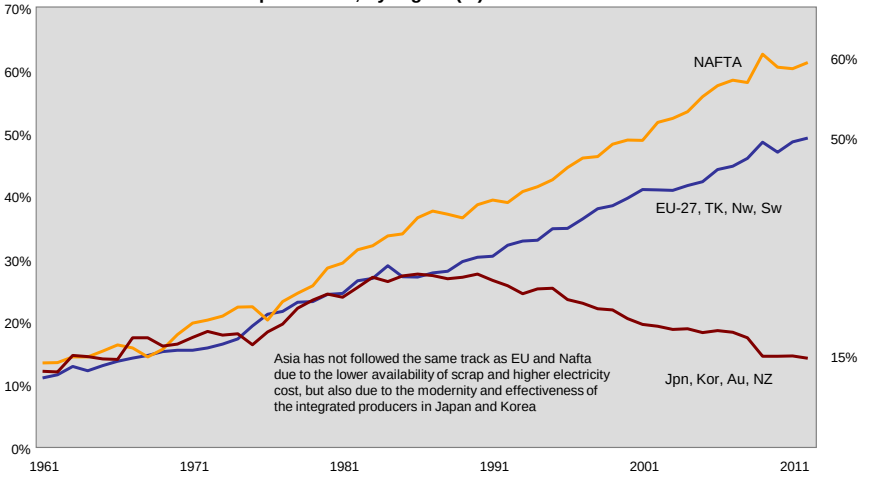
The OECD steel industry is facing severe energy and environmental challenges

- For integrated mills, energy (including coking coal) is the highest cost item; for minimills it is the second highest. Even allowing for the recent coal price decline, energy is the cost component that has grown the fastest.
- The industry has made very impressive efficiency improvements in the last decades, but with current processes, the technological limits are almost reached or uneconomical to overcome.
- Environmental pressures are also mounting : CO_2 taxation and air pollution, specifically for integrated plants that produce steel with by coking and sintering plant, blast furnaces and BOF shops.
- Laplace Conseil believes that (part of) the solution to these challenges is technological : **replace (part of) virgin iron ore by recycled scrap and (part of) coking coal by shale gas.**
  This means going « DRI and EAF » wherever possible

For many decades, the share of EAF steel has grown steadily in Europe and NAFTA

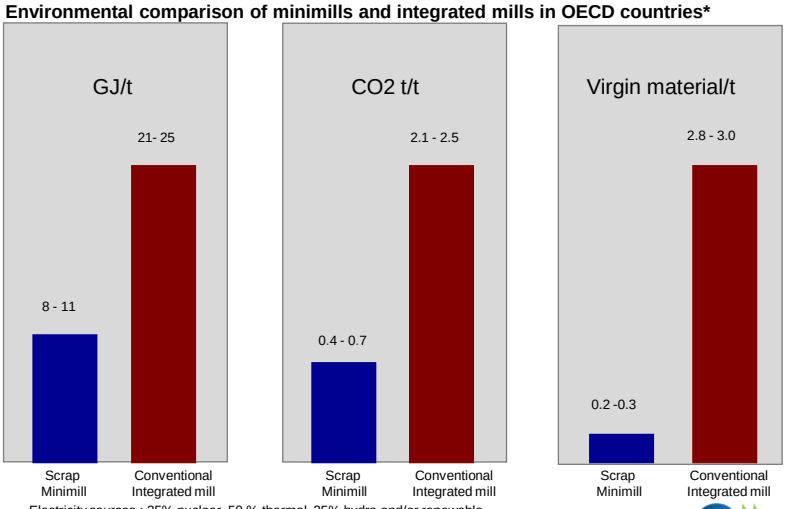
EAF share in crude steel production, by region (%)



Source : WorldSteel, Laplace Conseil analysis

The environmental advantages of scrap recycling over traditional BF/BOF smelting are important

Environmental comparison of minimills and integrated mills in OECD countries*



Electricity sources : 25% nuclear, 50 % thermal, 25% hydro and/or renewable
Source : Industry data, Laplace Conseil estimates

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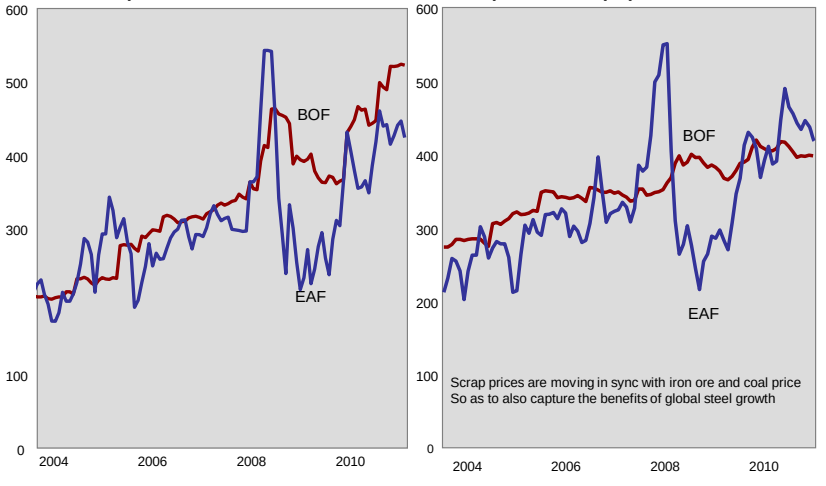
In EU and US, production costs of BOF are usually above EAF, particularly when steel demand is low

Cost comparison BOF and EAF crude steel in Europe and USA (€/t)



Source : SBB, Eurostat, EIA, Steel on the net, Laplace Conseil analysis

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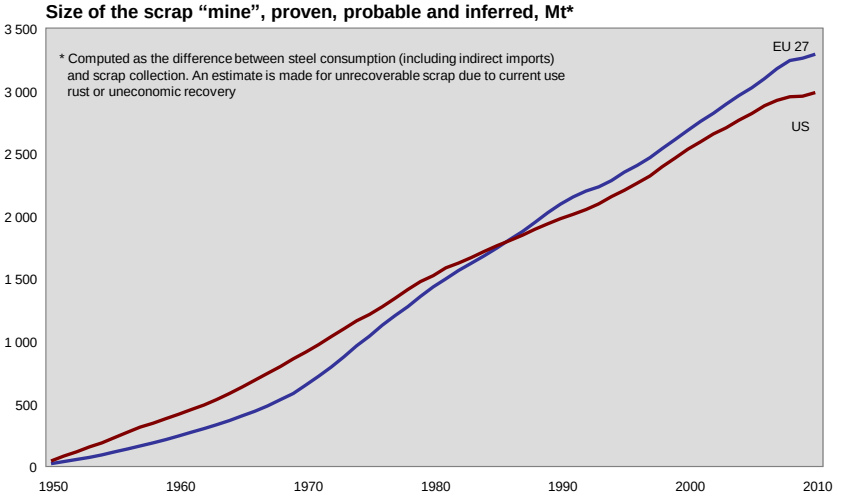
The EU and US scrap "mines" each have a proven and probable reserve of 3 billion tonnes

Size of the scrap "mine", proven, probable and inferred, Mt*



Source : Worldsteel, Laplace Conseil analysis & estimates

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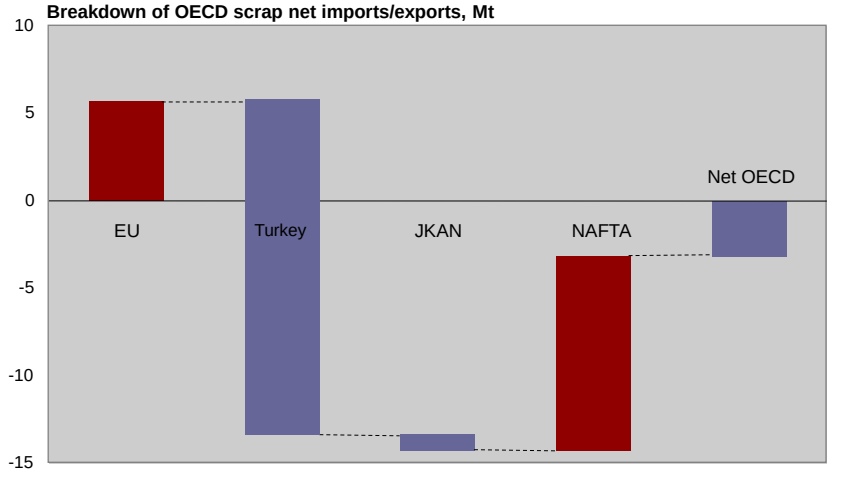
US and EU are large net exporter of scrap, primarily to Turkey; OECD is a small net importer

Breakdown of OECD scrap net imports/exports, Mt



Source : WorldSteel, Laplace Conseil analyses

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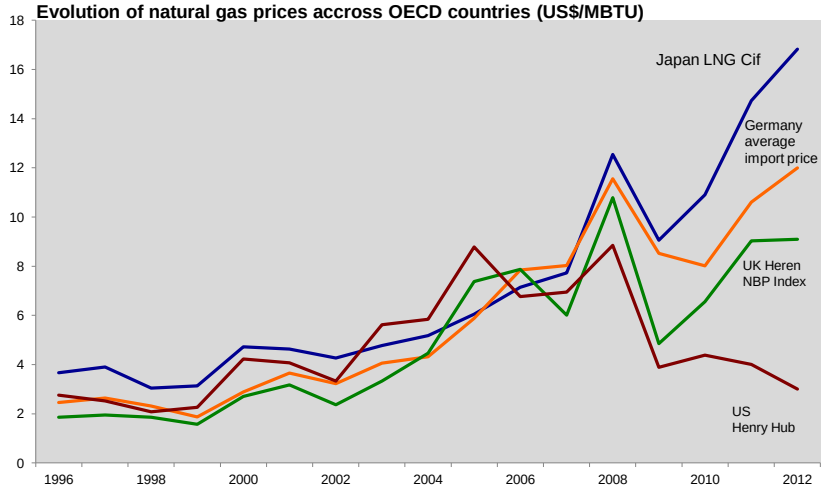
Shale gas is redefining the US energy landscape: prices are at the lowest since 2002

Evolution of natural gas prices accross OECD countries (US$/MBTU)



Source : EIA, BP, Laplace Conseil Analysis

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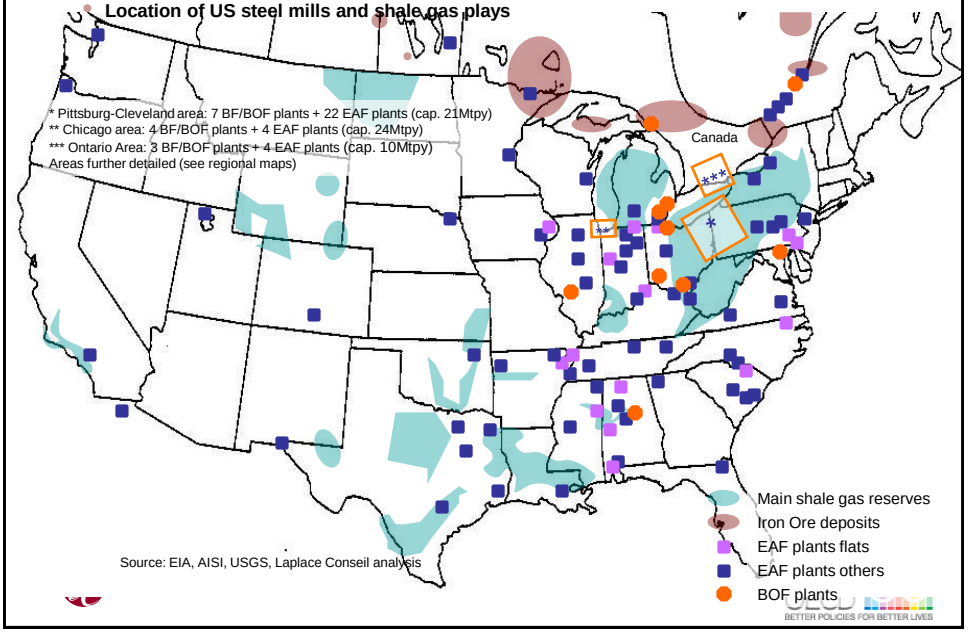
US mills are located over huge shale gas plays

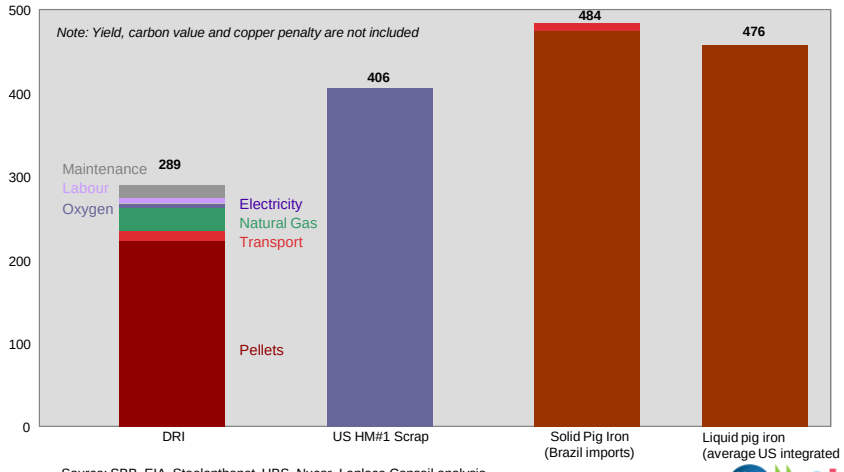
Location of US steel mills and shale gas plays



Source: EIA, AISI, USGS, Laplace Conseil analysis

In 2012, natural gas prices provide a competitive advantage to DRI compared to scrap, over $100/t

Cost comparison, DRI, Scrap, Pig Iron and Hot Metal
Average cost Q2 2012, United States, $/t

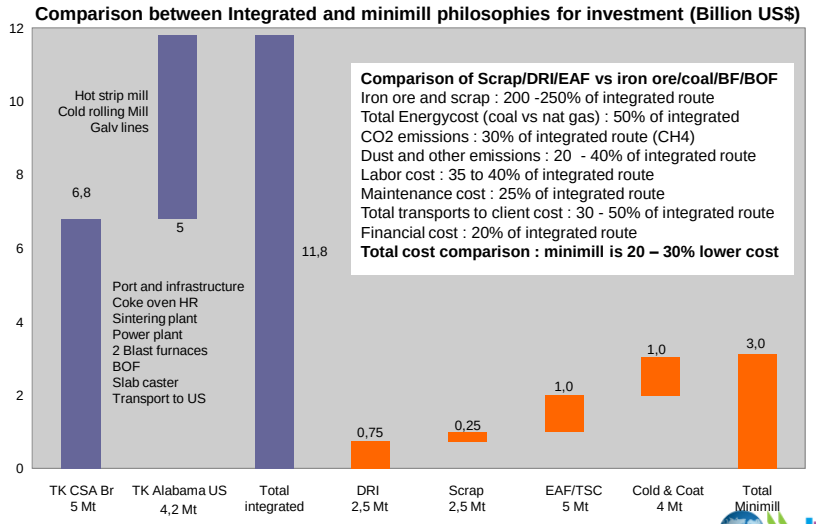


Source: SBB, EIA, Steelonthenet, UBS, Nucor, Laplace Conseil analysis

Nucor, already technology leader is the first to capitalize on the game changing shale/DRI strategy

- Nucor is the world leader in EAF/TSC (thin slab caster) technology for hot rolled coils production with 6 minimills in operation in the US and a combined capacity of 12 Mt of hot rolled coils (not including plates).
- Nucor is building a DRI plant in Alabama (2 modules for 5 Mt) in addition to its 2 Mt plant in Trinidad and has signed a 20 years contract for shale gas with Encana Oil and Gas Inc. to drill at « cost plus carried interest » all the gas needed for Nucor operations.
- Nucor flat product expertise coupled with its DRI experience will be used to enter the automotive sheet market and other high grade steel.
- Nucor has an unbroken record of 156 quarterly dividends, has the best return of capital employed of the industry and has never lay-off a “teammate” throughout the steel cycles.

Minimill technology drawing on DRI, EAF and TSC costs one fourth of the same integrated mill



Source : SBB, USGS, Steel on the net, EIA,WSJ, Laplace Conseil analysis

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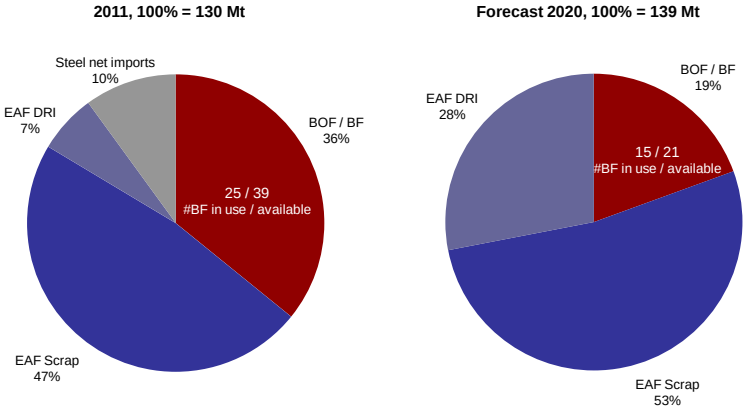
In NAFTA, DRI/EAF production will grow from 9 to 39 Mt, replacing imports and half the BF/BOF

NAFTA market supply by origin (Mt crude steel)



Source: WorldSteel, AISI, Midrex, Laplace Conseil analysis

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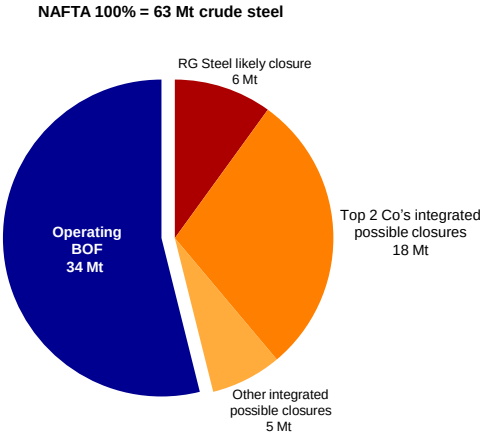
With the advent of DRI, nearly half of the NAFTA integrated mills will be threatened by closure

NAFTA Integrated mills utilization forecast by 2020



Source: Worldsteel, Laplace Conseil analysis

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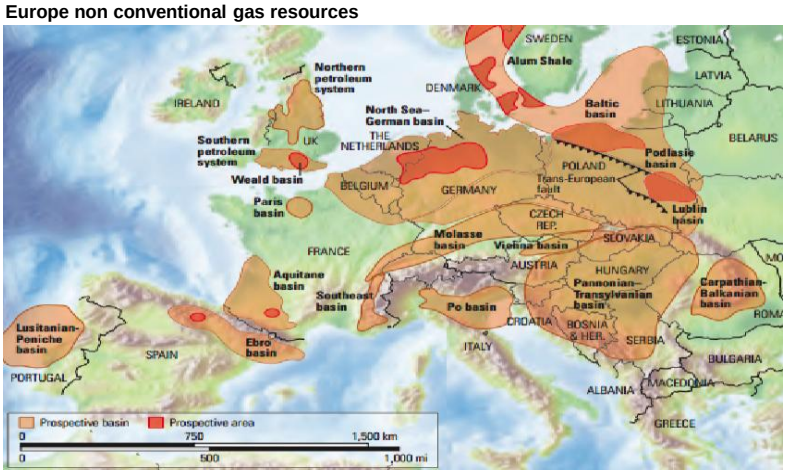
In Europe, shale gas are apparently abundant but exploration/exploration is still very prudent

Europe non conventional gas resources



Source: Kuuskraa et al

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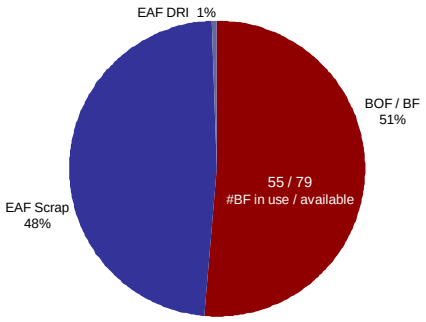
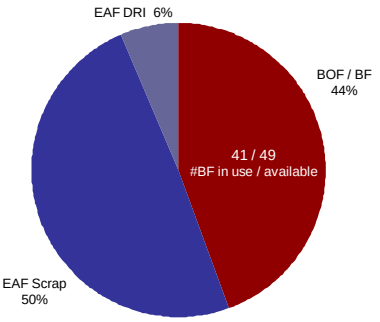
In Europe, integrated plants will probably shift to more EAF production, some DRI could be imported

EU-27 +TK, SWI, NW production , by origin (Mt crude steel)

2011, 100% = 213 Mmt



Forecast 2020, 100% = 236 Mmt



Source: WorldSteel, AISI, Midrex, Laplace Conseil analysis

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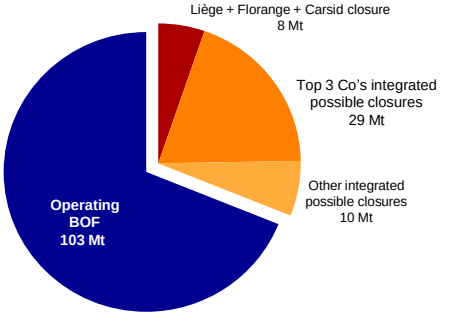
By 2020, the European integrated capacity could be reduced by one third

EU27 + TK 100% = 150 Mt crude steel



Source: Kuuskraa et al, Laplace Conseil analysis

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We believe that “Changes” will continue to characterise the OECD steel industry evolution

- The integrated sector will continue to bear the brunt of the effort, in particular the two or three largest integrated companies.
- While restructuring is currently more important in Europe, it is probable that North America will soon join in the process as more modern producers increase their presence in the market thanks to shale gas DRI.
- Consequently, strategy, governance and social relationship will need to evolve
  - The ***strategy*** of the large integrated companies will need to change so as to take into account the impact of cheaper scrap and DRI, especially in the US.
  - The ***governance*** of these companies will also need to change to find solutions at the shop floor level and not just in boardrooms. (Mitbestimmung or co-determination as practiced in Germany and many neighbouring countries)
  - The ***social relationships*** will need to improve to reduce confrontation, share decisions and flatten hierarchical pyramids for better workers empowerment.

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Implications for international organizations, governments and industry associations

- Focus assistance on the remaining unrestructured integrated producers where the bulk of the overcapacity is concentrated.
- Encourage OECD trade of high grade steel as well as technology and best practices; Relax but remain vigilant for « unfair » imports.
- Promote recycling (collectors, processors, EAF steelmakers).
- Encourage use of gas as substitute for coal wherever possible. Anticipate replacement of older BF/BOF by DRI/EAF.
- Encourage modern social relationships and local management.
- Promote steel as best material for the future.

Thank you for your attention

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