Commitment for Steel

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We are presenting this report for the Members’ Meeting of the steel organisations on 12 November 2015. The organisations want to provide written information on some of the initiatives and services with which they have represented the positions and interests of the steel industry in 2015. The responsible personnel would be pleased to provide more detailed information on these topics.

Attention in 2015 focused, in particular, on the growing intensity of global competition, international climate protection goals and Germany’s energy transition. We observe with concern the increase in political regulation.

The steel industry in Germany and Europe, however, requires some leeway in order to continue implementing the many product and process innovations. Against this background we therefore warn against any tightening up of the EU Emissions Trading Scheme, which could lead to an irreparable weakening of steel companies facing international competition.

Given developments in the area of energy and climate policies, in particular, targeted strategic communication remains indispensable. Our continuing communication activities draw attention to the fact that the steel sector is vital for Germany, as a technology location, for sustainable production and sustainable products. Communication activities during the coming weeks will concentrate on negotiations on an international climate agreement in Paris.

The recently updated study on ‘The economic importance of the steel industry’ by the Rhenish-Westphalian Institute for Economic Research (RWI) once again demonstrates that the steel industry is part of a cluster of decisive significance for the international competitiveness of German industry.

The award of the Steel Innovation Prize in Berlin, the European Steel Technology and Application Days (ESTAD) in Dusseldorf, and the Materials Week in Dresden impressively presented the innovative material steel and Germany as a steel location – also regarding technical-scientific aspects.

In response to the upcoming challenges we are steadily proceeding with structural changes in our organisation and thus creating further synergies. The ongoing modernisation of the Steel Institute VDEh will help bring about further development. Among other things, it will ensure efficient work structures which will continue to make it an attractive platform for exchanges of technical-scientific experience and an important representative of the economic interests of the steel companies in Germany and Europe.

Best regards

Hans Jürgen Kerkhoff
President
German Steel Federation
Chairman
Steel Institute VDEh
Focusing on climate policy

Priorities of the German Steel Federation in 2015

The high cost burdens resulting from Germany’s energy transition and reform of the EU Emissions Trading Scheme threaten to massively restrict the competitiveness of the steel industry. Our industry cannot shoulder the immense costs and remain internationally competitive. The Emissions Trading Scheme must not be permitted to hinder industrial development and international competitiveness. In discussions with political decision-makers, the German Steel Federation is making great efforts to focus attention on the increasingly dynamic competitive environment and the need for fair competitive conditions.

The steel industry in Germany is well aware of its responsibilities regarding environmental protection and the conservation of resources, and signed the ‘Agreement on introducing energy efficiency networks’ between the industry and the federal government in December 2014. The German Steel Federation and the Steel Institute VDEh will support the founding of energy efficiency networks and provide their members with a forum for exchanging experiences. The information platform www.oeffizienz-mit-stahl.de was set up in August in order to improve the visibility of the steel industry’s efforts to increase efficiency.

The ongoing communication initiative has made it possible to raise awareness of the sector-related interests of the steel companies in Germany and to convey targeted messages to politicians and the public. The Berlin Steel Dialogue, which this year took place in combination with the Steel Innovation Prize awards, was again successful — with about 580 participants and the Federal Minister for Education and Research, Prof. Johanna Wanka, as keynote speaker. The winning projects once more demonstrated the steel industry’s innovative strength.

The German Steel Federation also intensively advocates free and fair competition on the European steel market. This involves the topic of consolidation in the EU steel industry — restructuring should be market- and company-driven. Rising steel imports are a major challenge for the European steel economy, necessitating a foreign trade policy with instruments that are effectively structured and efficiently implemented.

Discussions with politicians: Chancellor Dr. Angela Merkel talks with Gerhard Endemann, Manager of the Politics Department, at the German Steel Federation’s stand at the CDU party conference (1). Hans Jürgen Kerkhoff talks with Federal Minister of Economic Affairs Sigmar Gabriel (2) and Federal Minister for the Environment Dr. Barbara Hendricks (3).

Steel energy-efficiency network

The energy transition: self-generation capacity market

Importance of the primary industries (sector dialogue with Ministry of Economic Affairs)

Influence industry-oriented reform of Emissions Trading Scheme

Sustainability in the steel industry

National and international climate protection policy

Steel innovations

EU state aid policy

Sustainable and industry-oriented clean air and resource policies

Strengthening of the steel value-creation network

Free and fair competition on the European steel market

Non-discriminatory access to sources of raw materials
The steel economy in Germany has developed solidly so far this year. Crude steel production during the first eight months of 2015 rose 0.5 per cent compared to the same period last year, largely meeting expectations at the start of the year. The forecast was for 43.3 million tonnes of crude steel, or a year-on-year increase of 1 per cent. According to a survey by the Munich-based economic research institute ifo, the current business situation in the steel industry has also improved, even if economic conditions for individual products vary greatly according to their customer groups. The current economic indicators for German steel processors show that firm demand can also be expected in the coming months, despite greater risks for Germany’s steel economy resulting from worldwide economic turbulence.

The relative stability of steel demand in Germany, and in the EU as a whole, contrasts with developments in many other regions of the world. Global steel demand will shrink this year for the first time since 2009. In addition to China, other important markets – such as Brazil and Russia, in particular, as well as the USA, Japan and South Korea – have also gone into reverse. Against this background, the worldwide under-utilisation of capacities has increased again while international competition has further intensified, above all due to the massive rise in Chinese steel exports. Whereby the open German and European steel markets are particularly exposed to high import pressure.
World steel production is falling for the first time since 2009. The stainless steel ball by Icelandic artist Olafur Eliasson hangs in Munich’s Fünf Höfe shopping mall and symbolises world openness and interconnection.
It is the task of the Economics and Statistics Department to identify and analyse fundamental trends on national and international steel markets. This is intended to simplify the member companies’ orientation in the ups and downs of the economy, whilst also strengthening the sector’s advocacy ability and public communications. The Department publishes quarterly economic reports and an annual forecast. There are also special reports on a variety of topics. This year they provided, for example, coverage of the situation facing the Italian steel industry, assessments of investment programmes on the EU and German levels, examinations of the potential effects of lifting sanctions against Iran, and an evaluation of the Chinese government’s steel restructuring plan.

The Department’s assessments are based on work in the economic committees at Eurofer, the World Steel Association and the Steel Committee of the OECD, as well as on collaboration with the Federation of German Industries (BDI), Germany’s central bank (the Bundesbank) and economic research institutes. In addition, there are our own association surveys on orders received, deliveries, investments and capacities. Finally, the Department has powerful foreign trade databases that cover both direct and indirect foreign trade involving steel – and are available free-of-charge to member companies. The most important statistical data are published in the annual Statistical Yearbook.

The Product Markets Department mainly focuses on developments regarding finished rolled steel products, including the relevant pre-materials. Six years after the financial and economic crisis there are still excess capacities – which vary according to product and region.

The overall positive developments in most segments of the automotive sector, the main demand-driver in general, have led to, for example, improvements regarding continuously rolled flat products (the strip mill segment) as well as high-quality wire rod and bars in the regions of southern Europe that have long been weaker.

Demand in the reinforcing steels and sections segment in northern and central Europe is at a relatively satisfactory level, while in southern Europe an initial positive turnaround can be found in Spain. In general, the infrastructural investments necessary for this segment have been lacking for some time now and, although on the political agenda, nothing noteworthy has yet materialised. The quarto plate segment not only also suffers from this lack of investment but, like other products, is also feeling the consequences of low oil prices expressed in the form of a consider-
ably greater global reluctance to invest in the conventional energy sector – and the existing demand from renewable energies cannot compensate for this.

With few exceptions, stocks in the distribution sector and at processors largely fell further in 2015. Apart from increased uncertainty regarding future developments in response to current global upheavals, the reasons for this include the increased material availability and shorter delivery times of European steel producers.

Imports from all over the world are an integral component of European and German steel markets. But China’s export offensive, a response to its weakening economy and massive overcapacities, is something else altogether. So far, in Europe, the entire flat steel market and increasing areas of the profile steel segment have been affected. The pressure emanating from China is also having an increasingly negative effect on European third-country imports.

The reduction in pre-material costs has not eliminated the discrepancies between the basic raw materials and scrap, so that the products manufactured via the two production routes continue to have differing starting positions.

Provision of the Department’s regular information on relevant product data has been reconceived this year and placed on a database-supported basis that offers recipients greater flexibility and is more user-friendly.

### Global crude steel production

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<thead>
<tr>
<th>Year-on-year change</th>
<th>Million tonnes annualised, 12-MMA</th>
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<tbody>
<tr>
<td>2007</td>
<td>1000</td>
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<td>2008</td>
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<td>2015*</td>
<td>1800</td>
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*Forecast 2015: 1800 m. tonnes (+ 1%)

Crude steel production in Germany remains in the doldrums.

### Global steel exports (steel mill products)

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<th>Million tonnes annualised</th>
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<tbody>
<tr>
<td>2012: 316</td>
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<td>2013: 316</td>
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<td>2014: 348</td>
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<td>2015*: 353</td>
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*annualised

You have been responsible for steel forecasts at the German Steel Federation for ten years now. Why are steel forecasts actually necessary?

The forecast that is published every December provides orientation on the basic economic trends in the sector. It is not just of great interest to steel producers, but also to customers, service providers or logistics companies, as well as research institutes. A steel forecast – and the argumentation behind it – also supports the sector’s public communications.

There is no crystal ball on your desk. How do you do it?

We do not need any crystal ball because we do not prophecy – we make a forecast. This is based on an expected overall economic situation from which we derive conclusions regarding steel demand in Germany and in the other important regions. We work on this as a team of three and can access very good data, such as the German Steel Federation’s database of foreign trade statistics.

With the exception of the crisis years of 2008/09, when all economists were off the mark with their predictions, your forecasts have been remarkably accurate. How have you managed this?

It’s true, we monitor our success and the results are really positive – we were almost perfect last year. We have so far also been pretty good at recognising economic changes of direction, in other words whether demand is slowing or rising. In 2008/2009, however, the situation was too uncertain for a forecast so, for the first time in decades, we didn’t make one.

Your forecasts also show structural changes. Which ones?

Structural changes have had considerable effects on the steel economy in recent years. The greatest changes started with the 2008/2009 crisis. The influence of raw material prices on steel demand has therefore grown, and foreign trade flows have fundamentally shifted. The inventory cycle has also shortened. The markets have now become more volatile and developments vary strongly by region.

What effect have your calculations had on the overcapacities discussion?

We do not actively drive this debate but try to influence it with factual arguments, for example within the OECD Steel Committee. We therefore consider it misleading when temporary excess capacities in market-oriented countries, for example in the EU, are treated the same as structural overcapacities in countries without a market economy, such as China. In the OECD we also successfully campaigned for the use of realistic definitions for capacity calculations because otherwise excess capacities are systematically overestimated.

Eurofer and worldsteel also make forecasts. How are you involved with them?

We actively participate in the exchanges on fundamental economic trends that take place in the economic committees of both associations. Final forecasts of steel demand are ultimately the result of work in both organisations. We consider it important to maintain an independent view of international developments because steel demand in Germany increasingly depends on the world economy – as our processors have become distinctly more export-oriented in recent years, and international competition on the steel markets has intensified appreciably.

Have the risks involved in making good forecasts increased?

Certainly. Because the overall economic and geopolitical risks are increasing. For example the uncertainties in the eurozone, the Ukraine-Russia conflict, or the problems in the emerging countries. China, as the largest player on the steel market, poses particular risks.
The steel industry between growing import pressure and falling raw material prices

International competition will become more intense again this year due to rising imports and lower raw material prices – whereby China, having increased its steel exports by 50 per cent last year, is playing a key role. This trend has continued undiminished in 2015. The flood of exports from China is principally an expression of enormous overcapacities, retained against market trends with state aid. This situation is unlikely to change in coming years.

In principle, the steel industry has nothing against competition and imports. The steel industry is prepared to face international competition and supports open steel markets. Steel producers, however, are concerned that the European market for some products is being damaged through unfair, i.e. dumped and/or subsidised, imports. Thus the European Commission has introduced measures this year against imports of cold rolled stainless steel sheet and grain-oriented electrical steel. Further trade cases are also currently under discussion: two complaints have been lodged (high-fatigue-resistant rebar and cold-rolled flat steel products), and more cases are being prepared.

The steel industry uses trade protection instruments responsibly and only promotes complaints to the European Commission if there is overwhelming evidence of dumping and the damage to the domestic steel industry no longer leaves any alternative. In contrast, antidumping legislation in other regions (e.g. the USA) offers the domestic industry substantially greater external protection by means of quicker and more effective measures. The steel industry in Germany is concerned that a wide range of legal complaints is being started in the USA. The loss of sales possibilities here would lead to increased quantities in other markets, such as the free and unprotected EU. This is the conclusion of a current analysis by the German Steel Federation.

“The EU’s recognition of the market economy status of China should be oriented upon the criteria defined for this purpose. China, however, currently only meets some of these.”

Stefan Grünhage
Chairman of the Foreign Trade Policy and Statistics Committee

In this regard, the steel industry has long been considering whether the EU will recognise China as a market economy in late 2016. According to China, this step should take place automatically. Europe has hitherto tied market economy status to clear criteria, which China has so far been unable to meet. Any premature classification of China as a market economy would lead to a clear weakening of the effectiveness of trade protection instruments against China. It would immediately become impossible to increase prices from analogue countries. It would also be almost impossible to provide proof of dumping. The German Steel Federation has created a collection of theses and arguments on this subject and is trying to raise awareness of this important matter with letters and discussions. An industrial alliance has also been formed on a national level in order to direct even greater attention towards this discussion.

“In recent months the steel scrap market has shown a clearly divergent trend compared to other steel input materials.”

Lutz Fröhlich
Chairman of the Metallic Raw Materials Committee (Steel Scrap)

In contrast to the state of affairs regarding foreign trade, the situation at the start of the value-creation chain has eased considerably. In recent months prices, in particular for bulk raw materials such as iron ore and coal, have fallen substantially. The secondary raw material steel scrap, however, has been subject to a different trend. In view of the conspicuous developments in recent months regarding steel scrap compared to other steel input
materials, the German Steel Federation has examined the factors currently affecting the scrap steel market in Germany in greater detail.

Raw material policy challenges remain unchanged despite the easing of prices. Thus protectionism and unfair market practices, such as the imposition of non-tariff trade barriers, are still on the march worldwide. In addition to the usual reporting on the current situation on the raw material markets, such developments have been examined in special analyses. Thus the German Steel Federation has compared, for example, raw material policy approaches in a variety of the world’s important steel regions. This has shown that the use of market-distorting and sometimes protectionist instruments is a fixed component of national raw material policy, above all for threshold nations.

There are also numerous other factors that have a considerable influence on raw material availability and prices. One example is the European Commission’s efforts to define transparency rules for the procurement of raw materials. The aim of this initiative is to stem the financing of armed groups via earnings from trade involving minerals in war zones and high-risk regions. The steel industry supports these efforts, but observes some of the proposals with concern. The steel industry has become involved in this process with clear positions in order to achieve a practical structuring of such reporting obligations.

Volatility and uncertainty are also topics for the economic work of the German Steel Federation. Thus, among numerous other matters, joint economic work focused on the improved flexibility of resources. The IT-related topic of cyber-criminality has also become a major subject of concern. The aim of future joint work is to provide member companies with a cross-sector overview of cyberattack techniques – as up-to-date as possible – and, in particular, to enable the use of appropriate protective measures. In addition, the solution-oriented dialogue with the producers of sector-specific software should be intensified, and general organisational guidelines and their protective effects discussed.
Environment, transport, education

Dealing with new challenges efficiently

Steel creates bridges – in this case between the course of the stream and the environment. The colours of the bridge in the arts park Not dal Mol in Sent, by Swiss artist Not Vital, match the environment thanks to the reflective surface of the 3.5-tonne stainless steel construction.
Politicians have long recognised the threat of production relocating as a result of the demanding emissions trading scheme introduced to mitigate climate change. But, in spite of the hope for a breakthrough to be made at the Paris climate change conference in December 2015, it is already obvious that even after Paris there will be no uniform global emissions trading system and thus no parity of competition at steel sites worldwide. The risk of a relocation of carbon-based industry (carbon leakage) to countries without any emissions trading therefore remains.

The threat to the steel industry in Europe, however, does not solely result from ambitious EU climate protection efforts. It is the wide range of burdens and demands in the entire environmental area – which our politicians always want to take a bit further than elsewhere – that in this form ultimately leads to a relocation of production as a result of political decisions (political leakage): investments within the EU are initially suspended in response to the unsuitable conditions here and ultimately will increasingly be made in non-European regions.

Despite these challenges, steel producers and the organisations of the Stahl-Zentrum continue to work intensively on improving efficiencies. A new internet-based efficiency platform is intended to simplify and stimulate technical exchanges in all areas – from raw materials, through production, to application. At the same time, the German Steel Federation, together with the Steel Institute VDEh, supports the formation of networks in accordance with an agreement on the introduction of energy-efficiency networks between industry and the German government.

Regarding the environment, the Industrial Emissions Directive (IED) introduced in 2010 is now an everyday occupation for the authorities and companies, e.g. through inspections, plant status reports, and monitoring or implementing new requirements for plant operation. Committee work in the Environment Committee involves discussions on this and the joint creation of methods of resolution, as well as statistics. This leads to the description of the best available techniques (BAT), as found in the recently published BAT reference documents according to the IED or in the current revision of the Technical Instructions on Air Quality Control (TA Luft). Further key topics include the new rules on accident legislation, on alternative construction materials such as slag products, on water polluting materials and chemicals (REACH), as well as the borderline between occupational safety and health protection.

“It is also necessary to consider the contribution that steel makes to society, growth and prosperity – and the negative effects that are thus prevented.”

Hildegard Kurtz
Chairman of the Environment Committee
80 per cent of the transport undertaken by the steel industry involves sustainable rail or inland waterway carriers. This high share of sector transport volumes has been maintained thanks to the steel industry’s substantial investments over decades in works railways, private commercial ports and, in some cases, in its own shipping companies. The steel industry has held intensive discussions with the railways on investments in new and modernised goods wagons, as well as on noise reduction measures. In addition, the German Steel Federation has repeatedly and emphatically warned about the risks and burdens for the steel industry during the total of nine goods transport strikes. The problems suffered by the largest rail customers during the strikes received much media attention.

“The steel industry in Germany transports an enormous 200,000 tonnes by rail every day. Short-term shifts to other rail companies or modes of transport are impossible, so longer rail strikes endanger the supply chain to our sector and our customers.”

Hans-Joachim Welsch
Chairman of the Transport Committee

The traffic infrastructure in Germany has been dramatically underfinanced for decades. The accumulation of renovation work required on road, rail and canal networks must be tackled urgently. There is also a major backlog regarding some new construction projects. While the budgets for transport infrastructures have, at least, risen somewhat for the coming years, the German Steel Federation nevertheless demands that investments in transport routes in Germany be increased from EUR 10.8 billion (2015) to EUR 14 billion per year as rapidly as possible and maintained at a needs-oriented level.

The wheels did not stop turning during the transport strike: a company transports coils itself.

Investments in traffic infrastructure in Germany

Renovation of the traffic infrastructure will require major investments. The planned budget increases from 2016 only compensate for the price rises of recent years.
The Education and Human Resources Committee focuses on work-related training against the background of digital development. Structures and workplaces need to be adapted and the employees appropriately qualified in order to exploit the opportunities of digital development for on-the-job training. For this purpose, the steel companies require highly qualified software developers that would otherwise go to other sectors.

“Not only must the structures and workplaces be adapted in order to exploit the opportunities of digital development for work-related training, but employees must also be appropriately qualified.”

**Harald Schartau**
Chairman of the Education and Human Resources Committee

Despite the continuing challenging economic situation, the total number of employees had only fallen slightly at the end of 2014. Long-term personnel management measures have proved effective here. Applicant numbers largely remained constant in 2014 compared to the previous year. The training rate also remained comparatively high, at about 5 per cent of the workforce.

Training in the steel industry is being promoted in schools – including those careers that are not usually thought of as connected with steel (e.g. in the transport sector) – in response to the difficult situation regarding the recruitment of talented young personnel. In addition, attempts are being made to prevent the early breaking off of training and, if this proves impossible, to persuade suitable college dropouts to undertake training in the steel industry.

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**Further education is the key to improving employee qualifications – here, for example, at the Steel Academy.**

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**The training rate in the steel industry is relatively high at about 5 per cent. In the picture: the new trainees from Dillinger Hütte and Saarstahl in 2015.**

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**Girls’ Day: apprenticeships in the steel industry are already being promoted in schools.**
What in fact is sustainability?

Only so much of a resource can be used so that future generations are not disadvantaged. Sustainability therefore involves three pillars: society, ecology and economy.

How does one measure sustainability?

There are a variety of indicators according to the particular case: for example, energy efficiency or energy consumption, the production of by-products instead of waste, work-related accidents, or the general economic efficiency of a process.

Is the steel industry sustainable?

In Germany certainly. Though even here there are still potentials for improvement. Major changes are, however, no longer possible.

Why must sustainability always be considered holistically?

The three pillars mentioned earlier may never be looked at in isolation. They have to be balanced, because an action taken to increase sustainability may, for example, improve the ecological side but worsen the social situation. There must, therefore, be a positive effect overall in order to be able to speak of sustainability.

Is the steel industry in Germany more sustainable than in other countries?

Steel producers in Germany are also in a top position worldwide regarding sustainability. We are leaders in environmental protection: many environmental protection techniques are based on German developments and innovations. Here, for example, about 95 per cent of tinplate packaging is recycled and processed into new products. The training rate here and, say, collaborations in research and development in the individual value-creation stages, are also worth mentioning.

What makes steel so special?

Steel is a material that can be recycled almost completely and with the same quality. And there are major potentials in the use of steel. It enables innovations in many fields and thus also makes an indispensable contribution towards growth and prosperity in Germany.

Why has the German Steel Federation issued a new Sustainability Report?

Because there have been considerable changes since the last report two years ago. Some indicators have been added while others are no longer used because the defined objectives have been achieved.

Where have there been improvements?

Constant research and development has resulted in an increase in patent registrations, for example regarding new steel grades and applications. Germany’s indirect steel foreign trade, i.e. the export of goods with a high steel content, has also increased.

Where have things got worse?

It is becoming more difficult to use by-products. When less construction is taking place there is a reduced demand for slag. Slag is also subject to more stringent environmental requirements than stone, for example. The poorer quality of raw materials also impairs energy efficiency.

What sustainability-related progress pleases you, personally, most?

For me it is the overall progress. Not every individual indicator has to improve, as long as the overall balance is positive.

Will the steel industry be more sustainable than now in 2030?

Yes. Because every little success contributes to better sustainability. Whether this step, however, will be a big one depends on many things, for example on research successes and political decisions. It should be the aim of politicians to maintain the high level of the steel industry in Germany in international comparisons. CO₂ emissions will fall thanks to the energy transition – and steel products, for example, will contribute towards this by allowing more efficient energy generation.
The proposal of a national climate change levy struck like a thunderbolt in the first half of 2015: the Federal Ministry for Economic Affairs wanted to impose a national obligation to surrender CO2 emission allowances for power plants above a defined exemption limit. This was in response to the target defined in the national climate action programme – an additional reduction in emissions of 22 million tonnes of CO2 in the electricity sector. The German Steel Federation criticised this proposal in subsequent discussions. On the one hand, it involved an impermissible and distorting national intervention in the harmonised European Emissions Trading Scheme. On the other hand, burdening the power plants would result in substantial electricity price increases that would affect the electro-intensive processes of the steel industry. Furthermore, there would be a considerable risk that power generation from waste gases of the steel industry would also come within the scope of such a system, with additional costs of up to EUR 170 million per year. Leading associations, affected sector associations and the Federation of German Trade Unions have formed a broad alliance – in which the steel industry is also involved – which demands continuation of the protection of the ecologically sensible self-generation. The Federal Ministry of Economic Affairs has signalled support in this matter. In addition, the German Steel Federation has made it clear in position papers and discussions that – given the special case of exploiting the energy of steel waste gases and other residual energies – a fundamental exemption is needed for electricity generation in this sector. In fact, generating electricity from waste gases replaces the use of primary fuels and is thus practically CO2-neutral. The existing application of the full EEG levy on new electricity installations for self-generation already prevents new investments in the exploitation of waste gases and residual energies which would have increased energy efficiency – and this, too, should therefore be corrected.

Another topic of fundamental importance for the steel industry is the upcoming review of the European Emissions Trading Scheme for the fourth trading period from 2021 to 2030. The European Commission presented a proposal for this on 15 July and it must now be discussed by the European Parliament and the member states. It proposes a flat reduction of the product benchmarks for allowance allocation, retention of the supplementary cross-sectoral correction factor, new additional criteria for the Carbon Leakage List, and a continuation of national electricity price compensation, though only proportionately. Allocation will be massively reduced, resulting in considerable costs – a conservative application would result in extra costs of about EUR 930 million in 2030 for the steel industry in Germany alone. This would be an intolerable burden for the steel industry and its international competitiveness. The German Steel Federation therefore demands fundamental revision of the Commission’s proposal. Allocation must take place at the level of the most efficient plants – without being restricted.
The proposed across-the-board reduction of the benchmarks and cross-sector correction factor must be dropped, the benchmarks for pig iron and sinter must be corrected to a realistic level. Moreover, electricity price compensation must be 100%. The German Steel Federation is maintaining an intensive dialogue on these and other concerns with MEPs and the German government (on the ministerial and working party level) as well as with federal state governments.

**Proposed Directive for 4th trading period of the Emissions Trading Scheme: effects on the steel industry in Germany**

- Steel industry emissions: 57 m. tonnes CO₂; power purchases: 15 TWh; insufficient allocation compared to the most efficient plants
- Correction factor (estimate): 18% 2030; benchmark deduction 0.5% p.a.; CO₂ price: 30 EUR/tonne CO₂.

**Study commissioned by Federal Ministry for Economic Affairs (BMWi): international electricity price comparison for an electric steel company**

- Exemptions are the norm.

**The Renewable Energy Sources Act (EEG) and self-generation: threatened financial burden on ecologically sensible cupola gas energy generation**

- Electricity generation from waste gases of steel production amounts to 20% of the total self-generation in Germany, preventing emissions totalling 6.5 m. tonnes of CO₂.
The new EU Commission, led by its President Jean Claude Juncker, started work on 1 November 2014. The Juncker Commission set itself the target of creating jobs and economic growth as well as encouraging investments through, among other measures, better legislation. The EU Commission therefore got a completely new structure for the period 2014 to 2019 in order to improve implementation of such political objectives. This restructuring is intended to permit dynamic interactions between all members of the Commission and to break down stereotypical thinking. One result of this restructuring has been, for example, the withdrawal of some environmental dossiers of importance to the steel industry. It remains to be seen what the expected proposal on the circular economy will look like. The German Steel Federation participated in the various consultations intended to involve political stakeholders. Influenced by the structural changes within the EU institutions, several dossiers of relevance to the steel industry have already been introduced in 2015. The heavily criticised proposed reforms to the Emissions Trading Scheme Directive, which will have a key role in Brussels’ discussions in the coming months, deserve particular attention. In advance of the UN Climate Change Conference in Paris and regarding the Emissions Trading Scheme, the German Steel Federation has confirmed its position in discussions with MEPs and the EU Commission, as well as within the new event formats.

The capital office in Berlin

The task of the capital office in Berlin is to encourage exchanges with Germany’s federal government and the Bundestag, and ensure inclusion in political processes. For this purpose, discussions are held with parliamentarians and representatives of the ministries, dialogue is maintained with working level contacts in the political parties, and developments and debates in Parliament are analysed. Something different, like a tour of Berlin art and architecture made of steel, was also popular.

Trade policy challenges, such as the issue regarding the market economy status of China and, in particular, energy and climate policies, were central topics on which the steel industry held high-level talks with Minister for Economic Affairs Sigmar Gabriel and Minister for the Environment Dr. Barbara Hendricks.

Another important focus of this year’s political work was on the regional level. Thus the trade union IG Metall joined us for steel summit meetings on 8 July in Saarland with the state Economics Minister Anke Rehlinger and, on 21 September, with Economics Minister Garrelt Duin in North Rhine-Westphalia, at which joint declarations on the steel industry and its concerns were formulated.

Discussions with Members of Parliament in the Bundestag were also intensified. The German Steel Federation’s stand at national party conferences provided a setting for many discussions on the political concerns of the steel industry.

New structures and processes in EU institutions

The external office in Brussels

The European Parliament in Brussels.

Steel summit of North Rhine-Westphalia for a strong competitive steel industry: Knut Giesler (IG Metall district management NRW), Garrelt Duin (Minister), Hans Jürgen Kerkhoff (German Steel Federation).

Ministerial discussions

The capital office in Berlin

The capital office in Berlin is to encourage exchanges with Germany’s federal government and the Bundestag, and ensure inclusion in political processes. For this purpose, discussions are held with parliamentarians and representatives of the ministries, dialogue is maintained with working level contacts in the political parties, and developments and debates in Parliament are analysed. Something different, like a tour of Berlin art and architecture made of steel, was also popular.

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The new EU Commission, led by its President Jean Claude Juncker, started work on 1 November 2014. The Juncker Commission set itself the target of creating jobs and economic growth as well as encouraging investments through, among other measures, better legislation. The EU Commission therefore got a completely new structure for the period 2014 to 2019 in order to improve implementation of such political objectives. This restructuring is intended to permit dynamic interactions between all members of the Commission and to break down stereotypical thinking. One result of this restructuring has been, for example, the withdrawal of some environmental dossiers of importance to the steel industry. It remains to be seen what the expected proposal on the circular economy will look like. The German Steel Federation participated in the various consultations intended to involve political stakeholders. Influenced by the structural changes within the EU institutions, several dossiers of relevance to the steel industry have already been introduced in 2015. The heavily criticised proposed reforms to the Emissions Trading Scheme Directive, which will have a key role in Brussels’ discussions in the coming months, deserve particular attention. In advance of the UN Climate Change Conference in Paris and regarding the Emissions Trading Scheme, the German Steel Federation has confirmed its position in discussions with MEPs and the EU Commission, as well as within the new event formats.
As part of its initiative to modernise EU state aid legislation, the European Commission recently affirmed the strict state aid regime for the steel industry. Thus, for example, rescue and restructuring aid or regional aid are forbidden for steel companies. Nevertheless, the German Steel Federation has found that EU member states are increasingly providing support for their national steel producers facing economic difficulties. A reversion to the past, when state aid for steel companies considerably distorted competition, would be disastrous. The German Steel Federation has now taken action on a current example and lodged a formal complaint with the European Commission against the subsidising of one of southern Europe’s largest steel producers. In the meantime, Eurofer has also made a state-aid-related complaint.

"A strict application of European state aid rules is indispensable for the steel industry. We learnt this lesson in the past, when national subsidies damaged competition and threatened the position of healthy companies."

Dr. Bernhard Gabel
Chairman of the Legal Committee

On the other hand, the special equalisation scheme of the Renewable Energy Sources Act 2012 (EEG) to provide relief for electricity-intensive sectors is by no means a form of state aid in the view of the steel industry. Relief takes place through a financing mechanism which only involves market participants. Nevertheless, the European Commission classifies this relief as impermissible state aid. The German Steel Federation, together with numerous member companies, has brought an action for annulment against this interpretation before the General Court of the European Union.

"Tax transparency" is the European Commission’s guiding principle for the taxation of companies. It supports an exchange of information between national financial authorities. Tax agreements, as reported from other member states, should be examined regarding compliance with state aid rules. In the view of the steel industry, however, such “tax rulings” must be treated entirely differently from binding information provided by German financial authorities. Binding information is not an agreement, simply the tax-law-based evaluation of a particular case by the tax authorities.

The reverse charge mechanism for VAT (for steel products, among other things) was introduced at extremely short notice in the summer of 2014 and did not last long – parts of it were cancelled with effect from 1 January 2015. The German Steel Federation contacted the Federal Ministry of Finance and Members of the German Parliament to criticise these abrupt changes and to demand effective transitional arrangements.

"Tax regulations should not be introduced without consulting the affected parties. Otherwise they are of limited duration, cause an unacceptable amount of effort for companies and authorities, but remain ineffective."

Peter-Michael Gens
Chairman of the Tax Committee

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Climate and energy policies, innovation and energy efficiency determined the work of the Public Affairs and New Media Department in 2015. The German government and the EU Commission honed their profiles as pioneers of ambitious climate protection: heads of state and government leaders proclaimed the decarbonisation of the world economy at the G7 summit in Elmau. Just a few weeks later the European Commission proposed a tightening-up of the Emissions Trading Scheme. Whereby preparations for the new world climate agreement leave little hope that comparable greenhouse gas reduction targets will be agreed at the Paris climate conference – so there is little chance of achieving fair competitive conditions. This situation makes it necessary to take a clear position on climate protection policy and continuously communicate it via all channels and in a variety of formats. The brochure “Climate protection and steel” forms the basic content of our political communication on the topic of climate policy. The Climate Puzzle, produced as a give-away for politicians and as an online animation, supplements our political positioning with a surprising representation of the contributions the steel industry makes towards climate protection. Both the brochure and the puzzle accompanied, among other things, letters to decision-makers – whereby the timing of the mailing was strictly oriented upon the political process. The dialogue on the effects of climate and energy policies on the steel industry was intensified and carried out in the highest political echelons.

“Developments in political conditions make it necessary to considerably intensify the tonality of the communication initiative.”
Arne Langner
Chairman of the Communication Committee

The future of the steel sector in the industrial location of Germany and steel’s innovative strength were the main topics examined in two magazines. While there was a supplement entitled “Prospects with steel” in the Tagesspiegel in November 2014, the publication “Innovation begins with steel” accompanied the Berlin Steel Dialogue and the awarding of the Steel Innovation Prize in June 2015. The lively and interesting short film “An Insightful Day”, which portrayed steel made in Germany as a high-tech product, received considerable attention on the internet with more than 4,000 hits.

The Steel Communication Initiative also focused on the topic of energy efficiency. This was in response to the agreement...
– also signed by the German Steel Federation – between the German government and business associations on the formation of energy efficiency networks. Because the topic is so important for the sector an internet platform (www.effizienz-mit-stahl.de) has been set up to collect examples of energy efficiency both in steel production and through the products themselves. The site will be continuously supplemented with new content, also intensifying Twitter communication.

The number of Twitter followers rose by about 40 per cent in the past year, to 1,300. Stahl-online.de records about 30,000 visits per month. In addition to these platforms, stahl-blog.de offers space for the stories behind steel.

With six press conferences in Dusseldorf, Hanover and Berlin, as well as almost 40 press releases, the media activities of the Public Relations Department reached a new level during the first half of 2015. The content dealt with the steel economy, trade policy and, above all, implementation of political messages on energy and climate policies. The presentation of the Steel Innovation Prize received the most media attention, with more than 400 reports. To mark the occasion, there was also a six-page supplement in the Süddeutsche Zeitung on this topic, which included largely positive articles on the steel industry. A six-page Steel Report by Die Welt was given to participants at the STAHL 2015 annual event.

A journalists’ tour of energy-intensive industries, organised by the German Steel Federation and the Paper Federation, visited ThyssenKrupp Steel Europe in Duisburg and the UPM paper company in Hürth. This was arranged on the occasion of the “Ten years of emissions trading” jubilee. While the resonance was good – with 15 journalists participating and 16 articles in the media – the intensification of work in the editorial offices, and the corresponding difficulty in finding time for journalists’ trips, is clearly perceptible.

The Marketing Department presented innovative steel light-construction systems for material- and energy-efficient building envelopes in commercial and multi-storey buildings at the world’s largest construction trade fair in Munich in January. 250 participants attended the seminar “The future of construction in Europe – the architecture and technology of multi-functional building envelopes made of steel” in Wolfsburg on 1 October 2015. 29 companies presented products and activities at the accompanying exhibition. The series of events is considered a sector meeting-place. The main topics of the seminar “Steel sheet piling” in Cologne in December 2015 will be flood protection, dyke construction and insertion technologies. Professors at 21 universities were surveyed about how steel is represented in automotive engineering classes. Steel has become less important compared to CFRP, aluminium and magnesium – it needs support. A working group with steel company representatives discusses appropriate measures.

The “Multi-talent steel” brochure appeared in June as part of the “Culture & Technology” series of the Deutsches Museum in Munich. It focused on steel’s recycling properties and its performance in bridge and car construction.
T
his year saw the tenth Steel Innovation Prize awards. Is the concept still relevant after 26 years?

The concept is undoubtedly still relevant. The reputation of the competition has risen steadily over the years. Word of the awards for the prize-winners gets around and stimulates their competitors, in particular, to enter too. Nothing spurs one on more than the success of others.

Aren’t there far too many innovation prizes now?

Yes, certainly. During recent years the number of competitions has risen enormously. I am aware of about 70 prizes that involve the topic of steel. Nevertheless, the Steel Innovation Prize is still one of the competitions with the highest level of entries. There were 578 submissions this year. Outside Germany only Sweden has something similar, but there the prize is only for one company and for one group of materials.

How great is the probability that prize-winning projects succeed in the market?

The chance that a prize-winning entry can successfully position itself in the market is really high. Market introduction or the existence of a prototype is a prerequisite for participation in three of the four categories. The prestige of the prize contributes towards highlighting an innovation. The projects in the Research & Development category, however, are further away from market introduction.

What has been the most successful project so far?

I can remember a very early, very successful project. This was a starter ring gear for automatic gears in cars. It is now used worldwide in more than 12 million vehicles a year. Another innovation involves a floor system reinforced with sheet steel. 100,000 m² of this has been laid during the last three years alone.

In what areas are steel customers particularly innovative?

During recent years, universities and institutes in particular have impressed with innovative entries and developments. Otherwise most of the projects come from the design field followed by construction and products. The regional emphasis is still in North Rhine-Westphalia (NRW), from where most of the entries originate. This is mainly because the value-creation chain in NRW is very strongly characterised by steel producers, processors and end-product manufacturers.

What was your personal favourite among this year’s 13 prize-winners?

The pistons for car diesel engines impressed me most. The newly invented steel pistons used in high-volume production were jointly developed by Daimler, Hirschvogel and Kolbenschmidt. Compared to the usual aluminium pistons, the steel pistons convince with their high performance and CO₂ savings potentials.

Was the new format of the prize-giving appreciated?

There were a few changes in the prize-giving. The timeframe was compressed. The prize-giving took place in Berlin instead of Dusseldorf. The awards and the Berlin Steel Dialogue were combined into a single event, and I am sure that the new format has proved successful. Our message that steel is the most important construction material with an inexhaustible innovative potential now also reaches political decision-makers.
The Special Steel Association celebrates 100-year jubilee

The Special Steel Association was one hundred years old on 12 December 2014. The jubilee party took place on the evening of the 11 June 2015 within the framework of the European Stainless Steel Conference, which the Special Steel Association organised this year at the Industry Club in Düsseldorf. Almost 100 guests from Germany and abroad attended the festive dinner. In a special jubilee film, which the Association produced, leading personalities from the special steel industry made statements on milestones, the fascination of the material, and the future challenges facing the sector. The 6th Düsseldorfer Edelstahltag in February 2015, in which the Special Steel Association was involved, was also very successful.

The Special Steel Association again provided comprehensive special-steel-specific services for its predominantly medium-sized member companies this year. The most important fields of activity were committee work, statistical reporting and the provision of information. Work in the numerous national and international (Eurofer) committees of the individual steel groups involved a wide range of activities. Discussions were held with the member works regarding developments on important national and international special steel markets for all special steel groups, as well as on the results of first-stage processing. In accordance with the Association’s reporting system, data on a wide selection of order- and sales-related statistics were collected monthly, processed, and regularly made available to the members. Numerous queries regarding special steels were answered by our information service, which represents an important bridging function for members. The extranet service was also abundantly used.

The annual special steel market declined slightly compared to the good previous year, though the performance of individual steel groups varied: while engineering and roller bearing steels, as well as tool and high-speed steels, only underwent a slight reduction, stainless steel overall suffered a significant decline.

“The hundred-year jubilee of the Special Steel Association is confirmation of its good and successful work in the interests of our industry.”

Dr. Heiner Schunk
CEO, Special Steel Association
Modernization in progress

Priorities of the Steel Institute VDEh in 2015

E
urope is playing an increasingly important role at the Steel Institute VDEh. Member companies from European countries – steel producers, plant constructors and supply companies – are active on many committees. This year the Steel Institute VDEh also opened up technical collaboration in the committees to European institutes and their member companies, thus expanding European co-operation and helping ensure that the Steel Institute VDEh is a successful service provider in joint technical-scientific work in Europe. In addition, the structures of the Steel Institute VDEh have been modernised this year, which is also reflected in the topics covered within the framework of ‘cross-cutting’ committees. This modernisation of the Steel Institute VDEh has resulted in various changes in the technical committees. The Committee for Metallurgical Fundamentals was dissolved and the fundamental topics were assigned to the relevant production-related Blast Furnace or Steelworks Committees. The Coke Committee is now integrated as a technical committee into the Blast Furnace Committee, and the Cold Drawn Steel Committee is integrated into the Committee of Long Product Rolling.

The 2nd ESTAD 2015 (European Steel Technology and Application Days) – a European conference initiated by the Steel Institute VDEh in early 2013 – was a technical highlight that accompanied METEC, the world’s largest metallurgical trade fair for steel which took place in Dusseldorf in June 2015. 593 presentations covered all the technical topics along steel’s value-creation chain. The conference was a complete success, with 1,350 participants from 45 countries.

In response to an initiative from the Research Committee, the topics examined in the Steel Research Agenda were reorganised. The potential R&D topics are now clustered in five innovation fields: Material and Component Design; Surface Treatment; Further Processing and Process Chain Optimisation; Conservation of Resources and Energy & Emission Reduction; as well as Process Simulation and Process & Measurement Technology. Initial concrete projects in these five fields have been identified for further activity.

Among other matters, the subject of the hydrogen reduction of iron ores and CO₂-free hydrogen production was examined as part of the cross-cutting topic of ‘Increased efficiency and CO₂ mitigation along the steel value-added chain’. Iron ore reduction exclusively with hydrogen is not yet used industrially, though encour-

Rolling with primary heat is energy-efficient.

SMS group GmbH, Dusseldorf
aging approaches exist. Developing these would require a considerable research effort.

“Hydrogen reduction of iron ores is undoubtedly a contribution to CO₂ mitigation during steel production based on the reduction of iron ore. We do not yet, however, have the industrial reduction process or the cost-effective production of hydrogen.”

Dr. Klaus Harste
Chairman of the Working Group
‘Increased efficiency and CO₂ mitigation along the steel value-added chain’

With regard to the cross-cutting area of ‘Industry 4.0’, the importance of this topic for the steel industry requires elucidation. Work on this cross-cutting topic is intended to describe the requirements for the steel industry and define topic fields. The recommendations yet to be made could be used to provide good arguments for Industry 4.0 in the steel industry. Industry 4.0 approaches originate from the concept of Discrete Manufacturing, which explains why there is a need for adapting such approaches for the steel sector. The main innovation offered by Industry 4.0 exists in exploiting new techniques and technologies to process large amounts of data in real-time, making this data available, and enriching it with additional information. Further developing Industry 4.0 for the steel industry will require an integrative view across the entire process chain. This will involve a fundamental paradigm shift.

In response to the new limit values for A-dust (A-dust: particles that can penetrate all the way into the air sacs (alveoli) in lungs; E-dust: dust that can be inhaled; PAHs: polycyclic aromatic hydrocarbons) and the amendment of the German Industrial Health and Safety Ordinance (BetrSichV) methods for determining possible damage to persons and objects and the current situation, work in the cross-cutting topic of ‘Health and Safety at Work’ led to the development of a stationary and human-oriented sampling of A-dust, E-dust and PAHs in co-operation with the responsible authorities and the Employers’ Liability Insurance Association (Berufsgenossenschaft) and implemented in collaboration with the Dillinger steelworks. 230 samples are currently being analysed in Dillinger Hüttenwerke’s chemical laboratory. A further topic focused on was the revision of the Workplace Ordinance (ArbStättV) which the Federal Cabinet postponed indefinitely in February 2015 following intervention by business leaders.

The aim of work on the cross-cutting topic of ‘Steel compared to other materials’ was to compile facts and arguments that could be used in public debate to improve steel’s image. The comparison of publicly available data was carried out with the objective of summarising the performance potentials of different materials regarding a variety of criteria, such as current and future material use, the availability of materials, costs per kilogram weight saved, or CO₂ performance.

Work on the cross-cutting topic of ‘The qualification of high-strength steels with improved ductility’ started with the definition of the terms ‘strength’ and ‘ductility’ and with a survey of ‘applied testing technologies’ according to the material groups involved. Work on the cross-cutting topic of ‘Quality assurance of steels’ involved a description of QA’s status in the steel industry and the identification of fields in which research is necessary or new applications would appear meaningful. A Working Group involved in the cross-cutting topic of ‘The strategic importance of standardisation’ worked out a standardisation strategy for the steel industry and published it in a strategy paper.

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The formulation of joint R&D projects based on revision of Steel Research Agenda
Cross-cutting topic: Increased efficiency and CO₂ mitigation along the steel value-creation chain
Cross-cutting topic: Health and safety at work in the steel industry
Cross-cutting topic: Development of qualities for basis raw materials
Cross-cutting topic: Industry 4.0 (Cyber Physical Systems) for the steel industry
Cross-cutting topic: Quality assurance for steels
Cross-cutting topic: The qualification of high-strength steels with improved ductility
Conferences: METEC & 2nd ESTAD 2015, Dusseldorf and Materials Week 2015, Dresden
Light construction potentials of steels for massive forming
With voestalpine Linz, Salzgitter Flachstahl, and SSAB Europe in Raahen retrofitting pulverised coal injection plants for their blast furnaces, coal injection represented a topical subject for the Blast Furnace Committee. Now all the hot-metal-producing blast furnaces in Europe inject pulverised coal as a coke substitute. Pulverised coal injection rates of a maximum of 230 kg/tonne of hot metal were achieved in 2014 with coke consumption of only 270 kg/tonne at that time. The increasingly poor quality of raw materials, however, remains a concern, particularly the increase in silicic acid in iron ores for the sintering plants and the increased ash content of coals. This leads to a rise in blast furnace slag volumes and prevents any lowering of reducing agent consumption.

The topic of hot blast stoves and their modernisation or renovation was discussed against the background that new limit values of max. 100 mg/m³ (STP)¹ for nitrogen oxide emissions in their waste gases will apply from 2016.

With regard to coking plants, the topics of coal logistics and the pre-treatment of coal, as well as coke yield and the main parameters affecting it, were also examined. Discussions on the maintenance of coking plants focused on pressure rods, pressure heads and levelling bars, as well as anchor stands. Regarding the pushing rods and pushing heads, the steel used to make them, damage, service lives, and the time required to exchange them were of particular interest, as was the measurement of chamber wall temperatures via measuring systems in the pushing rods.

Superfine ores are increasingly produced in the fine ores supplied for producing blast furnace sinter. These require special treatment for use in the sintering plants, or necessitate adaptation of the sinter process to the higher proportion of concentrate and pellet feed in the mixture.

“Our blast furnaces today operate with optimum reducing agent consumption despite the poorer quality of raw materials. Current reducing agent consumption is, however, higher than ten years ago due to higher slag volumes.”

Dr. Michael Peters
Chairman of the Blast Furnace Committee

Sintering plants are using expensive waste gas cleaning facilities in order to meet official environmental protection requirements. Progress that has hitherto been considered almost impossible has been achieved during the last ten years, e.g. by retrofitting bag filters for cleaning waste gases.

¹ Standard Temperature & Pressure
The work of the Steelworks Committee focused on process development and automation, product quality, material and energy efficiency, health and safety at work, environmental protection, and the organisation of work. Meanwhile work on the ‘Health and Safety Management’ guidelines continued in the Electric Steelmaking Technical Committee. A draft version of the guidelines originally published for ingot casting has been expanded for the electric steelworks.

The introduction of a certified energy management system in compliance with DIN EN ISO 50001 is a prerequisite for the partial exemption of energy-intensive processes from the Renewable Energy Sources Act (EEG) levy in Germany. During its spring meeting at ArcelorMittal Hamburg, the Steelworks Committee discussed the progress of works regarding implementation, the systems introduced, and the results so far achieved. Exchanges focused on examples of successfully implemented energy-saving measures in the works.

The Electric Steelmaking Technical Committee undertook an overview of the results of research on energy and resource efficiency in electric steel production – carried out with funding from the Research Funds for Coal and Steel (RFCS) – during the last ten years. The Valorisation and Dissemination of EAF Technology (VALEAF) consortium – which is also financed by the RFCS – was invited for this purpose. The results of projects on energy and resource efficiency during electric steel production were presented in six presentations. The subjects examined included, in particular, slag foaming during the production of stainless steels, the use of biomass to produce synthesis gas, and the use of conventional injection coal and dynamic process models to improve furnace control and operation.

The Technical Committee on Refractory Materials discussed new refractory developments on electric arc furnaces and basic oxygen furnaces. Magnesia carbon bricks with pitch synthetic resin bonding have greater cold-compression and hot-bending strengths compared to standard pitch bonding. Bricks of this new bonding type are to be tested in the trunnion area of the converter. The consequences of the new lining designs for converter operating modes and for the changed strategies of converter maintenance were also discussed. Price-performance-optimised converter linings take into account, in particular, the specific material requirements in the areas of the converter trunnion, scrap impact zone, slag zone, lower cone and bottom, as well as the upper cone and the tap.

In addition to the routine specialist committee work of the Committee for Chemical Analysis, which is organised into two Technical Committees with a total of 21 Working Groups, the European CETAS Conference 2015 (Commission Européenne d’Etude et d’Application de Travaux de l’Analyse en Sidérurgie) was organised in Dusseldorf – for the first time – with more than 170 participants from Europe, Asia and America. This CETAS Conference, which takes place every four years, examined ‘Progress in Analytical Chemistry & Materials Characterisation in the Steel and Metals Industry’. Another topic focused on involved the analysis of A-dust, E-dust and PAHs (A-dust: particles that can penetrate all the way into the air sacs (alveoli) in lungs; E-dust: dust that can be inhaled; PAHs: polycyclic aromatic hydrocarbons).

“Alongside iron ore, coal is our most important raw material and thus a major focus of the Committee for Chemical Analysis.”

Dr. Patrice Reeb
Chairman of the Committee for Chemical Analysis

“The efficient treatment of the resource of energy for iron and steel production has always been an important engine for progress and competitiveness in our industry. This will remain the case in future.”

Dr. Ralf Bruckhaus
Chairman of the Steelworks Committee
The Committee for Energy Technology focused on developments to increase energy efficiency as well as the technical implementation of the challenges posed by energy policies. Meetings therefore examined, among other things, energy storage technologies, the use of biomass, and technical developments for participating in the electricity balancing market. Exchanges also concentrated on measurement technology in thermo-process engineering for hot rolling, including cooling strategies for high-strength steels. The Committee was also involved in the joint initiative by the Federal Ministry for Economic Affairs and Energy (BMWi) and the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) on energy efficiency networks; participated in preparing the BREF document for large combustion plants; and evaluated energy statistics for 2014.

The steel industry in Germany was able to reduce its specific primary energy consumption for crude steel production from 20.56 GJ/tonne crude steel in 1990 to 17.56 GJ/tonne in 2014 – a decrease of 14.6 per cent. Regarding CO₂ emissions, a reduction of 14.5 per cent, to 1.332 tonnes CO₂/tonne crude steel, was achieved during the same period.

“The main aim of measures to improve energy efficiency is the multiple use of energies as, for example, in the use of coupling gas and waste heat.”

Michael Marion
Chairman of the Committee for Energy Technology
New high-strength steels are successfully used as lightweight construction materials in automotive construction and as line pipe steels, demanding further developments from the operators of hot and cold rolling mills in order to expand the process window and toughen up the plants for the production of high-strength steels. The Flat Product Rolling Committee has discussed special aspects of the rolling and coating of high-strength grades.

Mash-seam welding machines are generally used on continuous hot-dip galvanising lines for welding together the individual coils to create endless strip. These machines come up against their limits when welding the new high-strength steel grades, so laser welding machines are increasingly used in the plants. These are characterised by a high level of flexibility regarding the steel grades to be welded. The welding seams can be skin passed because they are not excessively high. Current developments involve optimising the mechanical properties of the heat-affected zone, particularly for high-strength grades, without increasing cycle times. New laser machines offer the possibility of pre-heating (preventing heat shock in the material) and after-heating (tempering the martensite formed by high cooling rates) of the welding seam area.

As a continuation of the topic of stretch bending and straightening, the Electrolytic Galvanised Strip Technical Committee received a report on form-fit bending technology to influence forming defects in high-strength strip at a low tensile stress level. Among other things, the regulated form-fit bending machine reduces the energy required for the motors of the S-rollers because considerably lower strip tensions are required to maintain the target ratio of extension by rolling. The fact that high-strength strip tends to take up relatively high residual stresses as a result of its high yield strength, which can have negative effects on further processing, must be taken into account.
A catalogue of surface, flatness, internal, transport and further processing defects was put together in the Heavy Plate Technical Committee. In the context of customer orientation, it serves to improve technical communication between plate producers, customers and manufacturers for further processing.

“High-strength steels score points both economically and ecologically.”

Dr. Michael Brühl
Chairman of the Flat Product Rolling Committee

The Long Product Rolling Committee discussed the use of cyber-physical systems (CPS) in the steel industry. This necessitates the interconnection of IT (e.g. Big Data, IT security), mathematics (e.g. data evaluation methods, the verification and consistency of data) and process technology (e.g. process understanding). The first step involves the CPS-enabling of individual plants. The collation and evaluation of data is still very expensive in relation to the gain in knowledge to be expected, partly due to the lack of standards and compatibility.

The use of modern measurement technology in rolling mills is state-of-the-art. A workshop examined how measurement processes could be optimised. Ignorance regarding measurement uncertainties, in particular, is economically relevant if, for example, tolerances are unnecessarily restricted. The hot dimensioning of profiles and the measurement of the straightness of cold drawn steel remained subjects for discussions.

“The constant optimisation of processes for producing forgings and rings is a major contributor to value creation in the companies of the forging industry. Further efforts are required to maintain and expand competitiveness. Thus the Open Die Forging Committee now focuses on plant availability, the further development of products, and production flexibility with maximum cost-effectiveness. Plant efficiency, in particular, needs to be improved whilst minimising material and energy inputs. Whereby plant technology is characterised by rapid technical and technological developments in order to provide customers with products with excellent material properties. Digitalisation within the context of Industry 4.0 will require special efforts.

Committee work focused on technical measures for determining the temperatures of blocks and rings, as well as further developments in handling technology with new opportunities for exploiting robot technology in forging works. Press drives with new hydraulic and control concepts, and linear drive technology for hammers were presented for further improving energy efficiency. Using optimised burners on furnaces offers further improvement potentials.

Simulation programs are increasingly used to increase the efficiency of forging presses. Simulation programs can be used to compute optimised forging processes before starting on the forging itself by determining the physical parameters of the forging, the underlying forging strategy, and the quality parameters to be maintained.

“Increasing digitalisation provides new information for further process optimisation in forging works.”

Ralf Rech
Chairman of the Open Die Forging Committee

The constant optimisation of processes for producing forgings and rings is a major contributor to value creation in the companies of the forging industry. Further efforts are required to maintain and expand competitiveness. Thus the Open Die Forging Committee now focuses on plant availability, the further development of products, and production flexibility with maximum cost-effectiveness. Plant efficiency, in particular, needs to be improved whilst minimising material and energy inputs. Whereby plant technology is characterised by rapid technical and technological developments in order to provide customers with products with excellent material properties. Digitalisation within the context of Industry 4.0 will require special efforts.

Committee work focused on technical measures for determining the temperatures of blocks and rings, as well as further developments in handling technology with new opportunities for exploiting robot technology in forging works. Press drives with new hydraulic and control concepts, and linear drive technology for hammers were presented for further improving energy efficiency. Using optimised burners on furnaces offers further improvement potentials.

Simulation programs are increasingly used to increase the efficiency of forging presses. Simulation programs can be used to compute optimised forging processes before starting on the forging itself by determining the physical parameters of the forging, the underlying forging strategy, and the quality parameters to be maintained.

“Increasing digitalisation provides new information for further process optimisation in forging works.”

Ralf Rech
Chairman of the Open Die Forging Committee

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“The concept of the digital factory is a major milestone on the path to Industry 4.0.”

Dirk Theis
Chairman of the Plant Engineering Committee

The digital factory

Plant engineering

In response to the economic and political environment, the Plant Engineering Department focused on adaptation measures in technical services. The growing demands made of plant operators and the realisation of increasingly complex industrial projects within ever-shorter implementation phases also require new methods of collaboration between suppliers and customers. For this purpose, the potential advantages and transferability of the concept of the ‘digital factory’ was examined for use by the steel industry. The digital factory is a comprehensive network of digital models and methods. The aim is the holistic planning, implementation, control and continuous improvement of all important factory processes and resources of relevance to the product. Among other things, this includes simulation and 3D visualisation of the components. With the increasing performance capability of computer technology and new developments in user software, simulation software and database technology, the individual tools are increasingly being networked with one another – forming the basis of the concept of the digital factory. The aim is to collate all the information on a production process and prepare it in such a way that resultant economic advantages are created over the entire life-cycle of the production process. The main advantages are the acceleration of decision-making processes, improvement of the data situation, and the simulation of variants. This helps prevent planning errors and allows users to exploit networked knowledge management. A Working Group set up to examine this topic has now issued guidelines on ‘The implementation of aspects of the digital factory in the steel industry’.

The 36th VDI/VDEh Maintenance Forum took place in June 2015. The Plant Engineering Technical Committee of the Steel Institute VDEh and the Association of German Engineers’ (VDI) Society for Production Technology were the guests of the Research Institute for Rationalisation (FIR) at the RWTH in Aachen for their annual joint maintenance meeting. Innovative ideas, successful strategies and their implementation were presented under the framework topic of ‘Future trends in maintenance’. Current and future developments in maintenance, production and logistics were examined in a presentation and subsequent workshop. These areas will be most affected by the development of Industry 4.0. For this reason, a special topic block was dedicated to the subject of ‘Smart Maintenance – Industry 4.0 in maintenance’. It was particularly emphasised that the VDI/VDEh Maintenance Forum is intended to make maintenance tasks the subject of a public exchange of experiences, as well as scientific considerations.

From a photo to a 3D model.

Plant Engineering
Korsten Letz
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All the activities of the Materials Committee are focused on investigating and characterising the material steel and its properties, and externally representing the material-related interests of the steel companies so that steel can be increasingly and dependably used. For this purpose there are close connections to the further and final processing industries. The range of topics necessitates specific Technical Committees and Working Groups to identify and further develop the properties profile of the steel grades examined and expand application potentials. Unambiguous material-technical discussions between steel processors and users are thus also guaranteed.

Participation in European and international standardisation in the steel sector plays an important role. In addition, specific iron and steel material/test specification sheets are published to meet any further requirements. This work forms the basis for efficient production and further processing of semi-finished and end-products – particularly those made of new steel materials. This enables light construction with increased performance and longer service lives.

The results of joint work flow into specific Technical Committee reports, specialist journals, as well as contributions to national, European and international specialist congresses. The results are also presented in summary during further education measures such as seminars or attended courses – an important contribution towards the further education of skilled workers in industry and science.

The arrangement of national and international events is another task of the Materials Committee. The 33rd Materials Testing Meeting and the 37th Conference on ‘The long-term behaviour of creep-resistant steels and high-temperature materials’ are currently being organised. Further developments and research ideas are jointly driven forward with customer associations and with the Research Association for Steel Application (FOSTA).

‘Two industries – one aim: forging companies and steel manufacturer join forces’ is the central theme of a joint initiative by the German Forging Association and the Steel Institute VDEh, and one of the topics focused on by the VDEh. During the first phase of the initiative, a mid-range car was analysed regarding its light construction potentials in the powertrain and chassis. The results were effectively communicated to the public and presented to about 170 attendees, most of whom were from the automotive industry, at a customer meeting in November 2014.

This study was expanded to include a light commercial vehicle, whereby material-related light construction potentials were focused on in greater detail. Particular attention was also given to design and material use in the vehicle gear unit. In a mid-range car, 42 kilograms can be saved on solid-formed components. This figure rises to at least 65 kilograms in the light commercial vehicle examined. A second customer meeting is planned in Stuttgart from 31 May - 1 June 2016.

In addition to the initiative on the corporate level, a research project was started on 1 May 2015 under the leadership of FOSTA that, in addition to the directly applicable solutions of the industrial initiative, is working on unresolved research fields to further utilise existing light construction potentials. This research project (which has total funding of EUR 4.2 million) involves ten university institutes as well as 64 companies in automotive technology, the supplier industry, the solid forming segment, and steel producers.

“Each material has its specific advantages but, overall, steel currently offers the most convincing properties profile regarding economic efficiency and its processing, availability and reparability – particularly in high-volume applications such as light construction in vehicles.”

Prof. Hans Ferkel
Chairman of the Materials Committee
What is the significance of Industry 4.0 for the steel-producing industry?

The main innovation in Industry 4.0 consists of processing large quantities of data in real time using new techniques and technologies, making them available, and enriching them with additional information. Further developing Industry 4.0 for the steel industry will require an integrative view across the entire process chain. High volumes of product and process data are valuable, but they can only make additional information worthwhile if the data are sensibly structured and evaluated.

Industry 4.0 is frequently discussed in the context of ‘networked production plants’. In addition to horizontal and vertical integration of production and its data, the demands regarding human/machine communication as well as training and qualification will fundamentally change. This change is becoming increasingly dynamic. The steel industry is actively participating in these developments.

What content is affected by this?

In addition to the work in the committees along the production steps from steel production to its application, important cross-cutting topics will in future receive cross-committee treatment. These include, for example, increased efficiency and CO₂ mitigation, the qualification of high-strength steels with improved ductility, the quality assurance of steels, the strategic importance of standards and standardisation, Industry 4.0, and health & safety at work. Research will also be given a more elevated status.

Are new formats involved?

The exchanges of technical-scientific experience will be supplemented by a European Scientific Steel Panel in order to establish the VDEh more strongly on the European science scene. Leading experts from European countries will discuss important topics here regarding sustainability, ecology, economy, society, the environment and technology from a scientific point-of-view. Another important task remains the organisation of European conferences in the area of steel production and use, for example ESTAD.

The VDEh ran the ESTAD conference in June 2015. Was it successful?

Yes it was. This conference represents a technical ‘event’ for the steel industry in Europe and establishes a European counterpart to important steel conferences in Asia and America. ESTAD stands for “European Steel Technology and Application Days” and was initiated by the Steel Institute VDEh. It is a meeting place for steel producers, suppliers and users to present and discuss the latest developments in the fields of steel production, processing and application. It makes clear the leading role of European technical developments regarding improved efficiency, CO₂ mitigation and steel material innovations and their applications. With 600 presentations and 1,355 participants it was a complete success. Its implementation as an accompanying conference to the world’s largest steel metallurgy trade fair METEC was also right.

What significance has Industry 4.0 for the steel-producing industry?

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The Steel Academy

The Steel Academy is the education department of the Steel Institute VDEh and the leading provider of seminars on the metallurgy and material technology of steel. The Academy’s programme covers the topics of raw materials, recycling, iron and steel production, forming, material technology, energy and the environment. The participants come from integrated and electric steelworks, the supplier and user industries, and plant manufacturers. The Steel Academy collaborates with numerous universities, technical colleges and institutes in order to ensure that the seminars maintain a high level. The roughly 200 speakers and trainers come from universities, industrial production, research and development, as well as the Steel Institute VDEh.

The current programme offers 35 technical seminars involving all aspects of steel, as well as business management for engineers. The events last from two days to four weeks. The Steel Academy always strives to further develop the seminar programme and to adapt it to new challenges. Thus, in response to customer requests, seminars on ‘Coke-making’ and ‘Computational Fluid Dynamics in Metallurgy’ were recently created and implemented. In addition, regular tailor-made in-house courses have been developed for steel producers and processors. The first English-language seminar ‘Electric Arc Furnaces’ was initiated in 2000. Nine events already take place regularly on an international level, representing an important component in the Europeanisation of the VDEh. Correspondingly, almost one quarter of the seminar attendees now come from abroad: from 21 European and 18 non-European countries during the last five years.

In 2015 approximately 35 students received monthly financial support of EUR 150. Five scholarship recipients completed their studies this year, of whom three will remain involved with steel through doctorates at university. A former recipient, who completed a doctorate after finishing his sponsored course, started his working career at a VDEh member company in 2015. The Steel Institute VDEh also promotes up-and-coming scientists with the Young Academics’ Steel Award, which will be presented for the first time during the STAHL 2015 annual event.

Further education becomes more international

New prize for up-and-coming scientists

Scholarships

Works visit to Hüttenwerke Krupp Mannesmann as part of the ‘Continuous Casting’ seminar, with participants from Egypt, Germany, France, the Netherlands, Austria, Saudi Arabia, Spain, Switzerland and Turkey.
The Steel Institute VDEh has been involved in the standardisation of steel products for over a hundred years. The offices of the Committee for Iron and Steel Standardisation (FES) are associated with the VDEh regarding their organisation, financing and personnel. The FES specialists elaborate standards in the area of steel and iron according to the rules of the German Institute for Standardisation (DIN). The FES represents German interests during worldwide and European standardisation in the area of steel and iron at the International Standards Organization (ISO) and the European Standardisation Committee (CEN). The European standardisation work is principally carried out at the European Committee for Iron and Steel Standardisation (ECISS), which is part of the CEN. The committees and sub-committees of the FES largely reflect ECISS and ISO intentions and bear the responsibility for forming German opinion. The FES is responsible, in particular, for elaborating technical delivery conditions, as well as dimensional, terminological and product-specific testing standards. The work is carried out in product-, steel- and/or application-based committees. Other committees are concerned with the classification, nomenclature, and numbering of steels, as well as sampling and general technical delivery conditions.

Given the endless variety of information available, the Technical and Library Information Department has dedicated itself to acting as an objective filter for researching, evaluating and displaying the literature – with its literature database, PLANTFACTS database and Special Library. The Library has expanded its online catalogue (OPAC) with a service called RSS Feed, which automatically informs users about the library’s new media inputs. The new Bookeye book scanner improves the quality of copies. The evaluation of specialist literature allows customers (95 per cent of whom are member works and personal members) to obtain a differentiated overview of the published literature via the Department’s online database StahlLit – with more than 450,000 data sets – and the reference publication Literaturschau Stahl und Eisen. StahlLit was given new user-friendly browser technology in 2015. The PLANTFACTS database, started in 1970, gathers worldwide information on steel-producing companies and their equipment in 115 countries. This internationally unique database contains more than 12,900 data sets. 120,000 data sets have already been sent to customers this year. Newly commissioned plants in steelworks will also be published in the Steel Yearbook in 2015.
The Research Association for Steel Application

The Research Association for Steel Application (FOSTA) finances and organises research projects in order to improve the use and application of steel, maintain its competitiveness, and open up new areas of application. These research projects are initiated, supported and funded in collaboration with the steel-producing and processing industries and carried out in networks consisting of industry and research facilities.

Projects focus on material behaviour, machining and processing, transport technology, construction, and environmental technology. Whereby important cross-sectional tasks include simulation techniques, research involving the principles of sustainability, and the conversion of results into standards and standardisation. As members, leading companies in Europe’s steel sector and the steel-processing industry, research institutes and engineering bureaux participate in funding both FOSTA’s research management and its research projects. They are involved in the selection of topics, the carrying out of research projects, and the implementation of research results.

FOSTA obtains funding from the Steel Application Research Foundation, from Germany’s federal and state economic and research ministries, and from the EU’s Research Fund for Coal and Steel (RFCS). This is supplemented by funds from research partners and by industry participation. This enables the implementation of current research topics in joint research projects. 99 research projects were worked on in 2014, with a total volume of about EUR 41.3 million. The funding, both from donors as well as from the industry itself, reaches the research centres carrying out the work in the form of assistance, services and cash payments.

The Federation of Industrial Cooperative Research Associations’ (AiF) project ‘An innovation network for technological progress in component, process and material design for solid formed components in automotive technology’ was approved on 1 May 2015 as part of the ‘Leading technologies within the framework of joint industrial research’ programme run by the Federal Ministry for Economic Affairs and Energy (BMWi). The kick-off meeting of the research alliance on solid light construction took place in the Stahl-Zentrum on 12 May 2015. About 70 participants from science and industry attended. FOSTA has overall responsibility for organising the research while the Institute for Material Sciences Foundation in Bremen is the responsible research centre. A total of four research associations, ten research centres and about 60 industrial representatives will study the topic over roughly three years. Funding for the research network amounts to about EUR 4.2 million.

In November 2014, the AiF awarded its Otto von Guericke Prize to researchers involved in FOSTA’s ‘Hot-dip galvanisation in steel and composite bridge construction’ project. They presented the results and two large-scale exhibits at the
The Verlag Stahleisen publishing house produces and markets information for professional use by the steel sector, and is the publication platform for the organisations in the Stahl-Zentrum. 2015 saw the publication of new editions of important Stahleisen books. The Steel Manual has been a proven educational resource for schools, teaching establishments and training institutes for decades. The small manual is also considered a comprehensible introduction for non-specialists in industry and commerce who want to familiarise themselves with steel and its production and processing methods. Both the German and English 2015 editions have now been completely revised.

The Stahleisen Dictionary has become an indispensable companion in the increasingly globalised environment of research, technology and science. The new, completely revised, 2015 German-English/English-German edition takes the constantly changing repertoire of new technologies into account – not only with new and expanded terminology, but also regarding the various forms in which the terms are used.

The Verlag Stahleisen publishing house presented itself to international specialists at METEC 2015, the world’s leading metallurgy trade fair, which took place in Düsseldorf in June. The joint stand of the Steel Institute VDEh and the Verlag Stahleisen publishing house was a popular contact point for steel experts and those seeking literature.

The publishing house’s products are always in demand at the STAHL annual event.
The VDEh Institute for Applied Research (BFI) is one of Europe’s leading institutes for application-related research and development in the field of steel technology. Under the motto ‘Practical. Flexible. Innovative,’ the BFI has maintained a practice-related and trusting relationship with its customers for over 45 years – with the aim of improving processes, plants and procedures in steel production. The BFI focuses on cross-process optimisation to increase cost-effectiveness. While it is often the case that all the potentials of certain process steps have been exhausted, cross-process optimisation approaches such as Industry 4.0, material recovery or the shortening of process chains offer further opportunities to increase efficiency.

The steel industry faces new challenges from rising demands regarding product quality, production costs, reduced CO₂ emissions, and plant capacity utilisation. The BFI offers customised innovations along the entire process chain of steel production, from input materials to the end-product. Its core competences are energy and resource management, process technology, measurement technology, and process automation.

The BFI helps its industrial partners obtain funding in order to achieve innovative solutions cost-effectively. As a professional innovation accelerator for the steel industry, the Institute is an important player in industrial research on the national and international levels, an active member in industrial networks (the Zuse Institute, DECHEMA, the Association of Innovative Companies, the Foundation for Heat Treatment and Materials), and an important contributor to academic research thanks to its close collaborations with, and honorary professorships at, leading universities.

The challenges faced by the steel industry extend beyond national borders: The BFI stands for innovation in the steel industry on the European level. In addition to its position as the most successful representative within the Research Fund for Coal and Steel, the BFI participates in European special interest groups and research platforms, such as ESTEP, EUROFER, SPIRE and RIES, in order to represent German steel research in Brussels. The BFI is also actively involved in many of the Committees of the Steel Institute VDEh and ensures transfer of the knowledge obtained. Whereby the BFI also sees itself as an engine and idea generator for further increasing the efficiency of steel production.

For more than 30 years, BFI Betriebstechnik GmbH (BT) has been developing, designing, and producing measurement solutions for the steel, iron, and aluminium industries. The company’s main focus is on flatness measurement and control. This involves the detection of ultra low-level signals from sensors operating under the rough environmental conditions in the metal processing industry. Rotary transmitters, developed by BT, transfer the digital measurement values from rotating components to high performance data processing units. Sophisticated algorithms and high processing power is used to extract the information necessary for process control. Another business is the design and construction of systems for online/inline measurement of physical parameters. The measurement systems DynTemp for measuring temperatures of molten metals, DynAcid for measuring concentrations in pickling media, and DynGas for determining the fuel gas qualities of process gases have been successfully realized.

“The BFI stands for future-oriented and practical research and development as a contribution towards the competitiveness and sustainability of the steel industry in Germany and Europe.”

Dr. Peter Dahlmann
Chairman of the BFI Board of Directors
The young international team at the Max-Planck-Institut für Eisenforschung (MPIE) carries out basic research on high-performance materials, particularly metallic alloys and related materials to enable progress in the socially important areas of mobility, energy, infrastructure, medicine and safety.

The Institute is financed jointly by the Max Planck Society for the Advancement of Science and the Steel Institute VDEh. The MPIE pursues a research approach in which material systems are studied with regard to both their highly complex nanostructures and the strains they are exposed to by extreme environmental conditions.

In addition to the four departments of the MPIE – Computational Materials Design, Interface Chemistry & Surface Engineering, Microstructure Physics & Alloy Design, and Structure & Nano-/Micromechanics of Materials – the Institute runs an independent Max Planck Research Group on Nanoanalytics & Interfaces led by Prof. Christina Scheu, who also holds a professorship at the Faculty for Georesources and Materials Engineering at the RWTH Aachen University.

There is also a Max Planck Research Group on High-Temperature Materials under the management of Prof. Gunther Eggeler, Chairman at the Faculty for Mechanical Engineering at the Ruhr-Universität Bochum.

An independent research group, TIME-BRIDGE (under Dr. Blazej Grabowski), financed by the European Research Council, has been working on multiscale simulations since July 2015 and a new Max Planck Fellow Group on Self-Reporting Materials has been active since October 2015 under the guidance of Prof. Jochen Schneider, Chairman at the Material Chemistry Department at the RWTH Aachen.

The Departments and Research Groups of the MPIE complement one another regarding the methods applied and principal emphases of research, working intensively on the following main areas of research both together and with colleagues all over the world:

- development of new structural materials,
- analysis of microstructure-dependent material properties,
- analysis and improvement of the stability of surfaces and interfaces,
- development of multiscale material simulations, and
- improvement of materials for new energies.

These main areas of research are undertaken in a highly interdisciplinary manner and combine the experimental and theoretical expertise of the individual organisational units.

The two new independent groups are presented here as examples for the dynamic development of the MPIE: The independent research group TIME-BRIDGE, led by Dr. Blazej Grabowski, is financed with EUR 1.5 million (2015-2020) by the European Research Council and develops new simulation methods that will, in future, permit the controlled optimisation of material properties such as strength. Whereby the properties of materials depend on their atomic structures and their dynamics. The aim is to achieve progress based on a fundamental understanding of these two influencing factors, from the nano- to the macro-scale within the materials, with a new theoretical approach. The new simulation methods include examining defects in materials and their interactions with one another.

The new Max Planck Fellow Group on Self-Reporting Materials enhances the MPIE’s collaboration with the RWTH Aachen. Led by Prof. Jochen Schneider, the group develops materials that report defects or reduced performance by changing their properties. The alteration of properties – based on changes in chemical composition and atomic-level structure – can, in turn, be measured during operation in engineering applications. Such self-reporting materials are particularly relevant for monitoring and assessing damage in technical components during their use in industrial applications.

“The Max-Planck-Institut für Eisenforschung is increasingly developing from a pure materials institute to a systematically structured research institute that considers complex materials within a holistic context of design, production and extreme environmental conditions.”

Prof. Dierk Raabe
Chief Executive of the MPIE
The Steel Innovation Prize awards 2015

The Berlin Steel Dialogue

1 Prof. Johanna Wanka, Minister for Education and Research and patroness of the Steel Innovation Prize, gives an impressive talk to 580 participants.

2 Presenter Ranga Yogeshwar; Andreas J. Goss, CEO of ThyssenKrupp Steel Europe; Ulrich Grillo, President of the Federation of German Industries (BDI); Prof. Dietmar Harhoff, Director of the Max Planck Institute for Innovation and Competition; and Prof. Matthias Kleiner, President of the Leibniz Association.

3 Prof. Heinz Jörg Fuhrmann, CEO of Salzgitter AG Steel and Technology; Dr. Jürgen Großmann, Partner in Georgsmarienhütte Holding; Dr. Karlheinz Blessing, CEO of Dillinger Hüttenwerke and Saarstahl; Dr. Michael Süß, Chairman of the Management Board of Georgsmarienhütte Holding; and Dr. Heribert Fischer, Member of the Executive Board of ThyssenKrupp Steel Europe.

4 The winners of the Steel Innovation Prize proudly display their certificates.
More than 3000 visitors in Dusseldorf

STAHL 2014

1 Interested listeners in the first row: Annegret Kramp-Karrenbauer, Saarland’s Minister-President; Ingo Kramer, President of the Confederation of German Employers’ Associations (BDA); Andreas J. Goss, CEO of ThyssenKrupp Steel Europe; and Prof. Udo Di Fabio, Bonn University.

2 Dr. Heinrich Hiesinger, CEO of ThyssenKrupp, at the Steel Get-Together with Hans Jürgen Kerkhoff, Chairman of the Steel Institute VDEh and President of the German Steel Federation.

3 Talks among colleagues: Eurofer President and ArcelorMittal Executive Vice-President Robrecht Himpe, with Dr. Dietmar Ringel, CEO of ArcelorMittal Bremen.

4 Regular visitors to Steel Day: (from left to right) Prof. Heinz Jörg Fuhrmann, CEO of Salzgitter AG Steel and Technology; Frank Schulz, Chairman of the Management Board of ArcelorMittal Germany Holding; Dr. Karlheinz Blessing, CEO of Dillinger Hüttenwerke and Saarstahl; Dr. Klaus Harste, Managing Director of Max Aicher.
Boards

Board Committee

Hans Jürgen Kerkhoff (Steel Institute VDEh), Chairman
Dipl.-Kfm. Andreas J. Goss, Vice Chairman (ThyssenKrupp Steel Europe AG)
Dipl.-Ing. Robrecht Himpe, Vice Chairman (ArcelorMittal S. A.)
Dr.-Ing. Peter Dahlmann (Steel Institute VDEh), Executive Member of the Managing Board

Boards

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Dr.-Ing. Klaus Harste (Max Aicher GmbH & Co. KG)
Dr.-Ing. Heinrich Hiesinger (ThyssenKrupp AG)
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Dr.-Ing. Jürgen Loh (BGH Edelstahl Freital GmbH)
Dr. Nicolas Müller* (VDM Metals GmbH)
Dr.-Ing. Bernd Münch* (AG der Dillinger Hüttenerwerke)
Dr.-Ing. Jens Overrath (Hoesch Hohenlimburg GmbH)
Dr.-Ing. Dietmar Ringel (ArcelorMittal Bremen GmbH)
Dr. rer. nat. Karl-Josef Sassen (DK Recycling und Rohreisen GmbH)
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Paul Tetteroo (ArcelorMittal Duisburg GmbH)
Dr.-Ing. Franz-Josef Wahlers (VDM Metals GmbH)
Dr.-Ing. G. Theodor Wuppermann*, Leverkusen
Dipl.-Ing. Hubert Zajicek (voestalpine Stahl GmbH)

Chairmen of the Committees

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Business Management**: Dipl.-Ing. Jan Oppermann (Salzgitter AG Stahl und Technologie)
Chemical Analysis: Dr. rer. nat. Patrice Reeb (AG der Dillinger Hüttenerwerke)
Energy Engineering: Dipl.-Ing. Michael Marion (Saarstahl AG)
Flat Product Rolling: Dr.-Ing. Michael Brühl (Salzgitter Flachstahl GmbH)
Research: To be nominated
History: Prof. Dr. phil. Manfred Rasch (ThyssenKrupp AG)
Blast Furnace: Dr.-Ing. Michael Peters (ThyssenKrupp Steel Europe AG)
Long Product Rolling: Prof. Dr.-Ing. Paul Josef Mauk (University Duisburg-Essen)
Open Die Forging: Dipl.-Ing. Ralf Rech (Buderus Edelstahl GmbH)
Steelworks: Dr.-Ing. Ralf Bruckhaus (AG der Dillinger Hüttenerwerke)
Environment**: Dipl.-Ing. Hildegard Kurtz (Saarstahl AG)
Materials: Prof. Dr. rer. nat. habil. Hans Ferkel (ThyssenKrupp Steel Europe AG)

* according to statutes or co-opted
** joint committee

The Board Meetings of the Steel Institute VDEh and the German Steel Federation in September were well attended.
Boards

The German Steel Federation

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Dipl.-Ing. Ulrich Grethe (Salzgitter Flachstahl GmbH)
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Dr.-Ing. Klaus Harste (Max Aicher GmbH & Co.KG)
Dr.-Ing. Andreas Hauger (Benteler Steel/Tube AG)
Dr.-Ing. Heinrich Hiesinger (ThyssenKrupp AG)
Dipl.-Ing. Robrecht Himpe (ArcelorMittal S.A.)
Dr.-Ing. Rolf Höflken (HKM – Hüttenwerke Krupp Mannesmann GmbH)
Dipl.-Kfm. Clemens Iller (Schmolz & Bickenbach AG)
Hans Jürgen Kerkhoff (German Steel Federation)

The Stahl-Zentrum: central meeting point of the Boards of the steel industry in Europe.

Chairmen of the Committees

Foreign Trade and Statistics: Stefan Grünhage (ThyssenKrupp Steel Europe AG)
Business Management*: Dipl.-Ing. Jan Oppermann (Salzgitter AG Stahl und Technologie)

Education and Human Resources: Harald Schartau (Georgsmarienhütte Holding GmbH)
Communication: Arne Langner (ArcelorMittal Germany Holding GmbH)
Marketing: To be nominated
Materials Management: Dr.-Ing. Beate-Maria Zimmermann (Georgsmarienhütte GmbH)
Metallitics:
Lutz Frohlich (Stahlwerk Thüringen GmbH)
Gerd Oehm (Schmolz & Bickenbach Edelstahl GmbH)
Organisation & IT: RA Dipl.-Kfm. Klaus Frizen (Mettmann)
Legal: Dr. jur. Bernhard Gabel (ArcelorMittal Berlin Holding GmbH)
Auditing and Risk Management: Karl Spanke (Salzgitter AG Stahl und Technologie)
Raw Material Policy: Dr. Jens Geimer (ThyssenKrupp Steel Europe AG)
Tax: Dipl.-Ok. Peter-Michael Gens (Salzgitter AG Stahl und Technologie)
Environment*: Dipl.-Ing. Hildegard Kurtz (Salzgitter AG Stahl und Technologie)
Transport: Dipl.-Kfm. Hans-Joachim Welsch (SHS - Stahl-Holding-Saar GmbH & Co. KGaA)
Insurance: To be nominated
Economy and Markets: Dr.-Ing. Sebastian Bross (Salzgitter Flachstahl GmbH)

* according to statutes or co-opted
** joint committee
In Germany:

ArcelorMittal Bremen GmbH (VDEh + WV)
28237 Bremen

ArcelorMittal Eisenhüttenstadt GmbH (VDEh + WV)
15888 Eisenhüttenstadt

ArcelorMittal Hamburg GmbH (VDEh + WV)
21129 Hamburg

ArcelorMittal Hochfeld GmbH (VDEh + WV)
47053 Duisburg

ArcelorMittal Ruhrort GmbH (VDEh + WV)
47137 Duisburg

Benteler Steel/Tube GmbH (VDEh + WV)
33104 Paderborn

Bessey Präzisionsstahl GmbH (VDEh)
74301 Bietigheim-Bissingen

BGH Edelstahlwerke GmbH (VDEh)
01691 Freital

BGH Edelstahl Siegen GmbH (VDEh + WV)
57076 Siegen

Bilstein Service GmbH (VDEh) - 58119 Hagen

Buderus Edelstahl GmbH (VDEh + WV)
35576 Wetzlar

C.D. Wälzholz Unternehmensgruppe (VDEh)
58093 Hagen

Chr. Höver & Sohn GmbH & Co. KG (VDEh + WV)
51789 Lindlar

DK Recycling und Roheisen GmbH (VDEh + WV)
47004 Duisburg

Dörrenberg Edelstahl GmbH (VDEh + WV)
51758 Engelskirchen

Edelstahl Rossowag GmbH (VDEh)
76327 Pfinztal-Kleinsteinbach

Energietechnik Essen GmbH (VDEh)
45022 Essen

ESF Elbe-Stahlwerke Feralpi GmbH (WV)
01591 Riesa

EZM Edelstahlzieherei Mark GmbH (VDEh + WV)
58294 Wetter

Friedr. Gustav Theis (VDEh)
Kaltwalzwerke GmbH
58104 Hagen

Friedr. Lohmann GmbH (WV)
58423 Witten

The GMH Group (VDEh + WV)
Georgsmarienhütte GmbH (VDEh + WV)
49124 Georgsmarienhütte

Stahlwerk Bous GmbH (VDEh + WV)
66359 Bous

Schmiedewerke Gröditz GmbH (VDEh + WV)
01609 Gröditz

Gustav Grimm (VDEh + WV)
Edelstahlgusswerk GmbH & Co. KG
42828 Remscheid

Hammerwerk Erft (VDEh + WV)
G. Diederichs GmbH & Co. KG
53896 Bad Münstereifel

Hoesch Hohenlimburg GmbH (VDEh + WV)
58103 Hagen

Hoesch Schwerter Profile GmbH (VDEh)
58239 Schwerte

Hüttenwerke Krupp Mannesmann GmbH
(VDEh + WV) - 47259 Duisburg

Karl Diederichs KG (VDEh + WV)
42899 Remscheid

Kind & Co. Edelstahlwerk (VDEh + WV)
51662 Wiehl

Lech-Stahlwerke GmbH (VDEh + WV)
86405 Meitingen

Lintorfer Eisengießerei GmbH (VDEh)
40853 Ratingen

Outokumpu Nirosta GmbH (VDEh + WV)
47807 Krefeld
Please note:

**STAHL 2016**

**Thursday, November 10, 2016**

In Europe:

- Breitenfeld Edelstahl AG (VDEh)
  A-8662 Mitterdorf
- Franchini Acciai S.p.A. (VDEh)
  I-25030 Mairano (BS)
- MORAVIA STEEL (WV)
  CZ-73970 Trinec - Staré Město
- Scana Steel Björneborg AB (VDEh)
  S-68071 Björneborg
- Schmiedewerk Stooss AG (VDEh)
  CH-8908 Hedingen
- SSAB EMEA AB (VDEh)
  S-78184 Borlänge
- SSAB Europe Oy (VDEh)
  FIN-92101 Raase
- Swiss Steel AG (VDEh + WV)
  CH-6020 Emmenbrücke
- Tata Steel IJmuiden B.V. (VDEh)
  NL-1970 CA IJmuiden
- Trinecké Železárny, a.s. (WV)
  CZ-73970 Trinec - Staré Město
- voestalpine Edelstahl GmbH (VDEh)
  A-1030 Vienna

- voestalpine Schienen GmbH (VDEh + WV)
  A-8704 Leoben-Donawitz
- voestalpine Stahl Donawitz GmbH & Co. KG (VDEh)
  A-8704 Leoben-Donawitz
- voestalpine Stahl GmbH (VDEh)
  A-4031 Linz

Platestahl Umformtechnik GmbH (VDEh)
58513 Lüdenscheid

Riva Stahl GmbH (WV)
H.E.S. Hennigsdorfer Elektrostahlwerke GmbH
16761 Hennigsdorf

B.E.S. Brandenburger Elektrostahlwerke GmbH
14770 Brandenburg

Rohrwerk Maxhütte GmbH (VDEh + WV)
92237 Sulzbach-Rosenberg

Saar-Metallwerke GmbH (VDEh)
66026 Saarbrücken

Saarschmiede GmbH (VDEh)
Freiformschmiede
66330 Völklingen

Saarstahl AG (VDEh + WV)
66330 Völklingen

Salzgitter AG (VDEh + WV)
38239 Salzgitter

Salzgitter Mannesmann Grobblech GmbH (VDEh)
45473 Mülheim

SCHMOLZ + BICKENBACH Gruppe (VDEh + WV)
40549 Düsseldorf

Stahlwerk Annahütte (VDEh + WV)
Max Aicher GmbH & Co. KG
83404 Ainring

Stahlwerk Thüringen GmbH (VDEh + WV)
07334 Unterwellenborn

ThyssenKrupp (WV)
45143 Essen

ThyssenKrupp Rothe Erde GmbH (VDEh)
44047 Dortmund

ThyssenKrupp Steel Europe (VDEh + WV)
47166 Duisburg

Vacuum-Schmelze GmbH & Co. KG (VDEh)
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Twitter: www.twitter.com/stahl_online
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