



EU steel industry

Further towards high-tech products

September 25, 2009



1998-2007: Only marginal growth in crude steel production. In the past nine years the production of crude steel in the EU-27 has crept up by a mere 1% p.a., a rate of increase well below the total world steel market average of 6% p.a. Anaemic growth in Europe was due to already high consumption of around 370 kg per head (against 190 kg worldwide), the declining importance of steel-intensive sectors and a surplus of steel imports. Another contributory factor was the already high infrastructure endowment.

2008-2010: Severe slump in production. As the international financial crisis deepened in September 2008 and spilled over into important markets (motor industry, mechanical engineering, construction), from October 2008 steel output nosedived at double-digit rates. For 2009 we are reckoning on contraction of 25% and then for 2010 an expansion of 10% owing to restocking effects. As a result, crude steel production in Europe in 2009/10 is still likely to be well down on its mid-2008 level.

2011-2020: Little growth. The close link between crude steel output and industrial production suggests that in the EU growth in crude steel output will be only slight over the medium term. Given considerably higher growth momentum in Asia, especially in China, the European Union's share of world steel production will probably slide from around 15% in 2008 to a paltry 8%.

Opportunities in high-tech products. Generally speaking, the production of crude steel in the EU only has a future with "specialisation" in premium products. Innovation drivers are energy efficiency and environmental responsibility. Wind energy is becoming more important in Europe. At present more than 100 offshore wind farms are under construction, each requiring about 3,000 metric tonnes of steel.

EU emissions trading not yet impacting competitiveness. Up to 2020 companies will continue to be allocated free carbon emission certificates based on benchmarks for the operation of their blast furnaces, as high environmental management costs would have impaired their international competitiveness severely and it was feared that production would be moved abroad.

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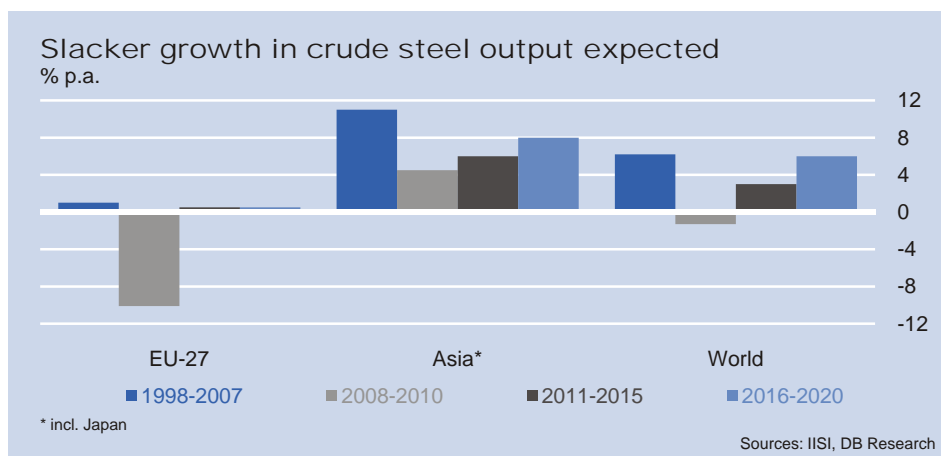
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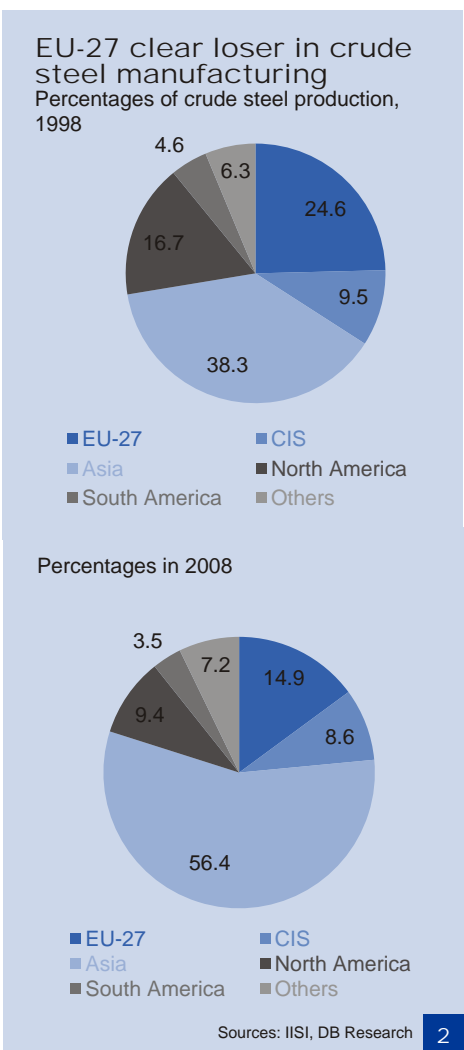
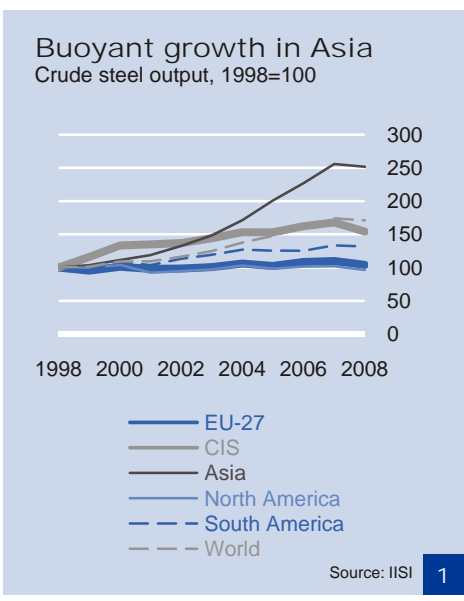
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1. Introduction: Broad spectrum of customers for steel products



Alongside mechanical engineering, vehicle construction, electrical engineering and chemicals, the steel industry is one of the key industrial sectors in Europe. Across the EU-27 the steel industry currently accounts for around 6% of total industry turnover. Its shares in Italy and Spain are slightly higher than average, while the contributions by Germany and France are slightly below par due to their different industrial structure. Each year the sector produces around 200 million tonnes of crude steel and currently employs roughly 400,000 people in the EU-27; indirectly, many times that number of jobs depend on steel – for example in downstream processing operations and recycling.

The steel industry manufactures primary products (e.g. profile steel, flat steel and wire) that are later converted into end products. But the real importance of steel as a material lies in the broad range of uses to which it can be put, made possible by its excellent properties. Steel can, for instance, be made very soft and malleable, like tinplate for food cans. On the other hand, it can be produced as a very hard and brittle material, e.g. for manufacturing knives. At present there are about 2,500 different types of steel in the EU. Moreover, steel is a material that can be melted down again for reuse any number of times, practically without diminishing its quality. The uses of steel range from development of the transport infrastructure through mechanical and power plant engineering, shipbuilding, the car industry and construction to the household appliances industry and toolmaking. According to the European Confederation of Iron and Steel Industries (Eurofer), the European steel industry’s major customers are construction, using 27% of the steel produced, followed by the automotive industry (16%) and mechanical engineering (14%). Together, these three customer sectors take up around 57%. Other important buyers from steel companies are steel pipe and tube producers, manufacturers of metal products such as radiators, tools, locks and fittings, and steel and ship builders, which together account for 36%.

Preponderance of big companies

Given that steel manufacturing is an elaborate and cost-intensive process, and also to exploit economies of scale, the sector consists mainly of large companies with several thousand workers. The major players in Europe are ArcelorMittal, ThyssenKrupp, Tata Corus and Riva, internationally operative groups that have arisen from numerous mergers in the past. ArcelorMittal, the world’s biggest steel corporation headquartered in Luxembourg, was created in 2006 from a tie-up between Arcelor (a previous merger of Spain’s Aceralia, Luxembourg’s Arbed and the French company Usinor) and Mittal (the result of a union in 2004 between Isphat International, LNM Holdings and PHS). ArcelorMittal currently operates around 150 steel plants, 60 of them in Europe. The five major crude steel producers in the EU currently turn out altogether roughly 107 tonnes of steel, representing about 55% of aggregate steel output in Europe (and around 8% worldwide).

As well as in Europe, ArcelorMittal is also the major player in North and South America and Africa and the second biggest producer of steel in the CIS. On all continents together, it employs roughly 310,000 workers and makes 8% of total world crude steel output. By way of contrast, the second and third biggest steel manufacturers in

The world's ten biggest steel companies 2008

Company	Country	Crude steel output Million tonnes
ArcelorMittal	Luxembourg	101.6
Nippon Steel	Japan	37.5
Baosteel	China	35.4
Hebei Steel	China	33.3
JFE Steel	Japan	32.4
POSCO	South Korea	31.7
Wuhan Steel	China	27.7
Tata Steel	India	24.4
Shandong Steel	China	23.8
US Steel	USA	23.2

Source: IISI **3**

Steel capacities up only marginally

the world, Nippon Steel from Japan and Baosteel from China, each account for only about 3% of the steel produced in the world.

The process of concentration in Europe has shrunk the number of companies in the steel industry since the beginning of 2000 by about 1% a year and the size of the workforce by roughly 1.5% p.a.

The internationalisation of Europe's steelmakers is a trend that did not set in until the steel crisis during the 1980s and has continued until very recently. Before that, the European steel industry in the individual countries had a broadly national focus, even though the cornerstone of the sector's internationalisation was laid back in 1952 with establishment of the European Coal and Steel Community (ECSC).¹

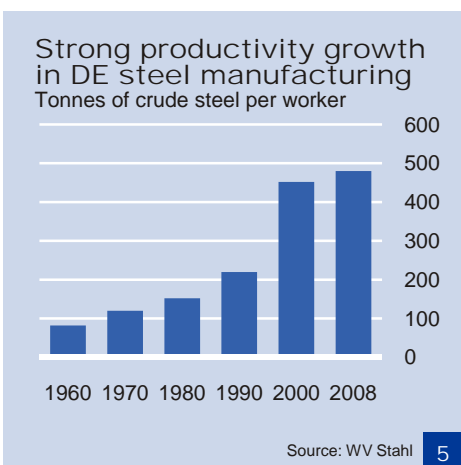
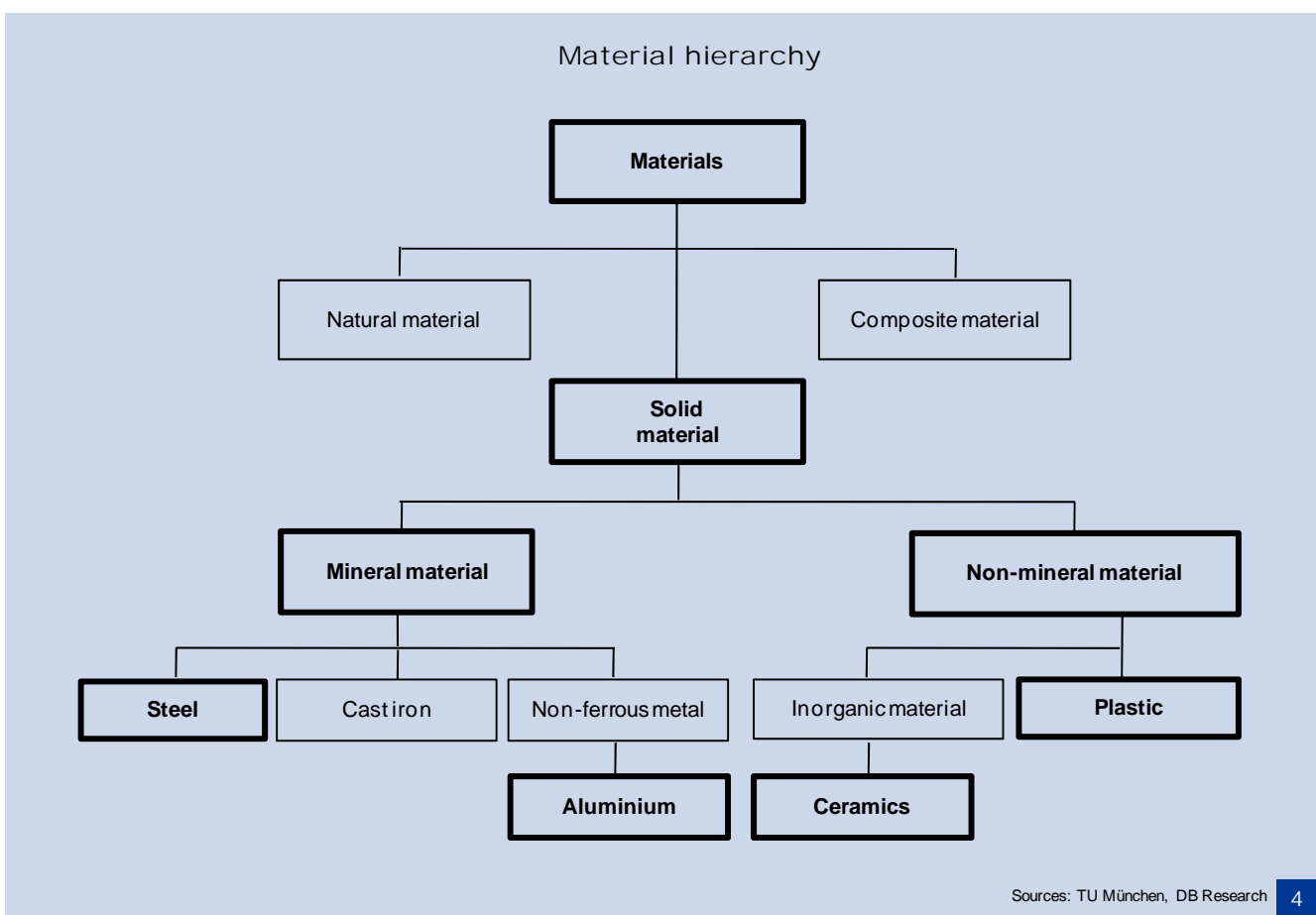
2. 1998 to 2007: Years of sluggish growth

Up to 2007 annual crude steel output in the EU-27 crept up by a mere 1% p.a. to roughly 199 million tonnes, a rate of increase well below the world steel market average of 6% p.a. This marginal growth is due to the already high level of production and the declining importance of steel-intensive sectors. Per capita consumption of around 370 kg is the highest in the world, comparing with a global average of 190 kg. Other producers are cheaper in some sub-sectors, which is reflected in the negative trade balance. From 1998 to 2007 EU steel imports climbed faster, by 6% p.a., than exports (4% p.a.), which is another reason why capacities in Europe were not expanded significantly. Between 2004 and 2008 plant grew only slightly from about 240 to 250 million tonnes (roughly 1% p.a.).

North America, where steel production was more or less flat, was the only country to post poorer performance than the EU-27. Meanwhile, output in South America (+3% p.a.), the CIS (+6% p.a.) and above all in Asia (+11% p.a.) climbed steeply, particularly in China, which registered annual growth of 18%. Asia's appetite for steel is so great because many countries there are in the process of economic catch-up. Huge infrastructure projects such as the construction of dams, hydropower plants and railways have boosted demand for steel. What is more, these countries' economic mainstays – one of which is the automotive industry – ratcheted up far higher growth than in Europe. Rising wages and salaries have enabled consumers to set their sights higher, spurring sales of household appliances. Strong expansion in the output of white goods implies steep increases in the need for steel. In Germany, on the other hand, practically all homes are equipped with a refrigerator and washing machine and the only demand is for replacements.

¹ The ECSC member countries were Belgium, the Federal Republic of Germany, France, Italy, Luxembourg and the Netherlands. For the first time in Europe national sovereign rights were assigned to a supranational authority. The main objective of the ECSC Treaty was to secure supplies of the factors of production key to reconstructing Europe after the Second World War – steel and energy – to the industries of the six signatory countries. The Treaty ended after a fixed period of 50 years mid-2002, after which the coal and steel sector was placed under the provisions of the Treaty on European Union (EC Treaty).

In the past years the EU and USA have registered declining specific steel consumption, that is to say demand for steel grew more slowly than gross domestic product. Between 1998 and 2007 the use of steel in the EU-27 rose by only 2% p.a., whereas GDP in the same period expanded by almost 3%. This was due chiefly to the declining importance of steel-intensive sectors in comparison to services, already high endowment with steel-intensive infrastructure and substitution by plastics, aluminium and ceramics, which have advantages over steel in respect of individual material properties. Plastics, for example have the edge in terms of their lower specific weight, aluminium its higher electrical conductivity and ceramics their better shape stability.

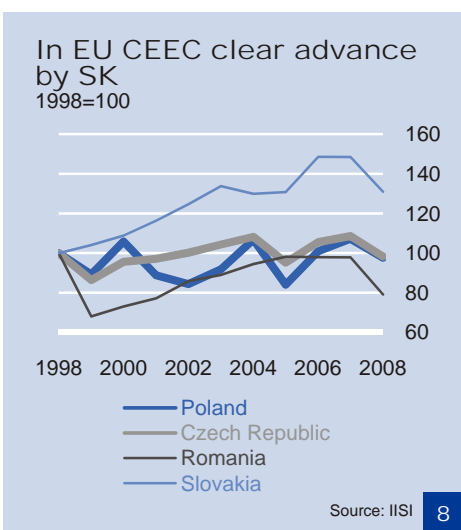
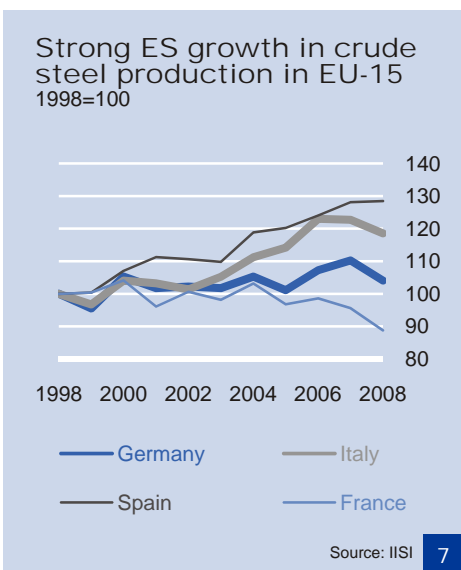
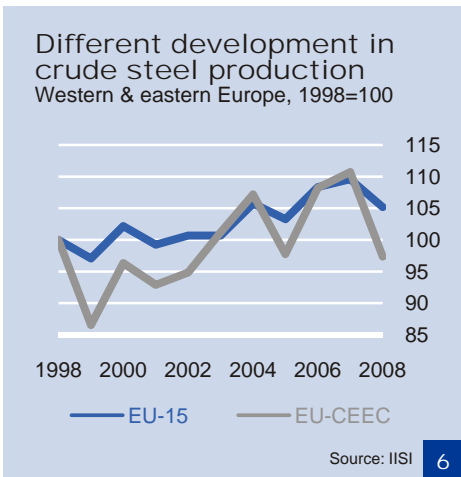


Strong regional divergence

However, there were marked differences in crude steel production between the western and eastern member states of the EU. While output in the EU-15 during the past ten years edged up by not quite 1% p.a., it shrank by around 0.5% in the Central and Eastern European Countries (CEEC) of the Union.

Steel industry in EU-15 benefited from modern product range

The steel industry in western Europe benefited in the past from conversion of its supply spectrum to products that add greater value, while most basic-level manufacturing was outsourced to low-cost countries. Higher productivity has also made the sector slightly more competitive. Whereas in 2000 Germany, for example, turned out only 450 tonnes of crude steel per steelworker, by 2008 this figure had risen to roughly 480 tonnes. Steelmakers in Greece, Austria and



Portugal notched up relatively high annual increases in output of between 5 and 8%, while manufacturers in traditional steel-producing countries like the UK, France and Belgium had to contend with a slight decline in production or only marginal growth rates. Most of the productivity boosts were achieved by shedding labour, as in Austria, Portugal and the UK. In Greece and Spain a slightly higher number of workers produced considerably more steel. Meanwhile, in France productivity even dipped a little as the number of workers fell less steeply than crude steel output.

The German steel industry managed to hold its ground in Europe with a small increase in crude steel production from 44 million tonnes in 1998 to 45.8 million tonnes in 2008. Germany is by far the biggest steelmaker in the EU-27, accounting for 23% of output (1998), followed by Italy, France, the UK and Spain. Together, these five countries turn out about 65% of the EU's total crude steel production, a share that has hardly changed at all over the past ten years (in the EU-15 roughly 85%).

In the past decades proximity to overseas ports, or ports capable of handling ocean-going vessels, has become a decisive factor because raw materials such as coal and ore can be purchased more cheaply from overseas. This explains the high proportion of oxygen steel (which has iron ore and coke as its main raw materials) in aggregate steel production in the Netherlands, the UK, Belgium and Germany (between 70 and 98%; 58% in the EU-27 as a whole).

In Greece and Portugal, on the other hand, the production of steel is based exclusively on the electric steelmaking process using scrap, for which the investment costs are much lower than with integrated steel mills. Moreover, the plants are not location-bound to the same extent as steel mills; they can base their choice of location on other aspects – as a rule the site chosen being geared to the demand for steel.

EU CEEC: below-average development

After joining the EU in 2004 and 2007 respectively, the steel companies in the CEEC states, which represent 15% of EU crude steel output, had to be able to withstand competitive pressure from within the Union. Many companies failed to do so, however. In the Czech Republic, Hungary and Bulgaria, for instance, the number of steel mills declined. While the degree of modernisation in the steel industry as a whole has improved in eastern Europe, in some countries it still falls seriously short of the EU average. In 2008 the share of continuous casting, as a measure of modernity, was still considerably lower in the Czech Republic (88.2%) and Slovenia (82.8%) than in the EU as a whole (96.3%).²

The iron ore needed to manufacture steel is imported from non-EU countries: Ukraine, Russia and Brazil. More than 70% of the coal supplied to the steel mills is delivered by non-EU countries. In some countries the share of oxygen steel is high, particularly in Slovakia (almost 92%), the Czech Republic (90%) and Hungary (75%), compared with 58% in the EU as a whole. However, their shares of electrical steel are comparatively small, ranging from about 8 to 25%, against 42% EU-wide.

² Continuous casting requires fewer working steps than ingot casting because no material unsuitable for further processing is left over from the crude ingot. All in all, continuous casting output is about 15% higher than ingot casting.

The privatisation process in the east European steel industry that began in the early 1990s is now largely complete. The first move by a western company was made in 1992 when the Italian Lucchini group took over Poland's Huta Warszawa, and 2000 saw the first commitment to the region by a US steelmaker with the acquisition of VSZ Kosice. A little later, Russian companies also acquired interests in eastern Europe's steel industry.

Current situation: Severe recession-induced slump in crude steel production in 2009/2010

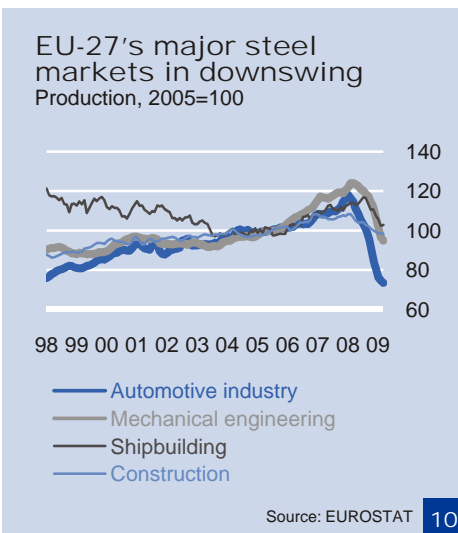
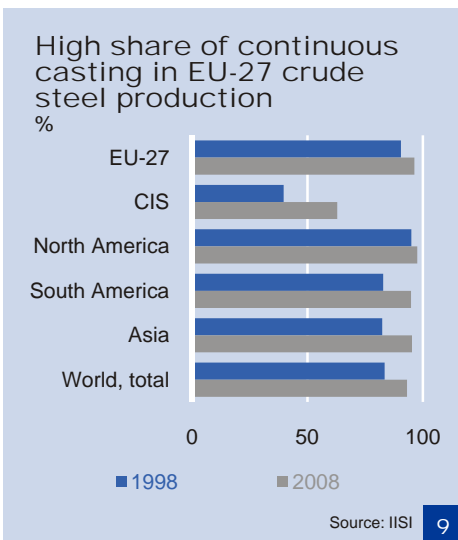
As the international financial crisis deepened in September 2008 and spilled over into important customer markets, the international steel industry, which had enjoyed good business in the previous years, spiralled into an abrupt decline. Having posted substantial rates of growth versus the same month of the preceding year up to August, global production of crude steel experienced single-digit yoy contraction in September 2008; then as from October the cliff-edge drop accelerated to high double-digit rates. The European steel industry was also seriously impacted by this trend – indeed, it tumbled far more drastically than the world steel market as a whole.

In the first half of 2009 crude steel output in the EU-27 was down 43% on the previous year as production by important customers collapsed. European carmakers' outturn at the beginning of 2009 crumbled by almost 40% year-on-year, while mechanical engineering was around 20% off. The shipbuilding industry and construction each slipped by roughly 10% on the previous year. What is more, steel customers had previously stockpiled on a very large scale, having expected shortages of steel and considerably higher prices right up to August.

During the same period the North American steel industry's negative performance was even more marked than in Europe, downshifting 49% yoy, while the reversals in South America and the CIS were not quite so steep, at 35% and 32% yoy respectively. The descent was at its most moderate in Asia, where production contracted 8% yoy.

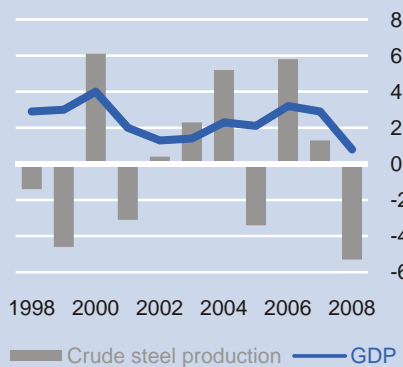
In the past weeks the sector has shown increased signs of bottoming out. ArcelorMittal, for example, has stepped away from plans to close a blast furnace in Eisenhüttenstadt as orders have picked up. At the end of July 2009 ThyssenKrupp und Salzgitter announced that they intended to ramp up their production again. However, capacity utilisation at some manufacturers is currently running at only 50 to 60%. In Germany the steel industry has been given a lift chiefly by the stimulus to new vehicle production from the government's "cash for clunkers" car scrappage scheme and increased construction demand resulting from various infrastructure programmes. Buoyed by somewhat brisker ordering now that stocks have been run down, steelmakers are also fine-tuning prices again.

Roughly in sync with the decrease in crude steel output, average prices for the main types of steel also collapsed. Mid-September 2008 they were still roughly two-fifths above the previous year, but since then they have backtracked rapidly. By mid-2009 they were already down two-fifths year-on-year, hitting a level similar to mid-2006. Since last autumn major steelmakers had curbed their production, partly in a bid to ease the pressure on prices, pursuing a strategy of "price over volume".



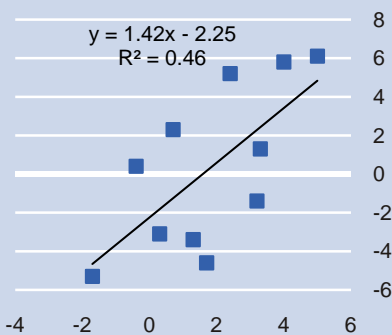
3. Industry forecast

Aggregate EU steel output growth below GDP % yoy



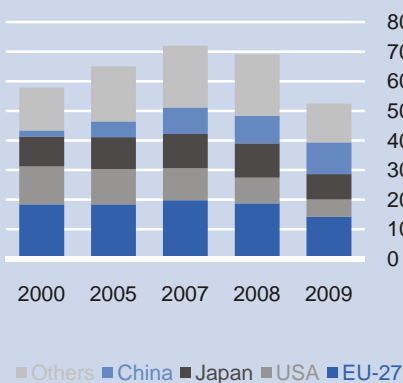
Sources: IISI, Oxford Economics, DB Research **11**

EU manufacturing output determines amount of crude steel production
X-axis: manufacturing output, %
Y-axis: crude steel output, %



Sources: Oxford Economics, IISI **12**

Marginal growth in EU-27 automobile production
Million items



Source: VDA **13**

The close nexus between crude steel output, GDP and industrial production suggests that expansion in crude steel output will be only sluggish over the medium term for the EU. In our forecast, GDP will expand by an average of barely 2% p.a. from 2010 to 2020, compared to a growth rate in the region of 3% p.a. at the end of the 1980s and the middle of this decade. Similarly, we expect manufacturing output (which makes up roughly 37% of GDP) to rise by no more than 3% p.a. in the forecast period, restricting growth in the use of steel. When seeking to export their steel, companies will encounter stiff competition from Asian countries – with China as the most serious rival – able to offer lower prices for basic steel products in many cases.

Demand for steel will be dominated by three sectors, which together use almost 60% of all steel.

Construction the most important customer

The construction industry is by far the most important offtaker of steel in the EU-27. The rate of increase in production is likely to be very moderate in the coming years – as in the past (it averaged 1% p.a. in real terms from 1998 to 2008). Development in western Europe will probably be slightly worse than in the CEEC countries, due chiefly to the expected slump in the number of housing completions given the large amount of property standing vacant, especially in Spain, Ireland, (the east of) Germany and Italy. We expect housing completions in the CEEC to tick up slightly in view of pent-up demand there. However, their share of housing completions in the EU as a whole is extremely low, at around 10%. The most important country in eastern Europe is Poland, which represents a large proportion of completions in the CEEC.

Growth in non-housing construction (e.g. industrial and office buildings) is also slowing appreciably in both western and eastern Europe. It could contract by nearly 6% between 2008 and 2011. The downturn is especially pronounced in Ireland, Finland, Spain and Slovakia. But the outlook for public construction in the EU is much better. We are even pencilling in double-digit expansion in road building in eastern Europe for the coming years, with an increase in the west of 1% p.a.

Carmakers second major customer

Steel is a key input factor for the automotive industry, and the considerable importance of European carmakers, who account for roughly 27% of the world market, makes them one of the steel sector's biggest customers. Italy's motor manufacturers, for example, take up about two-fifths of the steel used in Italy. Similarly, two-fifths of the entire steel made by ThyssenKrupp in Germany are delivered directly to the automotive industry.

However, the property and financial market crisis has dimmed the medium term outlook for European carmakers. The heaviest hit countries in Europe are Spain and the UK. Motor manufacturers have responded to the waterfall drop in sales by slashing their production, cutting weekly working hours or extending the summer break. We expect EU automobile production in 2009 to fall by almost one-quarter. Production is currently running at a very low level and about 30% down on 2007. It will presumably be quite some time until the relatively high unit figures of 2007 are revisited.



Concentration trends among manufacturers will therefore probably intensify, because even before the crisis the industry was suffering from excess capacity and some automotive sub-contractors are not likely to survive the present recession. This will reduce the motor industry's demand for steel. In western Europe, Oxford Economics predicts that output in major car-making countries up to 2020 will expand by only 0.5% p.a. in real terms. Production in France could be better than average, but in Spain it is even expected to contract. In the past four years, too, the car industry in Europe as a whole only managed to expand by 0.5% p.a. (in terms of units), and its share of the global automotive sector declined over that period by two percentage points as automobile production in Asia was stepped up by 7% p.a. (+2.5% p.a. worldwide).

Only moderate development in mechanical engineering

Mechanical engineering is the European steel industry's third most important customer. But there too, rates of expansion are expected to be no more than moderate, although this prediction is averaged for the period 2009 to 2020. In western Europe, which accounts for 94% of all European mechanical engineering, development in Germany could be slightly better than average for the five biggest countries, while output in Spain and France is predicted to fall very slightly. Germany is the major manufacturer in the EU, generating two-fifths of sales, followed by Italy on roughly 18%. A domain of German plant engineering that should gain enormously in importance in the coming years is problem solutions around the energy value chain.³

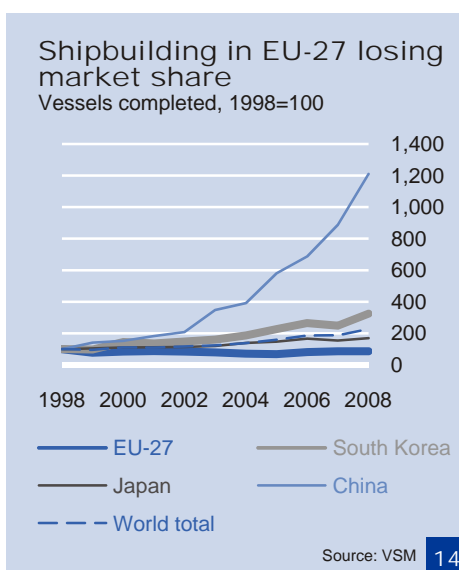
Italy is the main source of concern in the euro area. For one, the relatively rapid increase in unit labour costs over the past decade has dented its competitiveness and for another, important customers such as producers of textiles and clothing, leather and footwear are relocating to Asia, reducing the potential for selling machinery, and hence demand for steel. So far, mechanical engineering in China has concentrated on standard machines, but going forward machine builders are also likely to seek opportunities in the midsize mechanical engineering segment. The CEEC states account for only 6% of output in the EU. The only countries in that region to stand a relatively good chance are the frontrunners Poland and the Czech Republic on the strength of their product range (including drive engineering, elevators and fittings). These two have already managed to expand their production significantly in the past.

Shipbuilding continues to crumble

In shipbuilding the EU continues to surrender market share to Asia. Given the slump in incoming orders, the industry looks set for a fairly long lean period. In the past ten years Europe's share of global shipbuilding has sunk from more than 28% to around 11%, while Chinese shipyards have registered exceptionally dynamic development. As in other branches of industry too, the Middle Kingdom enjoys significant labour-cost advantages in shipbuilding. However, some of the shine is taken off these by the fact that Chinese shipyards still trail their foreign competitors in terms of technology and quality.

Going forward, European shipbuilders will have to focus more on ship repair and conversion – which, however, triggers less demand

Germany major machine builder in EU



³ See Auer, Josef (2008). German mechanical engineering steeling economy for the post-oil era. Deutsche Bank Research. Current Issues. Frankfurt am Main.

for steel than the construction of new cargo ships and cruise ships. Opportunities also exist in the medium term in the shipbuilding supply industry. In Germany, for example, this sector benefits from the construction of new vessels in China and South Korea with an export ratio of around 70%. To strengthen their market position through a local presence, many suppliers already operate production sites in South Korea and China that are even scheduled for expansion in the coming years. With this strategy businesses are hoping to counteract the danger of a national, subsidised supplier industry being built up that could either squeeze foreigners out of the market or prevent their free market access.

Crude steel production forecast up to 2020

For the whole of 2009 we still expect the EU-27 to suffer contraction by around 25%. Growth of 10% in 2010 will be due to restocking effects.⁴ All in all crude steel production in Europe in 2009/10 will still probably fall well short of its 2008 level, while shrinkage in the CIS could be a little less. It will presumably be years until the sector as a whole returns to its pre-economic-crisis status.

For the periods 2011 to 2015 and 2016 to 2020 we are pencilling in negligible growth in crude steel output of 0.5% p.a. to roughly 170 million tonnes (2020). This would still put outturn well below the extremely high average 2007/2008 level of 204 million tonnes, but it would be 23 million tonnes up on the extremely low 2009 statistic. In 1999, too, a sharp 5% drop in European crude steel production was followed in the next year by brisk expansion, which subsequently flagged in the years up to 2004 to 1% p.a. Developments from 2005 to 2007 were similar.

In contrast, output during the period 2008/2010 in Asia will increase by 4.5% p.a. (against 1.3% p.a. worldwide). From 2011 to 2015 and 2016 to 2020 production in Asia should gather pace (6 and 8% p.a. respectively; worldwide 3 and 6% p.a.). Growth there will be driven by massive pent-up demand in infrastructure and for capital and consumer goods.

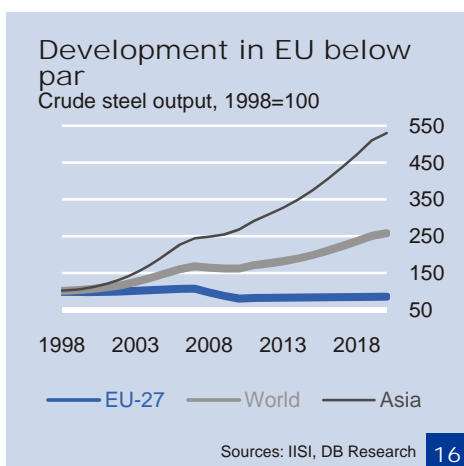
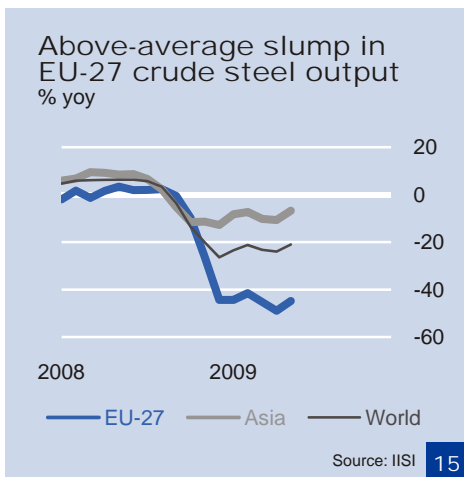
EU share of world steel market down to a mere 8%

The EU's share of crude steel output, which was around 15% in 2008, will presumably have slid to 11% by 2015 and to a meagre 8% by 2020. The reduction in Europe's percentage of global steel production is due not to a decline in the volumes produced but to an expansion in outturn by the emerging markets.

We expect Asia's share of crude steel production to soar from 56% (2008) to 72% (2015), brushing the 80% mark by 2020. Most importantly, China's Baosteel group aims to rack up its output by 43% from 35 million tonnes at present to 50 million tonnes by 2015. The 15 million tonne increase is roughly equivalent to the UK's entire crude steel output.

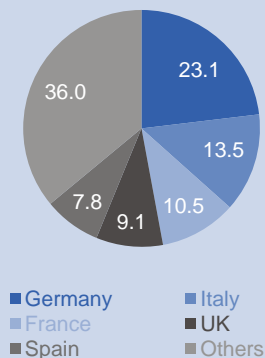
Modernisation as investment focus

Investment is currently concentrated on modernising existing steelworks, chiefly to comply with stricter environmental standards. In the western EU member states regional steel production hubs exist in the Ruhr district and Saarland (Germany), in Apulia and Lombardy (Italy), in Luxembourg, Fos-sur-Mer (France), Zaragoza (Spain), Upper Austria and in the UK's Sheffield region. In the CEEC

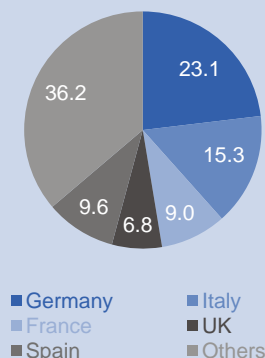


⁴ The customer industries have run down their stocks substantially; in 2010 these will have to be replenished in anticipation of better business.

DE can hold crude steel market share in EU-27
Percentages in 1998

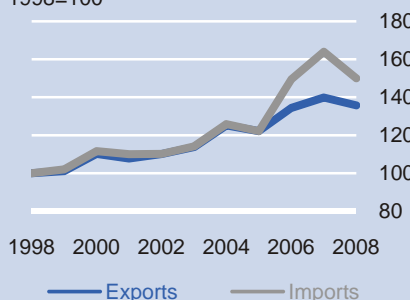


Percentages in 2008



Sources: IISI, DB Research 17

EU-27 steel imports recently up faster than exports
1998=100



Source: IISI 18

the main production clusters are located in the Upper Silesian industrial area and the region around Cracow (Poland).

At Voestalpine, for example, crude steel capacities in Linz were recently expanded by 5.8% to 5.1 million tonnes under its “Linz 2010” investment programme. On completion of the programme, follow-up investment is planned to raise crude steel capacity by another one million tonnes. Meanwhile, ArcelorMittal intends to spend USD 1.3 bn a year up to 2012 on its European sites, a large part of the investment going on Eisenhüttenstadt and Bremen.

In the CEEC the German Steel Federation (WV Stahl) estimates that crude steel capacities will increase up to 2012 by 1.5 million tonnes. Most of the capacity build-up will be in Romania and only a little in Bulgaria. In Latvia an old Siemens-Martin plant will probably be replaced in 2010 by a modern electric steel mill; capacity will remain the same at 0.8 million tonnes.

Hot rolling capacity in eastern Europe could rise by about 10 million tonnes up to 2012 according to planning by the companies there – notably Poltavsky Gok, Dunaferr and Huta Czestochowa. Most of this increase will be in flat steel – a good six million tonnes, an estimated four million of this in Hungary. Capacity expansion in Romania (by 1.7 million tonnes) is divided equally between long and flat products, whereas in Poland (3.5 million tonnes) most of the build-up will be in long steel.

But all told the planned crude steel capacity expansion represents just 1% of European production in 2012. Moreover, it is doubtful whether all these projects will be realised in full given the present slack period.

Further rise in imports of commodities

As in the past, imports are likely to climb faster than exports, particularly purchases of mass products from Asia, as steel capacities are expanding rapidly there and production far exceeds domestic use. In China the ratio of profile to flat steel products is currently 65:35, whereas manufacturers in western Europe consider 40:60 competitive. It must be borne in mind, though, that construction, which is an important customer for profile steel in China, is a far bigger player than in the EU. Even so, an increase in commodities is to be expected, mainly in the profile steel segment.

Should the trend persist, by 2020 the EU is likely to be importing around 235 million tonnes of semi-finished and finished steel products. In purely arithmetic terms that would represent an increase of 25 million tonnes, roughly half Germany’s total output of semi-finished and finished steel goods. However, with capacity build-up expanding in Asia, the possibility of even greater import pressure cannot be ruled out.

In 2008 a quarter of German imports from third countries were sourced from the CIS and a fifth from Asia, while third-country exports are delivered mainly to (non-EU) European countries and to NAFTA. One reason for the relatively high imports from the CIS is that commodity prices are lower owing to cost advantages resulting from the vertical integration of companies that own ore mines as well as coal mines and power plants.

Intense competition on third-country markets is even likely to depress EU steel exports a little.

The major crude steel-producing countries

1998, output in '000 tonnes

China	114,588
USA	98,658
Japan	93,548
Germany	44,046
Russia	43,822
South Korea	39,896
Brazil	25,760
Italy	25,714
Ukraine	24,445
India	23,480

2008, output in '000 tonnes

China	500,488
Japan	118,738
USA	91,490
Russia	68,500
India	55,050
South Korea	53,488
Germany	45,833
Ukraine	37,100
Brazil	33,713
Italy	30,477

Source: IISI **19**

Labour costs* highest in Germany

2007, in EUR

India	1
China	2
Bulgaria	2
Russia	3
Poland	6
Slovakia	6
Hungary	7
Czech Republic	7
Portugal	9
Japan	18
Spain	20
USA	23
Italy	24
UK	27
France	32
Germany	33

* labour costs per hour worked

Source: IW **20**

4. Long-range trends

Scene set for crude steel capacity build-up overseas

In the long run European companies will presumably build up greater steel capacities abroad for cost reasons. As a rule the capacities involved are for upstream business in standard qualities. That is to say, in low-cost locations slabs (compact rectangular blocks of crude steel) are manufactured as feedstock for the downstream process, during which they are made into rolled steel plates, coated and hot-dip galvanised.

ThyssenKrupp is currently spending upwards of EUR 8 bn on the construction of a new steel mill in Brazil with a capacity of five million tonnes and on a rolling mill in the United States to satisfy relatively high demand; both plants are due to go onstream at the end of 2009/beginning of 2010. A steel slab in Brazil is about 20% cheaper than in Germany. In spite of high transport costs, roughly half the steel produced is destined for further processing in Germany, the other half being used to supply ThyssenKrupp's rolling mill in the US state of Alabama.

Strong competition with suppliers from CIS and Asia

In general the Europeans must brace themselves for tougher competition in the future, as the current crisis erupted at a time when hefty capacities were being built up on the global steel market. In the past three years capacities jumped by about a quarter in total to approximately 1.5 billion tonnes (by way of comparison, crude steel output in 2008 was 1.3 billion tonnes). The days in which a few industrialised nations dominated the world steel market are long past. A challenge for the European steel industry is the emergence of new competitors from China, India, Brazil and the CIS countries, which are also rattling the bars of the EU's relatively strong market position in quality and high-tech products. In China, India and Russia labour costs per hour worked are between just EUR 1 and 3, compared to EUR 24 to 33 in industrialised countries like Germany, the UK, France and Italy. As well as developing and modernising their downstream activities, the major challenge for steelmakers in Europe is to prevent the gap to low-cost suppliers in Asia and the CIS from widening too much if they want to remain competitive.

EU mills: Structural shift towards high-tech steel

A window of opportunity for the European steel industry is that industrial demand for special steels in the highly-developed countries is increasing. Special steel is used chiefly in up-market automotive manufacturing and mechanical and plant engineering as well as for the production of superior consumer goods. Customers' requirements of the quality of this steel in terms of rust, acid and heat resistance, malleability and strength call for high-quality types. In many cases it is on these steels that the high international competitiveness of a large number of steel-based value chains in industry depends. Consequently flat products⁵ are moving increasingly to the fore in the industrialised countries, whereas steel production in developing countries concentrates more on long than flat products in view of infrastructure development and the considerable demand for housing. Long products⁶ add considerably less value than more highly processed flat steel products because

⁵ Flat products: e.g. heavy plate, sheet and steel strips.

⁶ Long products: e.g. wire, rods, beams, rails.



EU steel industry aims to reduce substitution losses

relatively low requirements are made of their quality. As a general rule, merchant grade steel can be produced more cheaply in the emerging markets, partly because of the lower wages there, than in the traditional industrialised countries.

HSD steel and AHSS have a future

The European steel industry's major thrust is to reduce losses from the substitution of other materials for steel by introducing new manufacturing techniques to produce thinner yet more durable steel products. The following examples argue in favour of close collaboration between the steel industry and its customers. The first is tailored blanks (made up of different strengths or thicknesses of steel) for the automotive industry. A 100 kg reduction in vehicle weight will lower fuel consumption by about 3%. Another example is the production of high strength and ductility (HSD) steels. Together with Tata Corus, since 2005 steelmaker Salzgitter has been investigating potential applications for HSD steel in selected market sectors. HSD steels are particularly suitable for sophisticated, fast-movement machine components and also deliver substantial benefits for carmakers in terms of lightweighting and improved vehicle crash resistance. The new materials also provide greater flexibility in vehicle design. In the event of a crash, modern advanced high strength steels (AHSS) also facilitate energy absorption on impact, making them ideal for safety-relevant components. Meanwhile, these steels are also being used in the small-car segment as well as for premium models. New high-strength manganese-boron steels are in increasing use for load-bearing and safety-relevant parts.

Another example of high-tech steel is the FR 30 fire-resistant special structural steel developed by ThyssenKrupp. Unlike conventional structural steels, it does not lose its load-bearing capacity so quickly and can thus resist fire for longer.

In general in the EU, the production of crude steel with a "specialised" focus on premium products is a model for the future.

Customer-oriented strategies helpful

In developing high-tech steel, European steelmakers are pursuing a customer-oriented strategy designed chiefly to set them apart from emerging market and east European products. The advantage to the steelmakers is that on the strength of these business relationships they can reckon with a certain sales potential and their competitors are, for the most part, out of the running. They also benefit from the fact that important offtakers of steel are based in Europe, facilitating cooperation and development partnerships with customers from the automotive industry, mechanical engineering and industrial plant construction, for example. Although the industrial base is likely to recede further, core industries will continue to play an important part in the coming years, as they are still way ahead of Asian suppliers in terms of their know-how. The automotive industry, mechanical engineering and aircraft makers are just some examples.

Innovation driver

The steel market as a whole constantly demands new products to satisfy increasingly exacting requirements of, say, environmental sustainability and energy efficiency. The assumption frequently expressed in public that steel is being substituted progressively by other materials needs to be nuanced. It is correct that steel is succeeding in expanding its position as a material in some fields or

Important steel customers based in Europe

Properties of rival materials vs steel products

Plastic:

- lower specific gravity,
- better formability,
- electrical insulator.

Aluminium:

- higher electrical conductivity,
- lighter-weight than steel products.

Ceramic:

- higher temperature resistance,
- better shape retention.

Sources: Stahl-Informationszentrum, DB Research

is even finding new areas of application. But on the other hand plastic, for instance, has advantages in terms of weight reduction and product formability. Then again, innovations are based on a new generation of blast furnaces, involving greater use of steel.

Climate change

The reduction in carbon emissions from 1.97 billion tonnes at present to 1.72 billion in 2013 set by the European Commission to combat climate change, and the measures companies will have to take to achieve this, are likely to trigger investment of benefit to the steel industry by sectors with large carbon footprints, such as refineries and the cement, glass and paper industry.

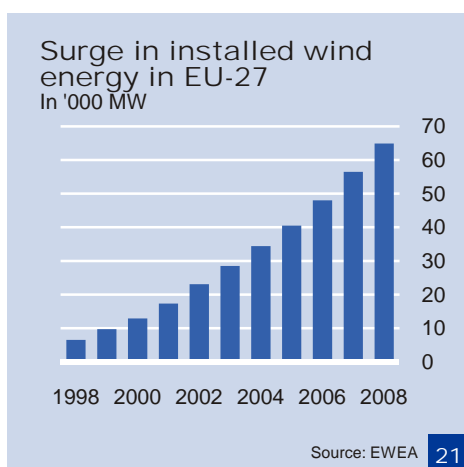
Alternative methods of generating electricity work enormously to steelmakers' advantage. Wind energy is assuming greater prominence in Europe. Besides Germany, the most important wind energy nations are Spain and Denmark, but countries such as the UK, Italy and Portugal are also pushing ahead emphatically with wind projects. An overview by the European Wind Energy Association (EWEA) shows that wind capacity in the EU-27 has increased by one-quarter per annum over the past ten years and by one-fifth in the past five years. In parts of Navarre (Spain) and in Schleswig-Holstein between 30 and 50% of the electricity is now wind-generated. Denmark produces a fifth of its electricity "renewably" from wind power. Although the rate of expansion has not been quite so high lately, in the medium term annual growth of 15% is expected for Europe, while the increases in China, the USA and India will presumably be even higher (world total: +20% p.a.).⁷

The German wind power industry already uses almost a million tonnes of steel a year – roughly three times as much as shipbuilders require. Around 3,000 tonnes of steel go into building one offshore wind farm alone. At present more than 100 such wind farms are under construction or in the pipeline in Europe. In response to brisk demand at home and abroad, German manufacturers are substantially ramping up their capacities. Apart from new installations, a growing number of old facilities are being repowered with modern technology. Operators of wind power plants have thus become an important customer segment for the steel industry, partially compensating for declining demand from traditional offtakers.

Demand for energy efficiency is also creating incentives to buy a host of products – ranging from major industrial installations to household appliances. Management consultancy Roland Berger values the global energy efficiency market in 2005 at EUR 450 bn and predicts growth of 5% p.a. up to 2020.⁸ Europe should benefit from growth in this segment.

Protection of the environment

Although the steel industry has halved its carbon emissions in the past with improved production methods, it is still seen as environmentally detrimental in Europe. As a rule, retrofitting existing blast furnaces entails the use of a substantial amount of steel. An existing plant in Eisenhüttenstadt, for example, is to be converted to



New production methods benefit the environment

⁷ See Auer, Josef (2007). Germany – the global force in wind energy. Deutsche Bank Research. Current Issues. Frankfurt am Main.

⁸ See Ehmer, Philipp (2009). German electrical and electronic industry – Industry structure allows hopes of early return to growth. Deutsche Bank Research. Current Issues. Frankfurt am Main.

top gas recycling process technology. In 2008 the Forschungszentrum Karlsruhe research centre estimated potential reductions in carbon emissions with the use of this modern technology at 50 to 60% in comparison to conventional steel manufacturing. Unlike conventional blast furnaces, the off gas is recycled back into the production process instead of being used for secondary energy generation. This technology requires less coke, produces fewer emissions and is intended to enable Europe's steel industry to reinforce its technical leadership.

EU emissions trading not yet affecting competitiveness

EU leaders' recent energy and climate policy decisions have let off the European steel industry relatively lightly for the time being. Up to 2020 companies will continue to be allocated free carbon emission certificates based on benchmarks for operation of their blast furnaces, as high environmental management costs would severely have impaired their international competitiveness and it was feared that production would be moved abroad. Austria's Voestalpine had already considered relocating part of its production facilities to Ukraine or Turkey. In environmental terms, however, offshoring makes no sense as it would, if anything, have been detrimental to the global environment. The traditional steelmakers producing oxygen steel would have been burdened with extra costs of EUR 10 bn.

What is more, in Germany for example a lot of work has been carried out since 1990 on cutting carbon emissions. Since then the carbon footprint per tonne of crude steel has been reduced from 1.6 to 1.4 tonnes.

Had ThyssenKrupp located the steel mill that it is building in Brazil in the EU, it would additionally have had to purchase emission allowances for 8.7 million tonnes of carbon dioxide. On top of the price of the carbon credits, this would have resulted in additional costs in the region of EUR 200 m, or EUR 42 per tonne, for emissions trading alone. That is about 5 to 10% of the total costs. It is true that in previous years the steel industry has been able to pass on significant increases in raw materials prices and freight rates to its customers. But these price rises affected steelmakers worldwide, whereas plans in Brussels to tighten up emissions trading would have hit producers in the EU one-sidedly.

From 2013 the power generation sector will have to buy its carbon emission allowances at auctions. In the medium term electric steel plant operators fear this will push up the price of electricity and prejudice their competitiveness.

5. Conclusion: Shares likely to be lost to Asia

The past ten years have witnessed considerable structural shifts on the EU steel market, and these are likely to continue. The process of concentration in the steel industry will probably persist as companies look to improve their cost structure and increase their market power through acquisitions. But the trend is not confined to the European Union alone. In China, the scale of concentration in the steel industry is still comparatively low. However, according to the guidelines on Chinese steel policy the government plans to consolidate China's several hundred steelmakers into ten larger units in the coastal region to the north of the People's Republic. By

Burden of costs in selected DE sectors (2007)

Share of gross production value in %

	Energy	Per- sonnel	Material
Production of pig iron, steel and ferro-alloys	8.8	10.8	51.8
Metal production and metal-working	5.2	12.3	55.2
Industry, total	1.8	17.3	44.3

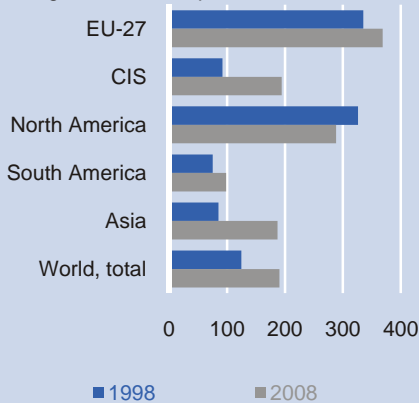
Source: Federal Statistical Office

22

Concentration ongoing

High steel consumption per capita in industrial countries

Kilograms, finished products



Source: Worldsteel Association

23

2010 these are targeted to encompass around half of crude steel output and by 2020 fully 70%. Moreover, high-tech steel is accounting for a larger part of European manufacturers' product ranges. In general, European companies are working together much more closely. ArcelorMittal, Tata Corus und ThyssenKrupp are collaborating, for example, on energy-saving technologies in blast furnace systems and underground storage of carbon dioxide to enhance their technology lead in this field.

By international standards, growth in European crude steel output – having declined by 9% p.a. in the period 2007/2010 – will be below average up to 2020, edging up by just 0.5% p.a. This will widen the gap further between the major steel-producing regions, especially between Asia and the EU. We must, however, consider that steel consumption of around 370 kg per head in Europe is the highest in the world. Even if the European steel industry's share of the world market does shrink appreciably, Europe will remain an important steel-producing region as manufacturing networks with important local customers continue to deliver essential advantages. The most notable ties in this context exist between the steel industry, carmakers, mechanical engineering and electrical engineering. Within the EU the western member states will still play a more important role than the CEEC countries, although progressive modernisation in eastern Europe should further boost its share of continuous casting. At present it still lags the EU-15 level by around 5 percentage points.

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