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Back to the future

Central Germany's Chemical/Plastics Cluster builds on its successful heritage

INNOVATION TO BEAT THE CRISIS

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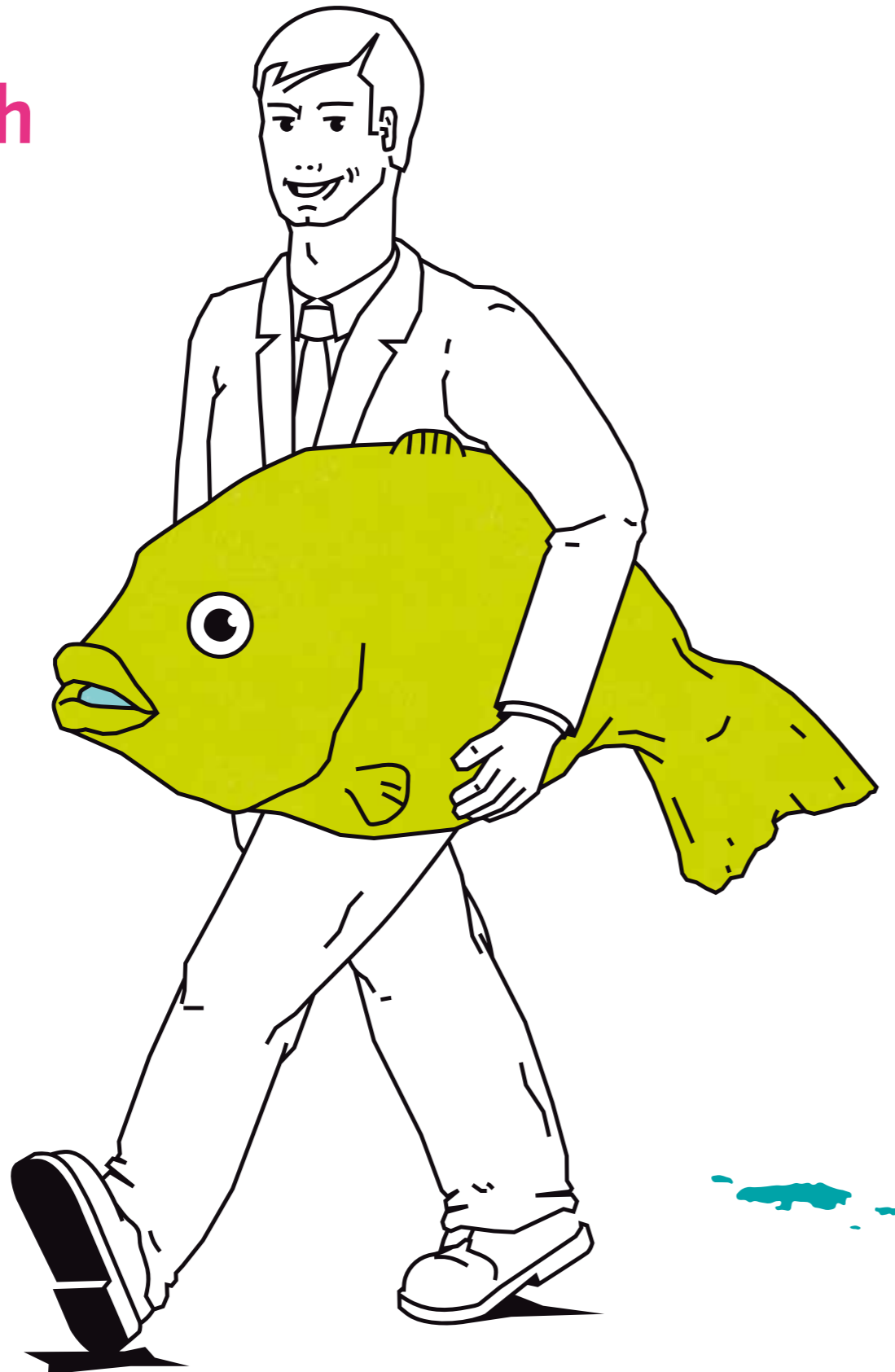
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From tradition to trailblazer

Central Germany's Chemical/Plastics Cluster is a European success story of productivity and innovation

Central Germany's Chemical/Plastics Cluster is a European success story of productivity and innovation

In this issue, we're continuing our coverage of economic clusters in Central Germany by taking an in-depth look at the Chemical/Plastics Cluster. The chemical industry and plastics processing are two of the most important growth sectors in Central Germany. Several giants such as Dow Chemical, Bayer, Total and BASF have set up shop in the efficiently networked chemical industry parks between Bitterfeld and Zeitz, and additional investments currently underway range into the billions of euros. More than 76,000 people are already employed by the over 650 companies working there. And with some of them enjoying double-digit growth, last year they generated a combined turnover of around €20 billion.

The cluster process instigated nearly six years ago by the Industrial Initiative for Central Germany is designed to increase networking among companies and also with research centres by cutting red tape between federal states in order to tap regional supply chains and boost innovation. Central Germany is now building on its industrial heritage

and becoming the foremost location of the chemical industry and polymer processing.

Cluster development has been very promising so far. According to independent studies, the cluster process increases companies' turnover. The European Commission has described the Central German Chemical/Plastics Cluster as an example of European "best practice" and "a success in terms of building up productivity and innovation capability", adding that investment and innovation right along the supply chain had particularly been generated by the political classes and the business community joining forces across federal state borders. In fact cluster work has now contributed to the emergence of one of the most efficient chemical industry locations in the world. Find out on the following pages about the key players in business, science, education and politics, and gain an insight into the current trends of the chemical industry and cluster work. Learn how the car and photovoltaic industries in Central Germany benefit from the Chemical/Plastics Cluster as well as about the role now played by biomass and the comeback of coal. It all makes for a fascinating read!



Klaus Wurpts



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Fascinating facts and intriguing insights



Michael Weinholdt

was elected chairman of the PolymerMat Thuringian Plastics Cluster on 6 April 2009. He has spent many years working in various areas of the plastics-processing industry and is currently head of development at Schmuhl Faserverbundtechnik GmbH & Co. KG in Liebschütz.



Dr Christian Schleicher

became CEO of Bayer Bitterfeld GmbH with effect from 1 January 2009. Born in Argentina, he replaced Dr Hans-Joachim Raubach, who left to become site manager of Bayer Schering Pharma and director of the supply centre in Berlin.



Qpoint Composite GmbH

recently garnered the Prof Johannes Nelles Prize and a cheque for €7,500 in the 2009 IQ Central German Innovation Awards. The Dresden-based company has developed new carbon fibre heating structures for the faster and cheaper production of fibre-reinforced plastics.



Dr Volker Deckert

began work at the Institute of Photonic Technologies and the Institute of Physical Chemistry at the University of Jena on 20 May 2009, where he will further his research into tip-enhanced Raman spectroscopy. This renowned chemist had previously been based at the Institute for Analytical Sciences in Dortmund.



Rudolf Lamm

became chairman of Dow Olefinverbund as of 1 May 2009, placing him in charge of the sites at Schkopau, Leuna, Teutschenthal and Böhlen. Aged 48, he has worked at various Dow sites in Germany, Finland and the USA. Before moving to Central Germany he was plant manager at Bützflether Sand.



The Chemical and Biotechnological Process Centre will research alternatives to oil and natural gas



Dow Chemical plans to produce special adhesives at Leuna for the automotive industry

FEEDSTOCKS

Oil gives way to biomass

New process centre to study alternative fuels for the chemical industry

Oil and natural gas are still indispensable in the chemical industry. In fact these fossil fuels are the basis of most chemical products, including plastics, varnish, detergent, adhesives and cosmetics. But as the world's stocks of oil and natural gas are finite and slowly dwindling, finding alternatives is becoming increasingly urgent. Tackling this problem will be the job of the new CBP Chemical and Biotechnological Process Centre at Leuna announced in early April.

The CBP is being planned by scientists from the IGB Fraunhofer Institute for Interfacial Engineering and Biotechnology and the ICT Fraunhofer Institute of Chemical Technology in conjunction with InfraLeuna GmbH, the operating company in charge of Leuna. Using this flexible bio-refinery concept, in future biological raw materials are to be processed so that oil, grease, cellulose, and raw materials containing starch or sugar can be obtained as feedstocks for chemical products.

The CBP is designed to close the gap between laboratory research and industrial implementation. The costs of setting up the new research centre of around €50 million are being shared by the government of Saxony Anhalt, the German government and the Fraunhofer Society.

For more information, log on to www.infraleuna.de

INVESTMENTS

For the future

Companies are still investing in Central Germany despite the crisis

Even in the currently tough economic climate, chemical and plastics companies are continuing to invest in Central Germany.

For example, in mid-June Dow Chemical opened a new plant at ValuePark Schkopau manufacturing special adhesives for the car-making industry. These ingenious types of glue will enable entire sections of bodywork made of different materials such as plastic and steel to be bonded together. As a result, carmakers will be able to cut the weight of certain models by as much as 20kg. The new plant employs 80 people and has also led to 100 more jobs among local contractors.

In late April, fertiliser manufacturer Agro Service Nord GmbH opened a new plant at Leuna with initially six new tank farms to mainly produce nitrogen fertiliser. The extraordinary thing is that the company uses by-products from, say, the food industry that would otherwise go to waste. The new tank farms have a capacity of about 6,000 cubic metres and the production facilities are set to produce 100,000 cubic metres of fertiliser annually, tripling the company's previous output.

For more information, log on to www.infraleuna.de and www.dow.com/valuepark



Left to right: Andreas Hiltermann, Dr Reinhard Prose, Wolfgang Blümel and Dr Christoph Mühlhaus

CLUSTER MANAGEMENT

Growing challenges

Chemical/Plastics Cluster reinforces its management

Alongside Dr Christoph Mühlhaus, since the beginning of the year Central Germany's Chemical/Plastics Cluster has been represented by three more spokesmen. The aim is to better meet the cluster's growing challenges in cooperation with its partners and trade associations.

Qualified engineer Wolfgang Blümel is the new spokesman for the chemical industry. He is also deputy chairman of the north-east division of the Chemical Industry Association.

The new plastics spokesman is Reinhard Prose. After studying chemistry at Clausthal-Zellerfeld University of Technology, he completed a doctorate in engineering there, too. Reinhard Prose is the founder and chairman of CircleSmartCard AG and since 2004 has been president of the Federation of the Plastics-Processing Industry. Andreas Hiltermann, CEO of InfraLeuna GmbH, is in charge of chemical industry parks and feedstocks. As a member of CeChemNet, he represents the chemical industry parks, one of the largest interest groups in the cluster.

Finally, operating business remains in the capable hands of Gunthard Bratzke, managing director of scientific consulting and service firm isw GmbH.

For more information, log on to www.cluster-chemie-kunststoffe.de



Solina, the "Little Miss Sunshine", is the mascot of the project for youngsters to combat migration and the shortage of skilled labour

SKILLED LABOUR

Learning with the sun

Experts to help children love science and technology

With many young adults still moving away from Central Germany, lots of companies in the region are suffering from a lack of qualified employees. In response, Solina has been devised to save the day by countering this trend. Solina fronts a new campaign launched by mining, chemical industry and energy trade union IG Bergbau, Chemie, Energie designed to grow up with children for a period of fifteen years from first nursery school and primary school to secondary school and then work.

"Scientists and technicians from firms will be visiting kindergartens and schools and helping to draw up teaching programmes in an effort to interest children in the world of science by conducting experiments with them," explains Erhard Koppitz, head of IG Bergbau, Chemie, Energie's Halle-Magdeburg chapter. Approaching children on their level is designed to encourage an attachment to Central Germany, including the employers based there and the products they make. In addition, this provides an outstanding opportunity for children to find out about employment prospects at an early age. By the way, Solina is still on the look-out for people with the right expertise who enjoy communicating technical and scientific information to help out with the campaign, regardless of whether they are still working or have retired.

For more information: tel: +49 (0) 345 291690 or write to bezirk.halle@igbce.de

Go East

In view of the complex production processes, chemical companies depend on an efficient logistics infrastructure in order to remain competitive. As a result, a dense network of pipelines and intermodal logistics terminals has been set up in Western Europe and Central Germany to distribute raw materials and intermediate products between different locations. By contrast, Central and Eastern Europe only has a pipeline network for crude oil. Production centres are far removed from navigable waterways while rail networks are not compatible with Western Europe owing to their different gauge.

To combat this situation, Saxony-Anhalt's Ministry of Economic Affairs and Labour has launched the project Chemical Logistics Co-operation in Central and Eastern Europe. The



aim of ChemLog is to develop an advanced system of logistics at the chemical industry centres in Central and Eastern Europe. Moreover, links are to be built up between these growth markets and the chemical industry in Central Germany. "In order for the chemical industry in Central and Eastern Europe to be competitive, it is vital to set up a chemical infrastructure between different locations of the type that has long been in existence in Western Europe. The contribution to this by the ChemLog project is invaluable," says Dr Reiner Haseloff, Saxony-Anhalt's Minister of Economic Affairs. Partners from seven European countries are cooperating in this project funded by the EU. Within three years, studies are to be carried out to advance the development of a joint strategy, the international planning of infrastructure projects, and the foundations for trans-European logistics connections. (www.chemlog.info)



DR CHRISTOPH MÜHLHAUS

studied process engineering at Merseburg College of Technology before joining chemical combine Buna as a designer in 1966. In 1988 he was awarded a doctorate in engineering at the Academy of Sciences in Berlin. He joined the board at Buna AG in 1990, and from 1995 until 2008 he was part of the management of Dow Olefinverbund GmbH. Dr Christoph Mühlhaus is the spokesman of the Central German Chemical/Plastics Cluster.

Innovation will power us out of the crisis

Dr Christoph Mühlhaus, spokesman of the Chemical/Plastics Cluster, talks about the sector's economic significance for Central Germany and the impending challenges in international competition

Written by Kai Bieler Photos: Christian Hüller

Since late 2008, the chemical and plastics industry has also been beset by the recession. Was this something you'd foreseen?

Until that point we'd benefited from a decade of double-digit growth. A while ago, however, we realised that a shakeout of the market of some sort was likely following the opening of new production plants in the Middle East. But we were astonished to see this escalate so abruptly into an economic crisis.

What's the situation in the region at the moment?

Although the packaging market has got off lightly, plastics suppliers serving the car industry and machinery manufacturers relying on export trade have been hit especially hard. But in two years we ought to have recovered once the right course has been mapped out.

What does that mean specifically?

It partly means identifying those companies

which will be able to survive in the long term and how they can be bailed out. But what's actually more important is to strengthen the industry's innovation in the long term. In the current climate, the strategic work of the cluster is vital.

Why is innovation so important?

It's crucial for a plastics producer to know whether it can be involved as a technology partner by car-makers in the development of new components early on. Otherwise it'll join the ranks of mass suppliers with a correspondingly low margin – which could be enough to derail it. That's why we need to back applied research and the right supply chains to ensure the regional chemical industry develops sustainably.

What advantage does Central Germany have over the competition as far as the chemical industry is concerned?

We're virtually the inventors of the chemical in-

dustry park model. By now it's become almost standard throughout the world for supply chains and materials cooperation to be concentrated at centres of the chemical industry. Nevertheless, Central Germany still outclasses competing regions with its exceptionally modern production plants and infrastructure. That also goes for its excellent road and rail links. Another advantage is its pool of specialists.

What other steps need to be taken to improve Central Germany's competitiveness?

The structure of companies in the region is still largely based on the wave of privatisation following 1990. It boils down to mainly large companies with production plants frequently lacking internal R&D departments. We therefore want to build up applied research at the production centres using the concept of 'knowledge sites'. And we're on the right track thanks to the various research centres opening up in the chemical industry parks.

Just how important is the chemical industry for the region's economy?

With about 76,000 employees and annual turnover of around €20 billion, it's developed into a key industry. Moreover, the presence of the chemical and plastics industry attracts other sectors such as car manufacturers and photovoltaics. Indeed, the latter wouldn't have become one of the success stories of Central Germany had it not been for the chemical industry and its infrastructure and specialists.

What are the cluster's current priorities?

In the plastics industry it's the injection moulding roadmap process, which we are using to analyse future processes and materials and to coordinate development in the cluster. The chemical industry faces the challenge of making sure the supply of raw materials is safeguarded in the future. That's why we're developing feedstock alternatives to oil and gas, for example using coal and biomass.

What part can lignite play in the future supply of raw materials?

The lignite stocks in Central Germany are rich in bitumen and contain hydrocarbon structures

which are too valuable to be burned up merely to generate electricity. In the first step, lignite wax can and is already being extracted. In the second and third steps, other materials could in future be obtained by means of pyrolysis. Finally, synthetic gas could be made using gasification. The Innovative Lignite Integration project we launched harbours the potential for a new growth core.

What other challenges does the Chemical/Plastics Cluster in Central Germany face?

One key element is improved transport links to the future growth markets in Eastern Europe. We've hence set up the Chem-Log project to bring chemical companies and logistics contractors together. Other priorities in our work include securing the demand for qualified employees by means of basic and further training addressing the needs of Central Germany's economy and cooperation in innovation between chemical industry regions under the Chem-Clust project.

Close networking at the European level is becoming increasingly important in this respect.

Yes – after all, all these complexes have a European dimension. And they have certain aspects

that can only be advanced and decided at a European level. They include for instance the implementation of the recommendations of the High Level Group concerning the competitiveness of the chemical industry and the auctioning of CO₂ emission certificates. Speculators trading in these certificates have become a serious setback for the chemical industry's competitiveness. That's why the European Chemical Regions Network with around twenty member regions has been set up under the overall control of the government of Saxony-Anhalt. The ECRN enables us to represent the positions and interests of the Central German chemical and plastics industry in Brussels and to liaise on current issues with partners from all over Europe.

You've been associated with the chemical industry in Central Germany for 45 years. Given all the changes in this time, is there anything that's stayed the same?

Yes, probably the main reasons for the success of the chemical and plastics industry in the region: people's enormous commitment and expertise along with the high acceptance it enjoys. That gives me confidence about the future.

For more information, log on to www.cluster-chemie-kunststoffe.de



Around the Dow plants in Schkopau, Böhlen, Leuna and Teutschenthal, the Dow ValuePark Schkopau has developed into a centre of excellence for the production and processing of sophisticated plastics



Bayer Bitterfeld GmbH has a state-of-the-art pharmaceutical production line where 4.3 billion aspirins were produced for the European market in 2008

The stuff of the future

Central Germany's chemical industry has successfully mastered structural transformation on an unparalleled scale. The result is now held up as a shining example for the prospects of the industry as a whole.

Written by Kai Bieler Photos and diagram: Dow/H.Fechner; Bayer Bitterfeld GmbH; Foto Faust; CeChemNet/isw GmbH

Anyone looking at the proud past, present and future of the global chemical industry can't ignore Central Germany. In fact the transformation of the industry's global structural is modelled on the chemical industry sites in Central Germany. Building on a legacy dating back more than a century in the chemical industry, the most advanced chemical industry centres anywhere in the world

The 'chemical triangle' in Central Germany successfully combines the past, present and future of the chemical industry

were built there after 1990 thanks to investment in production plants and infrastructure totalling some €17 billion. This successful transformation process is reflected in the continued growth of the chemical industry in Central Germany for more than ten years. The turnover in 1997 of €2.6 billion rose to €6.8 billion by 2007, while the number of people working for the chemical industry in the same period grew from 22,400 to 39,300.

The region's advantages for the chemical industry

include not just its central location and the resulting proximity to the burgeoning markets in Central and Eastern Europe, its huge pool of skilled labour and the high acceptance enjoyed by the sector, but also the concept of chemical industry parks born in Central Germany providing the one-stop supply of services such as energy, logistics and facility management. "The rapid, reliable availability of raw materials thanks to the superb infrastructure within and between the various centres contributes decisively to the region's attractiveness and the parks' success," explains Fiene Grieger, who heads the coordination office of the Central European Chemical Network. Set up in 2002, CeChemNe brings together the six main centres of the chemical industry in Central Germany: Leuna, Bitterfeld-Wolfen, Schkopau and Zeitz (Saxony-Anhalt), Böhlen (Saxony) and Schwarzeiche (Brandenburg). It focuses the regional strengths of chemical industry park development, encourages cooperation between the centres, and aids investors by compiling tailored packages for chemical companies interested in operating in Central Germany. "Each of our six

chemical industry parks with a total area exceeding 5,500 hectares and 28,000 employees has its own profile," says Fiene Grieger. "We help investors find the location that's best for them." The Bitterfeld-Wolfen chemical industry park run by the Preiss-Daimler Group is devoted to the

Since 1990, more than €17 billion has been invested in the six chemical industry parks, making them some of the most modern in the world

chemical and solar industries, focusing on chlorine and phosphorus-based chemistry as well as pharmaceuticals, quartz glass and fine chemicals. The 360 businesses based there employ 11,000 people and include international giants like Bayer, Evonik Degussa and Akzo Nobel, not to mention solar cell manufacturer Q-Cells. These companies have invested nearly €5.4 billion in Bitterfeld-Wolfen chemical industry park since 1990, including €230 million just on the complete renewal of the infrastructure. Various media are delivered reliably and inexpensively to manufacturers through the more than 28km of

pipe bridges comprising the materials network. P-D ChemiePark GmbH delivers competitive services to enable the companies to use the benefits of joint production.

Dow ValuePark Schkopau/Böhlen is a unique centre of plastics expertise. At the heart of this industrial park operated by Dow Olefinverbund GmbH are the Dow plants in Schkopau, Böhlen, Leuna and Teutschenthal, providing employment for 2,300 people. The starting point of the production chain is the cracker at the Böhlen plant, where naphtha is turned into the basic chemicals ethylene and propylene as well as feedstocks for various types of plastics, paint, adhesives and cosmetics. The overwhelming majority of these basic products is processed by Dow into synthetic rubber and plastic. This in turn creates ideal conditions for companies like the Italian Manuli Stretch Group. The biggest producer of stretch film in the world has been operating at ValuePark Schkopau since 1998. And RP Compounds GmbH, a subsidiary of the Belgian Ravago Group, also profits from being close to Dow. Every year, the 120 members of staff produce and refine some

110,000 tonnes of plastic granulate for carmakers and the insulation of high-tension cables. Meanwhile, INEOS ChlorVinyls GmbH is Europe's

One-stop services: this model originating in Central Germany has now caught on all over the world

biggest producer of PVC, making 1.4 million tonnes annually, including about a quarter at ValuePark Schkopau. All in all, since the park was opened, sixteen German and foreign companies have invested more than €475 million in this area 150 hectares in size – and created over 850 jobs into the bargain.

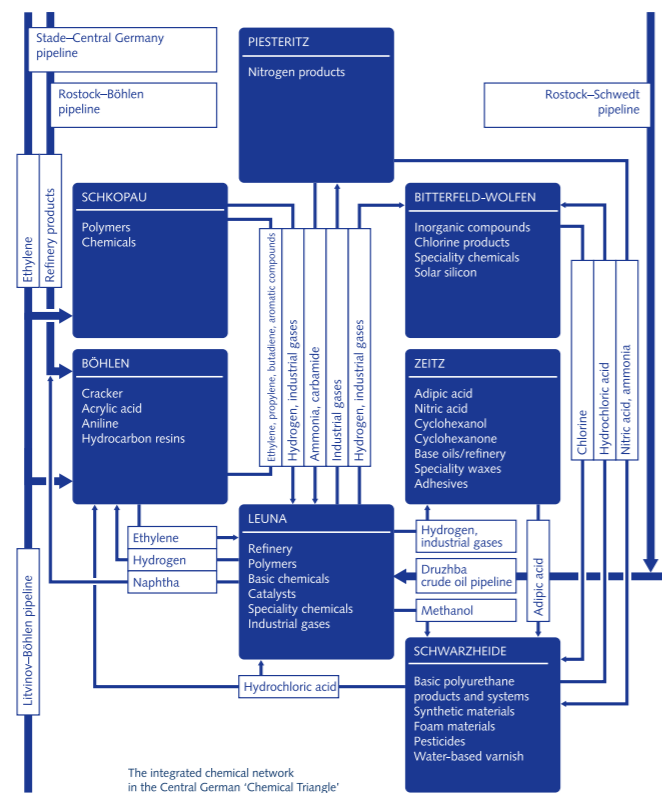
"The massive restructuring of the previous Leuna plants paved the way for one of the first chemical industry parks in Europe and the largest single chemical location in Germany," explains Andreas Hiltermann, CEO of operating company InfraLeuna. Thanks to investment topping €5.5 billion, the 1,300-hectare site is now home to more than 100 businesses employing around 9,000 people. The production structure ranges

from mass chemicals to speciality chemicals. The synergy effects resulting from different chemical companies working side by side provide ideal conditions for individual production. The core of this chemical infrastructure includes the refinery opened in 1997 belonging to TOTAL-Raffinerie Mitteldeutschland GmbH, which turns around 12 million tonnes of oil every year into fuels, fuel oil, liquefied gas, bitumen, naphtha and methanol, and which is Germany's largest producer of methanol. Other activities viewed as the centre-pieces of the chemical infrastructure are caprolactam synthesis by the DOMO Group and the production of industrial gases at Linde's largest gas centre in the world.

All the infrastructure at Leuna is owned and run by InfraLeuna GmbH and its subsidiaries. The InfraLeuna Group's services consist in the generation and supply of energy, water and sewage, safety (including fire-fighting), analysis, logistics and telecoms. Mind you, InfraLeuna has also been very successful in site development. Its combination of modern site management, marketing and hands-on assistance during invest-



Fiene Grieger, project manager of CeChemNet – Central European Chemical Network



Chemical cooperation between the industrial sites in Central Germany ensures the swift delivery of raw materials and enables collaboration along extended supply chains

ment projects has not only attracted new firms to Leuna but also generated expansion among companies already working there. InfraLeuna applies the low-profit principle.

In the view of Andreas Hiltermann, also the spokesman of Central Germany's Chemical/Plastics Cluster for chemical industry parks and feedstocks, the model's advantages are self-evident: "It means that InfraLeuna's business activities are primarily geared to providing all the companies based on its sites with infrastructure services and supplies at low, internationally competitive rates." What's more, the fact that planning permission has been secured throughout the park means businesses can invest with confidence. Leuna's sustained attractiveness in the face of the economic downturn is also underlined by current investments totalling approximately €250 million. We could not imagine life today without a host of items made in the district of Lusatia such as shoe soles, mattresses and refrigerator insulation. Synthetic materials have been the order of the day at Schwarzheide for more than thirty years. In October 1990, the plant was taken over by BASF, which has since invested over €1.4 billion in state-of-the-art production facilities and the infrastructure on this 230-hectare area. Nowadays BASF Schwarzheide GmbH's chemical industry

park employs around 2,500 operatives and is used to make polyurethane, industrial plastics, pesticides, water-based varnish and high-grade chemicals. Three things make Schwarzheide especially attractive: its location with easy access to Eastern Europe, its modern infrastructure, and the advantages offered by BASF. And twenty or so medium-sized companies like Air Liquide GmbH, Cyclics Europe GmbH and FEBRA Kunststoffe GmbH and Co. KG are already benefiting from them.

Meanwhile, the fusion of traditional chemical industry based on fossil fuels and industrial biochemistry using renewable raw materials is taking

Already successful production centres, the chemical industry parks in Central Germany are now increasingly evolving into 'knowledge sites'

place at Zeitz Chemical and Industrial Park. Zeitz is now witnessing processes such as the industrial use of biomass and the generation of electricity from lignite thanks to advanced coal gasification technology. Over fifty companies are now operating on the 232-hectare site, which is developed and marketed by ZSG Zeitzer Standortgesellschaft mbH. They include the Italian Radici Group, which has been making adipic acid, nitric

acid and cyclohexanol in Zeitz since 2001, PURALUBE GmbH, which has built a refinery there to treat used oil, and Jowat Klebstoffe GmbH, which produces a diverse range of special adhesives for a wealth of different purposes. With investment of around €357 million, so far a total of 1,200 jobs has been created.

Building on their specific expertise as production centres and the competitive advantages resulting from manufacturing synergy, the six CeChemNet locations are also increasingly evolving into 'knowledge sites' each with their own unique R&D profile. This paradigm shift is reflected by projects such as the new Chemical and Biotechnological Process Centre in Leuna, the Fraunhofer Pilot Plant Centre for Polymer Synthesis and Processing, the Dow centres of excellence for synthetic rubber and PET at ValuePark Schkopau, the Chemical Industry Park Institute in Bitterfeld-Wolfen, BASF's European development centre for polyurethane feedstocks in Schwarzheide and the centre of excellence for the industrial exploitation of biomass in Zeitz. Says Fiene Grieger from CeChemNet: "This will enable the centres of the chemical industry in Central Germany to regain their position as global pioneers and bolster their position within international competition."

For more information, log on to www.cechemnet.de, www.infraleuna.de, www.industriepark-zeitz.de, www.basf-schwarzheide.de, www.dow.com/ValuePark, www.chemiepark.de

A well-connected location

Linde Gas and DOMO Caproleuna operate out of Leuna Chemical Industry Park – and profit from its integration within Central Germany's thriving 'chemical triangle'

Written by Kai Bieler Photos: Linde AG, DOMO Caproleuna GmbH

Some attachments simply last longer. It was back in 1916 that Linde AG opened the world's first air separation plant in Leuna. Immediately after German reunification, Linda returned to the scene of its former glory when its Industrial Gases division took over the production and distribution of industrial gases at the Leuna works. Nowadays Linde AG operates its largest gas centre in Europe there, producing hydrogen, oxygen, nitrogen, carbon monoxide, carbon dioxide, and special gases like argon, krypton and helium. Dr Joachim Pretz sums up the location's advantages as follows: "Leuna is at the heart of Central Germany's industrial region and has pipelines connecting it to all the other chemical industry parks. From here we can optimally share in the chemical region's dynamic development." Consequently, Linde is also working hard to help Central Germany's future development in the chemical industry. "At meetings of the chemical and plastics cluster board, we bring our expertise to bear on the cluster's strategic work," says

Leuna profits from the chemical synergy on site and with the other chemical industry parks

Dr Pretz. Apart from its 450 employees, another visible sign of growth is the new plants regularly erected by Linde Gas. In late 2007, for instance, air separator no. 8 and the second hydrogen liquefier in Germany were started up. And since 1990, the company has invested around €500 million.

From Leuna, Linde supplies about fifty chemical and photovoltaic companies like Dow, Bayer and PV Silicon in the industrial parks at Schkopau, Zeitz, Bitterfeld and Piesteritz via more than 500km of pipelines. In addition, it offers an entire range of liquid and canister distribution for the gases produced in Leuna. Masdar PV GmbH, for instance, a producer of thin-film solar cells, signed up as a new customer in spring 2009. Linde Gas AG will supply gas to Masdar's new plant just outside Erfurt.

Apart from being integrated within the chemical industry locations in Central Germany, Linde also plays a crucial role in Leuna's chemical infrastruc-

ture. "We supply here our largest customer, the TOTAL refinery, with oxygen for methanol production as well as hydrogen," states Dr Joachim Pretz. At present, hydrogen is extracted from the fossil fuel natural gas, and in gaseous form alone about 120,000 cubic metres is produced every hour. However, the foundations are now being laid for the hydrogen of the future. Linde subsidiary Hydromotive GmbH is building a demonstration plant for the production of liquid hydrogen from biogenic raw materials. And the very first 'green' hydrogen is set to be made by mid-2010. This could benefit DOMO Caproleuna GmbH, which also has 465 workers at Leuna, and which is one of Linde AG's biggest customers. Caprolactam production, originally one of the old Leuna plan's strands, was taken over in 1994 by the Belgian DOMO Group. Since then, its production capacity has been doubled while its annual turnover has risen fivefold. Caprolactam is the feedstock used to make polyimide 6 and is produced in multi-stage synthesis from benzene, propene, ammonia and sulphur. The intermediate products produced in Leuna aren't just used in subsequent process stages but are also sold in their own right. For instance cyclohexanone and acetone are used as solvents in the adhesive and paint industries and as feedstocks for other plastics. And the joint product ammonia sulphate is mainly used for fertiliser.

The main purchaser of caprolactam is Xentrys Leuna GmbH, which is a member of the DOMO Group and employs 255 people. It produces polyamide 6 in a polymerisation plant built in 1996. The polyamide 6 is then spun to make tear-proof, highly elastic yarns which are used in carpets and as fibres in the textile industry. From Leuna the DOMO Group supplies more than 1,500 customers in over sixty different countries. All in all, more than €400 million has been invested in the two companies.

"The advantages of Leuna are the chemical and energy synergies," affirms DOMO Caproleuna's Dr Annett Scholz. "We use propene and sulphur from the TOTAL refinery and buy oxygen, nitrogen and hydrogen from Linde." Energy is supplied by local power stations. In addition, the ex-



Linde Gas's biggest European gas centre is located at Leuna Chemical Industry Park – and supplies customers throughout the region



Every year, some 45,000 tonnes of carpet yarn leave the Leuna factory of Xentrys GmbH, a member of the DOMO Group

tensive services provided by operating company Infraleuna GmbH have created a competitive cost structure at Leuna. "This allows us to concentrate on and grow our core business," says Dr Scholz.

For more information, log on to www.linde-gas.com, www.domochemicals.com

21st-century material

Thanks to Central Germany's Chemical/Plastics Cluster, this traditional region is now growing into a European stronghold of plastics production and processing

Written by Katharina Kleinschmidt Photos: Dow Olefinverbund GmbH

Plastic is the material of the future. With the way it looks and feels, the many functions it can perform, and its general versatility, it's easy to understand why it's so beloved of manufacturing industry, regardless of whether it's used to produce domestic appliances, medical instruments or construction equipment. And in the vehicle industry, its enormous design potential is being continuously explored, especially because of its low weight.

In Central Germany, a well-networked plastics sector has become established right the way along the plastics supply chain from production to processing. Says Dr Reinhard Proske, the cluster spokesman for plastics: "The cluster's synergy structures transcend regional boundaries. While the major chemical companies and plastic producers are based in Saxony-Anhalt and Saxony, the plastics-processing industry in Thuringia is dominated by SMEs. That works out very well in terms of geography."

The biggest manufacturer of plastics in eastern Germany is Dow Olefinverbund GmbH. A pipeline network with a length of some 1,300km interlinks its sites and connects it to the global flows

of materials and goods. At its factory in Böhlen, Dow turns out feedstocks for plastics production in Schkopau and Leuna. Naphtha is used to produce the basic chemicals ethylene and propylene. Other substances made include aniline, acrylate, butadiene, aromatic compounds, styrene and hydrocarbon resins, which are needed for the manufacture of plastics, paint, adhesives and cosmetics. Within Dow Olefinverbund, plastics like polyethylene, polypropylene, polystyrene, PET and synthetic rubber are produced from the majority of the petrochemical products. The various plastics are output in granulate form ready for processing on the European markets or even on the doorstep at ValuePark Schkopau.

The ValuePark was set up by Dow in 1998 as an industrial estate specifically for the plastics-processing industry. Seventeen companies are now operating there, with plastics-processing firms joined by contractors in related services such as logistics and maintenance. Vinnolit Schkopau GmbH has become established there as a manufacturer and supplier of PVC for carpets, floor coverings and technical coatings, as has Manuli Stretch Deutschland GmbH, the world's

biggest manufacturer of stretch film, while RP Compounds GmbH refines plastics for various applications, including car production and food packaging. A new arrival at the ValuePark is the Fraunhofer Pilot Plant Centre for Polymer Synthesis and Processing, which offers research co-operation to local and regional companies.

Dow Olefinverbund at ValuePark Schkopau is the largest plastics manufacturer in eastern Germany

It goes without saying that the main aim of this centre of excellence is networking with regional companies. The coordination work required is done by Polykum – the Organisation for the Promotion of Polymer Development and Plastics Engineering in Central Germany (the Saxony-Anhalt arm of the MKN Central German Plastics Network).

Stepping back in time for a moment, the rapid expansion of the chemical industry in central Germany in the early twentieth century was followed by the growth of the plastics-processing industry, which within the space of three decades became



Major manufacturers' plastic granulates provide the basis for the work of Central Germany's plastics-processing companies – usually SMEs



Plastics like polyethylene, polypropylene, polystyrene, PET and synthetic rubber are produced by Dow at ValuePark Schkopau

the European leader. After World War II, production was recommenced there, and plastics manufacturing and processing became a core area of the East German chemical industry. German reunification paved the way for a genuine new start: Central Germany's Chemical/Plastics Cluster enjoyed swift development in terms of both size and quality thanks to its high degree of networking and has now come to be regarded as a growth core with an international impact. These days, around 750 chemical and plastics companies employ 76,000 people, while nearly €17 billion has been invested in building new plants and refurbishing existing ones since 1990.

Firms' inventive forces are concentrated by a plethora of networks. They include the MKN Central German Plastics Network, under whose auspices the three regional networks AMZK (Saxony Automotive Suppliers' Plastics Network), Poly-

kum (Saxony-Anhalt) and PolymerMat (Thuringia) operate. Says Reinhard Proske: "Thanks to cooperation between different German states, plastics manufacturing and processing firms, research institutes and industrial construction com-

The Central German logistics hub is one of the geographical advantages of the Central German chemical industry

panies can boost their development expertise – and hence their ties to carmakers." Another network known as FEKM (Plastics Engineering Research and Development in Central Germany) fronts non-university R&D centres serving industry.

If plastic is the material of the twenty-first-century, the various centres of excellence and institutes within the cluster are the future powerhouse.

"The SMEs in plastics processing are frequently unable to maintain their own research departments," explains Reinhard Proske. "Yet businesses need to be supported if they are to remain competitive."

The work of the networks and centres of excellence within the cluster creates the structural basis required to strengthen innovation. For example, the KuZ Plastics Centre in Leipzig concentrates on injection moulding, processing polyurethane duroplast, and welding, while the Halle-Merseburg Plastics Centre of Expertise on the campus of Merseburg University of Applied Sciences is shared by a number of different universities. The economically independent IKTR Institute of Plastics Technology and Recycling in Weissandt-Görlau is dedicated to R&D for industrial applications, economic efficiency and ecology.

For more information, log on to www.dow.com, <http://mk-netz.net>, www.polymermat.de, www.amz-k.de, www.polykum.de



GRAFE has a separate colour design department for the automotive industry where new trends and shades are developed from design prototypes



Production processes are simulated beforehand and changes required during production are taken into account in the formula

A granulate that's proud of its colour

GRAFE Advanced Polymers GmbH specializes in the modification of thermoplastics – and its reputation has spread far beyond the automotive industry

Written by Katharina Kleinschmidt Photos: GRAFE Advanced Polymers GmbH

On the A4 autobahn in Thuringia, cars rush by, seemingly emotionlessly. Near the Magdala exit however, quite a few of them ought to feel at least a twinge of nostalgia. For they are passing by the GRAFE Advanced Polymers GmbH factory, which is responsible for the properties and colours of the various plastic components used in cars. The trend towards more and more plastic in cars has prompted an extraordinarily successful company history. Back in 1991, the four brothers Matthias, Clemens, Christian and Michael Grafe went into business in Jena. "It was a time of new departures and we wanted to risk something entirely new. And Thuringia made sense because of its geographical location," says Matthias Grafe, now the family business's managing director. The company rapidly expanded and needed more space, which was acquired in 1995 in Blankenhain. More than 200 people are now employed at the site, which is blessed with good transport links thanks to the nearby motorway. Every type of plastic has its own profile in terms of properties and colour depending on its planned use. It's carefully formed by GRAFE with master

batches (plastic additives in granulate form), compounds (ready dyed plastic granulates), and composites (blends of various materials and additives). The GRAFE Group concentrates on three areas: colour batches for pigments, additive batches to modify the plastic's quality, and polymer technology, which is used to manufacture a wide range of functional plastic compounds.

But GRAFE doesn't just serve carmakers. Samsonite for example had a plastic with a metallic effect and carbon optics developed by GRAFE for

Plastics made by the GRAFE Group are used in cars, high-class suitcases, hospitals and children's toys

its Cosmopolite series of suitcases. Bio-plastics for biodegradable plastic bags are dyed using biodegradable pigments. Plastic ordered by toy manufacturers like Playmobil has to be colourfast, stable and obviously non-toxic. "Toys sometimes get left outside in the sandbox for a couple of summers. Children and parents alike are pleased when they don't lose their colour," says Matthias

Grafe with a grin. The company also makes additives for synthetic yarns, surgical thread and even implants. It is driven by a desire to turn around its clients' needs quickly and efficiently and to develop innovative products. One of the biggest R&D departments in the sector works on new technologies designed to equip plastic with intelligent functions and new colours. Up to 10,000 blends are devised every year. The production processes are simulated beforehand and any changes required during production are taken into account in the formula.

GRAFE's most recent coup occurred in June 2009 when together with Trovotech GmbH from Wolfen it showcased the world's first New Inorganic Biozide Master Batches, enabling the inexpensive and toxicologically harmless production of antibacterial fibres. Silver and other metals are added to the batches. "The level of silver in the powder is around up to 5 per cent. The use of silver ions is what's new compared to other suppliers," explains Matthias Grafe. Textiles made of antibacterial fibres are ideal for use in hospitals, old people's homes and nursery schools.

For more information, log on to www.grafe.com

Three questions for

Prof Ralf B. Wehrspohn, director of the IWM Fraunhofer Institute for Mechanics of Materials and head of the Microstructure-Based Material Design Group at the Institute of Physics of Martin Luther University in Halle-Wittenberg

Written by Thomas Magosch Photos: Fraunhofer-Institut für Werkstoffmechanik IWM

1. Using the Technology Roadmap being drawn up under IWM's direction, you intend to analyse the future demand for innovation in Central Germany's Chemical/Plastics Cluster. What do you expect to achieve?

The Technology Roadmap being worked out at businesses and non-university research centres in Central Germany on behalf of the government of Saxony-Anhalt is designed to deliver current and future research, business and policy recommendations.

One surprising yet gratifying conclusion of the study for the injection moulding segment now completed is that the areas addressed by research and industry are very similar – in other words, there's high research congruence. Given a list of about a hundred questions, that's astonishing when you remember that research is often criticised for failing to address the areas tackled by industry.

The study also makes specific policy recommendations regarding potential support programmes in industry. Since the business structure in Central Germany is very broad and contains numerous small firms, the roadmap highlights concrete possibilities in which assistance can be provided to the plastics industry in Central Germany, which is predominantly a supply industry.

2. What concrete demands arise from the Technology Roadmap – and how can the Pilot Plant Centre for Polymer Synthesis and Processing set up by the Fraunhofer Institute for Mechanics of Materials at ValuePark Schkopau help?

The congruence noted in response to many questions is of course also offset by some differences. The depth of research in SMEs is still rather limited: their time horizon is still very short and their prospects are restricted. At present, costs are the biggest driver behind innovation. The situation will be relieved somewhat by the future replacement of expensive industrial synthetic materials by blends and nano-reinforced bulk plastics. Secondly, polymer prices are being pushed up by the costs of raw materials, which will boost demand for natural fibre based systems and hence interest in renewable raw materials over the next ten to



PROF RALF B. WEHRSPORN

has been the director of the IWM Fraunhofer Institute for Mechanics of Materials in Halle (Saale) since 2006. This pioneering researcher is currently 38 and took his doctorate on the chemical properties of amorphous and crystalline silicon. He has received several awards for his work, including the Massachusetts Institute of Technology's TR100 prize for young innovators.

fifteen years.

The pilot plant centre will be an important bridge to companies. On the one hand it will act as an interface for knowledge transfer between research and medium-sized companies due to its systems and processes designed with the needs of industry in mind. And on the other it will enable finished components and prototypes to be produced, including in large batches. This is PAZ's unique selling point since there is nothing like it in the world outside industry that can work on this large scale.

3. What form will future innovations take? What are the prospects for the polymer industry in Central Germany?

For one thing, as I just mentioned, there's an urgent need to cut costs. The question of energy efficiency is also important. Energy consumption,

maintenance and flexibility are all aspects of the machinery and tool sector where not enough has been done yet.

Furthermore, the innovation cluster needs to build bridges in order to advance user-specific polymer systems, for example in nano-composites and long-chain polymers. SMEs simply haven't got the resources at the moment to tackle these systems – yet they harbour (like new rubber systems) immense future potential.

One area on which I'm working intensively is chemical aspects of photovoltaics. At our branch at ValuePark Schkopau, we're studying the integration of polymers and silicon, for instance for the development of polymer-based solar modules. These can then be produced using a far higher degree of automation and are light since both the frame and the glass plate completely consist of polymers.

For more information, log on to www.iwmh.fhg.de

From molecules to finished components

Central Germany's proud heritage of chemical and plastics research is mirrored by its blossoming future with even greater emphasis on networks and practical application

Written by Thomas Magosch Photos: Kunststoff-Zentrum Leipzig; Alexander Krause

A roadmap shows you how to get somewhere by the shortest and hence quickest route. And this sort of guidance is the essence of the Technology Roadmap currently being compiled for Central Germany's Chemical/Plastics Cluster by the IWM Fraunhofer Institute for Mechanics of Materials in Halle/Saale. For even better networking and coordination among the centres of excellence and research are clearly imperative for the future of the region's plastics and chemical industry.

A prime example of this is Dow ValuePark in Schkopau, where Central Germany's long-standing polymer R&D is being continued. Work is underway at the PAZ Fraunhofer Pilot Plant Centre for Polymer Synthesis and Processing to not only develop new types of plastic for, say, the automotive industry, but also to optimise the ways in which polymers are processed. Run jointly by the Fraunhofer IAP Institute of Applied Polymer Research and the Fraunhofer IWM Institute for Mechanics of Materials, PAZ focuses on developing and adapting polymer syntheses in the laboratory and then scaling up the results for industrial production. The researchers at PAZ address the entire polymer supply chain and devise solutions start-

ing from the test tube up to the large-scale production of plastic components. In the field of synthesis, for example, research is concentrating on water-soluble polymers for use in environmental technology and the safety aspects of polyreactions. Research into polymer processing is chiefly devoted to studying materials and methods for fibre-reinforced materials and how they affect the use and reliability of plastic components.

The objective is to accelerate the transfer of findings of pure and applied research to new

Central Germany is a centre of excellence for the research and development of polymers

products and processes. Knowledge transfer is guaranteed by the presence of various polymer producers and plastics-processing companies on the doorstep as well as close cooperation with Polykum (the Organisation for the Promotion of Polymer Development and Plastics Engineering in Central Germany) and Halle-Merseburg Centre of Plastics Excellence. The importance of ValuePark Schkopau as a centre of not just production but also research is highlighted by the establishment

of the two Dow Chemical centres of excellence in synthetic rubber and PET. It is here that Dow is concentrating its worldwide activities in the development of new, tailored types of rubber for use in for instance fuel-saving car tyres and the exploration of new applications for PET plastics. Pure and applied research are also being merged at the Leibniz Institute of Polymer Research in Dresden. "From molecules to finished components" is how Kerstin Wustrack puts it, quoting the IPF's concise slogan. The advantage is that researchers are working side-by-side with engineers on development up to the processing of different polymers. Research also covers nanotechnology and biomimetic interfaces imitating, prompting and controlling biological processes. By contrast, the KuZ Leipzig Plastics Centre takes a more practical approach, chiefly tackling aspects of manufacturing industry.

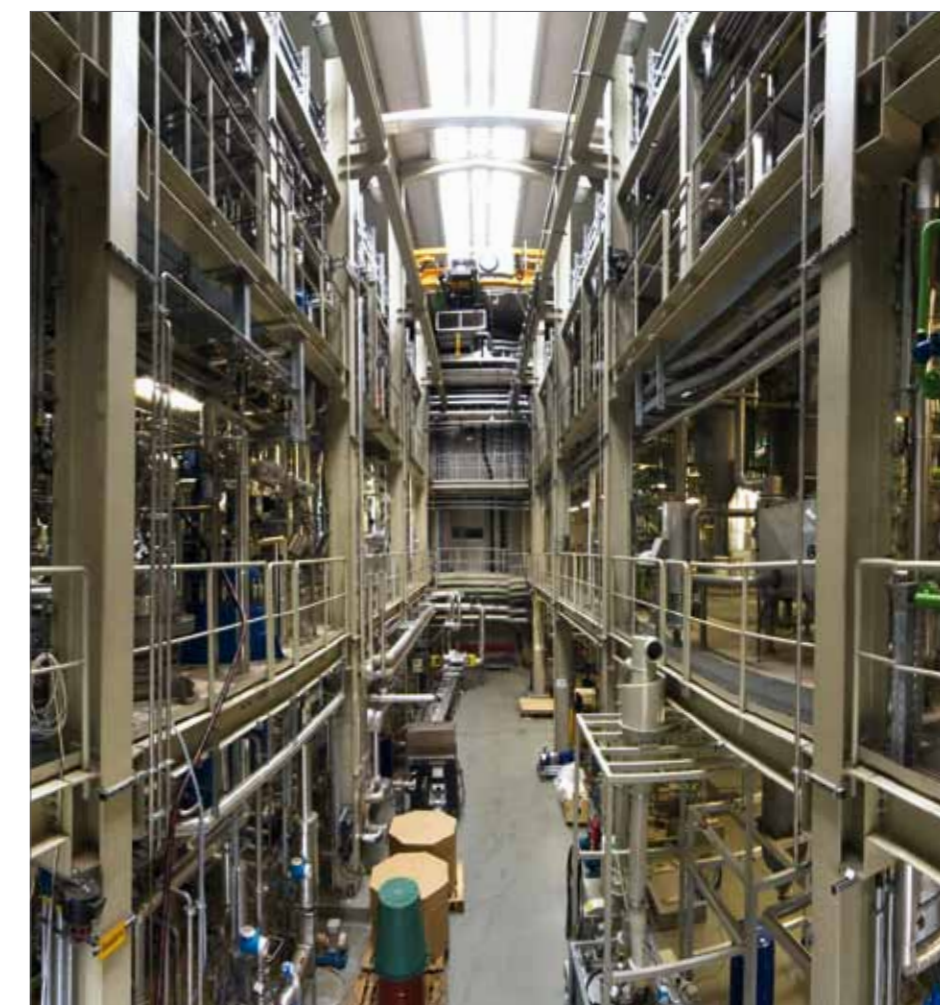
Its target group comprises small and medium-sized businesses, which can avail themselves of KuZ's outstanding pool of experts and materials in order to optimise products and the way in which they are made. Moreover, KuZ also offers assistance every step of the way from the initial

idea to the final product, an approach illustrated by Dr Thomas Wagner using 'formica plast' developed at KuZ. "Small, nimble and precise" was the brief for the components, which are mainly used in microsensors and microlenses.

The about 130 researchers at the TITK Thuringian Institute of Textile and Plastics Research in Rudolstadt work on industrial textiles and high-performance fibre materials based on renewable and synthetic polymers, including antiseptic textiles, fibres which can stay warm or cool as required, and textiles with built-in protection against ultraviolet light or insects. By working hand in hand with industry, this globally acclaimed institute specialising in polymers for functional and design materials aids SMEs to develop innovative ideas and techniques and then bring them to market. Their significance for competitiveness is enormous. The east German textiles industry already earns over 40 per cent of its turnover with industrial textiles. All in all, the R&D infrastructure in the plastics and chemical industry in Central Germany is superb. What needs to be done now is to maximise the efficiency with which the existing roads and channels are used.



"Small, nimble and precise": injection-moulded microcomponents produced by the 'formica plast' machine, which takes its name from the world of ants and was developed and produced by the KuZ Leipzig Plastics Centre. The components weigh no more than 10mg



The Fraunhofer Pilot Plant Centre for Polymer Synthesis and Processing has seven modular production lines which can be flexibly used in multi-shift operation to put different synthesis techniques through their paces

For more information, log on to
www.polymer-pilotanlagen.de, www.kuz-leipzig.de, www.ipfdd.de, www.kkz-halle-merseburg.de, www.titk.de, www.vci.de, www.polykum.de

Did you know

Fascinating facts and intriguing insights into the world of plastics and chemicals: over 70 years of synthetic rubber, cars made of plastic, and the cradle of modern colour photography



Photos: www.photocase.de-Dan Kula; www.photocase.de-Munky; Industrie- und Filmmuseum Wolfen

... that the world's first industrial plant for making synthetic rubber was opened in 1937 in Schkopau?

The principle was first developed in the laboratory in 1929 by German chemist Walter Bock. Its industrial production laid the foundations for the development of the chemical industry in Schkopau. The process used to make artificial rubber – the polymerisation of butadiene with sodium (Na) – resulted in the term 'Buna', which gave the site its name.

Dow Olefinverbund GmbH continues to produce synthetic rubber in Schkopau. Another plant for the production of synthetic rubber was completed as recently as in 2008. A special type of rubber is produced known as solution styrene butadiene rubber. SBR features special characteristics in terms of rolling resistance, grip and durability, and is mainly used in the tyre industry, especially for the tread of high-performance tyres. KB

... that nowadays each car contains on average about 170kg of synthetic materials of diverse sorts?

The proportion of these light materials within a vehicle's total weight has hence increased more than tenfold over the past fifty years to currently 15–20 per cent. This is all down to plastic's properties: it's light, versatile, doesn't rust, and is cheaper to make and process than metal. About half the plastic in cars is used in the interior: for trims, buttons and levers, seat belts and upholstery.

About 22 per cent of the plastic components are used in the exterior, followed by 20 per cent in the engine compartment and 11 per cent in electrics and lighting. And in view of the trend towards lighter construction in order to cut petrol consumption, the significance of plastic in motor vehicles will continue to grow. Given the prominence of the automotive industry in Saxony, this can only be good for plastics developers and producers throughout Central Germany! KB

... that the history of modern colour photography began over seventy years ago in Wolfen in Saxony-Anhalt?

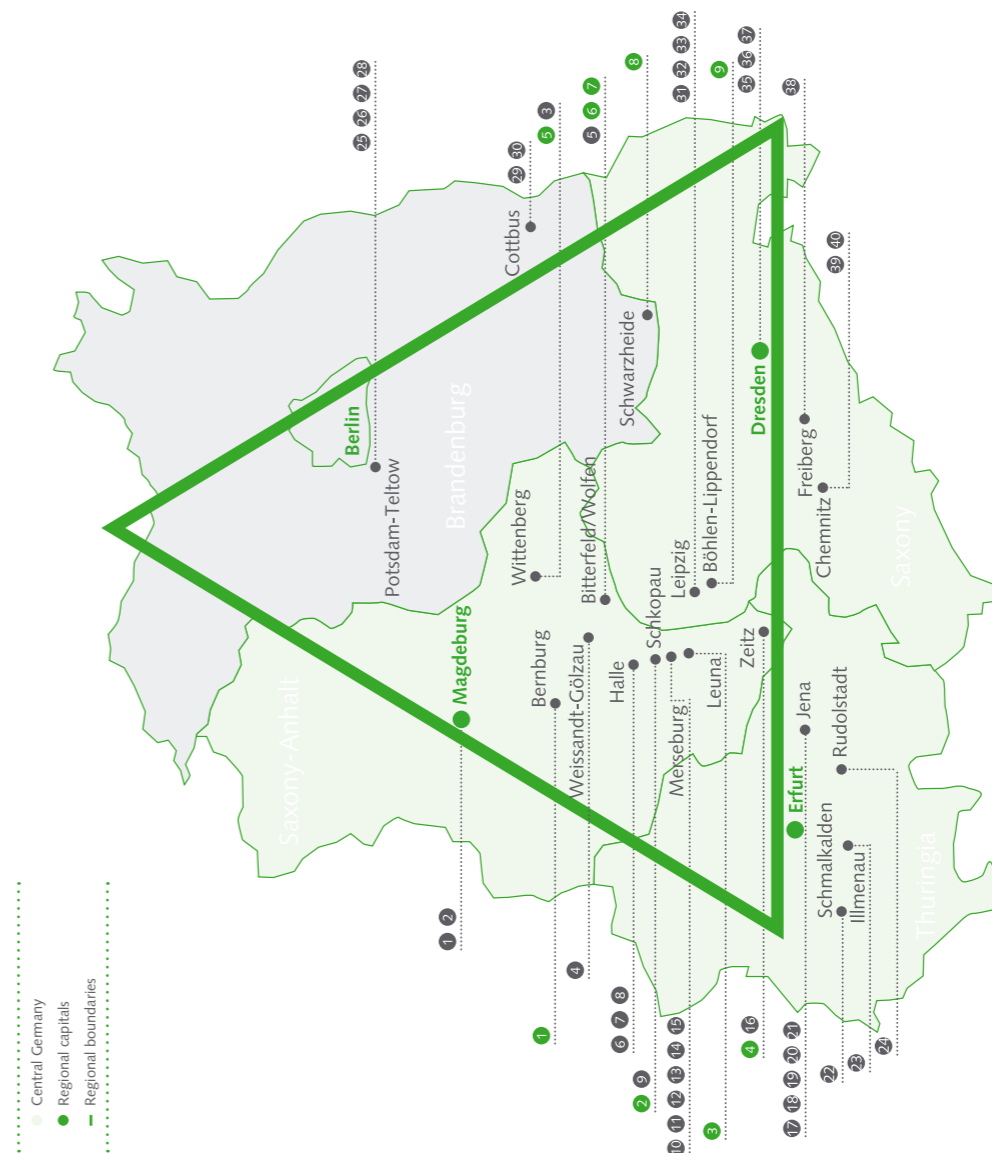
A world first took place on 17 October 1936 when the first universal multilayer colour film was demonstrated by Prof John Eggert, head of the scientific laboratories at the film factory in Wolfen. This innovation, which was destined to change the media landscape in a manner almost unparalleled before or since, made Wolfen, now a district of Bitterfeld, into the cradle of modern photography. The new film meant that for the first time amateurs were now able to take colour photos and even shoot cine film easily. At the 1937 World Fair in Paris, Agfa Color Neu was awarded the Grand Prix. The famous ORWO film (taken from 'ORiginal Wolfen') was made in Saxony-Anhalt during the East German era. The machine used to coat the world's first colour film can these days be admired at Wolfen Museum of Industry and Film. KB

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Plastics and Chemical Industry Triangle

Survey of companies and research centres in Central Germany



NETWORKS

- 4chiral Network
- Biotechnical Materials Innovation Network for Central Germany
- CeChemNet – Central European Chemical Network
- Central German Rapid Prototyping Network
- ECP – European Center of Plastic
- FASA – Organisation for the Promotion of Machinery and Plant Construction
- FEKM – Plastics Engineering R&D Innovation Network for Central Germany
- lbi – Innovative Light Integration in Central Germany
- Kubla Plastics Network Berlin-Brandenburg
- micromoldnet network
- MIT – Innovative Materials Thuringia Association
- MKN – Central German Plastics Network
- AMZK – Automotive Suppliers' Plastics Network (Saxony)
- Polykum – Organisation for the Promotion of Polymer Development and Plastics Engineering in Central Germany (Saxony-Anhalt)
- PolymerMat – Thuringian Plastics Cluster
- MIQuK – Central German Association of Excellence in Quality Development and Component Testing for Plastics Engineering
- NEAO Network – Nano-NaGe-Polymer-Products
- Pipeline and Plant Construction Network
- Polymer Technology Innovation Cluster Halle-Leipzig
- ReactiveWetCoating 2 – Innovative Regional Growth Core

CHEMICAL INDUSTRY PARKS

- 1 Solva Bernburg Industrial Park
Soda, sodium carbonate, hydrogen peroxide
- 2 Dow ValuePark®
Dow: synthetic rubber, PET, polypropylene, Further processing of polystyrene, polyethylene, plastics (granulate) at ValuePark®
Dow Centre of Excellence for Synthetic Rubber
PAZ Fraunhofer Pilot Plant Centre for Polymer Synthesis and Processing
- 3 Leuna Chemical Industry Park
Production of mass and specialist chemicals, plastics, plastic additives, glue, resins, fuel, chemical catalysts, lubricants, industrial gases, power generation
- 4 Zeltz Chemical and Industrial Park
Adipic acid production (Radio), adhesive production, manufacture of wax and additives, centre of excellence for industrial white biotechnology and biomass production
- 5 Wittenberg Piesteritz Agrochemical industry park
Nitrogen production
Melamine production (AMI)
Agrochemical Institute (ACI)
- 6 Bitterfeld Wolfen Chemical Industry Park
Chlorine and phosphorus based chemical industry, fire chemicals, specialty chemicals, metal processing, solar technology
CPI Chemical Industry Park Institute for industrial preliminary research, materials research, reactive wet coating, chiral compounds
- 7 Bayer Industrial Park Bitterfeld
Raw materials for varnish, pharmaceutical products for self-medication, ion exchangers
- 8 BASF Schwarzheide GmbH
Production centre for high-grade chemicals and plastics, polyurethane feedstock and systems, pesticides, water-based varnishes, industrial plastics, dispersions and Lanomer brands, BASF technical laboratory: polyurethane plastics centre of excellence (KKS)
- 9 Böhlen-Lippendorf Industrial Park
Dow: cracker, ethylene and propylene as well as feedstocks for plastics, paint, adhesives, cosmetics
AirLiquid: industrial gases, plasterboard production, production of high-grade steel

△ CeChemNet Central European Chemical Network
Association of chemical locations in Central Germany with seven partners:
PD ChemiePark Bitterfeld Wolfen GmbH
Infralocum GmbH
Dow Olefinverbund GmbH (ValuePark® Schkopau, Böhlen)
BASF Schwarzheide GmbH
ZSG Zeltzer Standortgesellschaft mbH
North-east division of the Chemical Industry Association
Isw Gesellschaft für wissenschaftliche Beratung und Dienstleistung mbH

RESEARCH CENTRES

- Saxony-Anhalt**
- 1 IUF – Institute of Varnish and Paint, Magdeburg
 - 2 ZFH – Haldensleben Fibre Composites Centre, Haldensleben
 - 3 AP – Piesteritz Agrochemical Institute, Piesteritz
 - 4 IKTR – Institute of Plastics Technology and Recycling, Weissenhof-Götzau
 - 5 CPI – Chemiepark Institut GmbH, Bitterfeld-Wolfen
 - 6 IWM – Fraunhofer Institute for Mechanics of Materials, Halle (Saale)
 - 7 Martin Luther University of Halle-Wittenberg, Institute of Industrial Chemistry and Macromolecular Chemistry, Halle (Saale)
 - 8 Max Planck Institute of Microstructure Physics, Halle (Saale)
 - 9 PAZ – Fraunhofer Pilot Plant Centre for Polymer Synthesis and Processing, Schkopau
 - 10 Mersburg University of Applied Sciences, INW – Department of Engineering and Sciences, Mersburg
 - 11 IPW – Institute of Polymer Materials, Mersburg
 - 12 Halle-Merseburg Centre of Plastics Excellence, Mersburg
 - 13 Martin Luther University of Halle-Wittenberg, Chair of Plastics Engineering, Mersburg
 - 14 PSM – Polymer Service Mersburg, Mersburg
 - 15 AMK – Academy of Central German Plastics Innovations Foundation
 - 16 IFN – Institute of Commodity Reclamation, Trogitz, Elberaue
- Research facilities:**
mitz – Mersburg Innovation and Technology Centre, Mersburg
Bitterfeld-Wolfen Technology and Start-Up Centre, Bitterfeld-Wolfen
- Thuringia**
- 17 Jena University of Applied Sciences, SCTEC – Department of Precision, Materials and the Environment, Jena
 - 18 Friedrich-Schiller University of Jena, IMT – Institute of Material Sciences and Materials Technology, Jena
 - 19 Friedrich-Schiller University of Jena, Institute of Organic Chemistry and Macromolecular Development, Jena
 - 20 INNOVENT Technology Development, Jena
 - 21 Polysaccharide Research Centre of Excellence, Jena
 - 22 Schmalzkalden University of Applied Sciences, Department of Mechanical Engineering, Schmalzkalden
 - 23 Ilmenau University of Technology, Department of Plastics Engineering, Ilmenau
 - 24 TTK – Thuringian Institute of Textile and Plastics Research, Rudolstadt
- Brandenburg**
- 25 FI biopos – Bioactive Polymer Systems Research Institute, Teltow
 - 26 IAP – Fraunhofer Institute of Applied Polymer Research, Potsdam-Cottbus
 - 27 EZM – Fraunhofer Institute Fraunhofer Institute for Reliability and Microintegration, Teltow
 - 28 Max Planck Institute of Colloids and Interfaces, Potsdam
 - 29 Brandenburg University of Technology in Cottbus, Chair of Polymer Materials, Cottbus
 - 30 Brandenburg University of Technology in Cottbus, Chair of Biorefinery Technology, Cottbus

- Saxony**
- 31 HTWK – Leipzig University of Applied Sciences
 - 32 KZ – Leipzig Plastics Centre, Leipzig
 - 33 IOM – Leibniz Institute of Surface Modification, Leipzig
 - 34 University of Leipzig, Faculty of Chemistry and Mineralogy, Leipzig
 - 35 Dresden University of Technology, Institute of Lightweight Construction and Plastics Engineering, Dresden
 - 36 IMA – Material Research and Application Technology, Dresden
 - 37 Leibniz Institute of Polymer Research, Dresden
 - 38 FLK – Leather and Plastic Sheeting Research Institute, Freiberg
 - 39 Chemnitz University of Technology, Plastics Chair, Chemnitz
 - 40 Chemnitz University of Technology, Chair of Lightweight Construction and Plastics Processing, Chemnitz

INDUSTRIAL INITIATIVE FOR CENTRAL GERMANY



Successful companies for a successful region

The Industrial Initiative for Central Germany brings together key corporations, business chambers and local authorities from Saxony, Saxony-Anhalt and Thuringia with the common aim of promoting the successful development and marketing of the traditional economic region of Central Germany.

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