# CHEManager EUROPE

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THE NEWSPAPER FOR THE CHEMICAL AND LIFE SCIENCE MARKETS


**Chemicals**

*Nano-sized materials in cosmetics could soon become reality*

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**Regions & Locations**

*The world has lots to offer for industrial sites*

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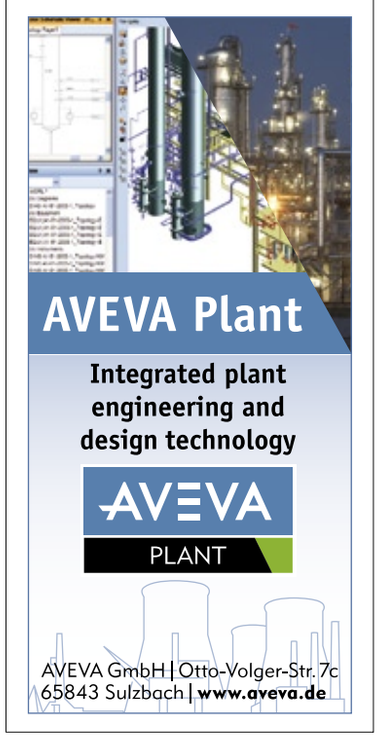
## Newsflow

**EU anti-trust regulators have carried out raids on some firms in the pharmaceutical sector on suspicions of collusion to delay the entry of generic drugs into the market, the European Commission. The Commission, which acts as the competition watchdog of the 27-nation European Union, said the raids took place Nov. 30 in several EU countries, but it did not identify the companies. Drugmaker AstraZeneca confirmed it was a subject of the EU raid, which concerned heartburn drug Nexium, and that it was cooperating with EU authorities. Bayer, GlaxoSmithKline and Sanofi-Aventis said they were not affected.**

**Huntsman Polyurethanes has become the first chemical firm to win a "Lean and Green" award from Sustainable Logistics Innovation Connekt – a Dutch network of business and government departments that encourages Netherlands-based companies to operate in a sustainable way when it comes to transport, supply chain and mobility issues. Huntsman received the award for its commitment to cutting $CO_2$ emissions at its Rozenburg site in Holland. The company has already optimized critical parts of its European supply chain but aims to make further reductions of between 5–10 % by 2012. Launched by the Dutch Ministry of Transport and Public Works, the Lean and Green award scheme recognizes enterprises that strive to achieve $CO_2$ reductions through the careful planning, implementation and management of environmentally conscious distribution and logistics strategies.**



# Intensive Cooperation

## Transparent Communication in the Pharma Supply Chain Vital to Patient Safety

**Wake-up Call – Infant formula laced with melamine, heparin tainted with oversulfated chondroitin sulfate, cough syrup contaminated with diethylene glycol – these scandals didn't just cause outrage among consumers over the recent years. They have also served as a wake-up call for both suppliers and manufacturers in the pharmaceutical industry and have made apparent the need for companies on both sides to work together to exchange information.**

Industry initiatives such as the European Fine Chemicals Group (EFCG) and the International Pharmaceutical Excipient Council (IPEC) as well as a new international pharmaceutical supply chain consortium Rx-360 are dedicated to help to overcome this challenge. Rx-360 was launched in January 2009 with the aim of enhancing the security of the pharmaceutical supply chain and to assure the quality and authenticity of the products moving through the supply chain. Brandi Schuster spoke with Dr. Najib Sehat, Head of Regulatory Service at Merck's KGaA newly created Merck Millipore division and the company's Rx-360 representative, about the work the group has done and the inherent problems that exist when it comes to regulating excipients.

*CHEManager Europe: Dr. Sehat, what is the difference between Rx-360 and other organizations already out there?*

**N. Sehat**: The uniqueness of Rx-360 is that pharmaceutical and biotech industries, as well as their suppliers, are globally working under one roof with the aim to improve the supply chain – from APIs all the way to packaging materials – and to set standards for the improvement of quality. This collaborative effort will enable the industry to avoid the tragic situations that we have unfortunately seen in recent years. The main focus is on the patients' health and safety.

*How has industry interest been in the organization?*

**N. Sehat**: After the successful launch of the organization in at the beginning of 2009, Rx-360 was incorporated as a non-profit consortium to support an industry-wide commitment to help ensure patient safety by enhancing quality and authenticity throughout the supply chain.

The first Rx-360 global open meeting took place at the Merck KGaA headquarters in Darmstadt, Germany, in September, with 125 global attendees, representing some 89 organizations from across pharmaceutical, biotechnology and generic drug manufacturing industries, along with their suppliers, professional trade associations and regulatory agencies, including the U.S. Food and Drug Administration, the European Medicines Agency and the European Directorate for the Quality of Medicines & HealthCare.

Dr. Najib Sehat, Head of Regulatory Service at Merck's KGaA newly created Merck Millipore division

Approximately half of those in attendance were from organizations that are considering joining the 51 organizations that already make up the Rx-360 consortium. Attendees came to the open meeting to hear from regulators and learn about the consortium's tremendous progress in the past year and future plans. There has been a very positive industry response to this consortium.

Our aim is to hold this kind of open meeting once a year; next year's is planned to take place in the U.S. in May.

*How does Rx-360 work together with other organizations, such as the EFCG or IPEC?*

**N. Sehat**: At this stage, eight associations have an observer status within Rx-360, including the EFCG and IPEC. An observer is able to participate in certain Rx-360 activities and receives quarterly updates on all consortium activities. Rx-360 values its collaboration with EFCG and IPEC greatly and has stated from the beginning that the consortium does not want to duplicate existing efforts.

One of the aims of Rx-360 is to endorse or even create standards, if needed. For example, IPEC and its partner organizations have created a set of standards for excipients, such as GMP and GDP that manufacturing authorization holders can use to gauge the suitability of excipient suppliers.

Continues **Page 4**

# 'Culture Of Innovation'

## SABIC Aims to Dominate in Chemicals and Plastics

**Big Plans – Düsseldorf was buzzing at the end of October with hundreds of thousands of people from all over the world who came to Germany for the world's largest trade show for plastics and rubber, the K 2010. The show's organizers reported an excellent mood among the over 3,000 exhibitors, and the show itself exceeded industry expectations. One of the plastic industry heavyweights at the show was Saudi Arabia's SABIC, who used the show to showcase its theme "Culture of Innovation." Brandi Schuster and Michael Reubold caught up with SABIC's executive vice president for Polymers, Khaled Al-Mana, about his company's strategy to become the preferred world leader in chemicals and plastics.**

*CHEManager Europe: Mr. Al-Mana, what is your company's strategy for growth?*

**K. Al-Mana**: Our theme, "Culture of Innovation" is built on four pillars: growth, technology, sustainability and customer focus.

In order to grow, it is important

*"We are committed to maximizing the usefulness of natural resources."*

to be able to meet our customers' requirements – not just today, but also in the future. To this end, we continuously invest in expanding our global production capacity and adding new resources for technology in our key sectors.

*Where have you recently expanded capacity?*

**K. Al-Mana**: We added more than one million tons of polymer capacity at our plants in Sharq and Yansab, Saudi Arabia. We've also expanded high-density polyethylene production in Gelsenkirchen, Germany, and we have opened a new low-density polyethylene facility in Wilton, UK. Of course, considerable capacity will be added when our plants at Saudi Kayan in Al-Jubail come online.

*What are some examples of your technology activities in SABIC's key sectors?*

**K. Al-Mana**: In early 2011, we will be adding state-of-the-art specialty polypropylene compounding to our site in Bay St. Louis in the U.S. in order to satisfy demand from the North American automobile sector. Also, our new Genk, Belgium, site – which is the largest Greenfield PP compounding plant ever built in Europe – will supply PP compounds to Europe and other composites to Europe and Asia. In addition, our Teeside, UK, plant has the largest name plate capacity of its kind in the world – 400 kt/y – and targets growing customer needs in packaging applications with LDPE.

*Sustainability has been THE industry buzzword this year. What initiatives have SABIC taken?*

**K. Al-Mana**: Global sustainability issues are at the core of our business strategy, and we are committed to maximizing the usefulness of natural resources. Customers have told us that they want products that cut manufacturing energy costs; that reduce the weight of their products; and that can be easily recycled or that include recycled materials. To this end, we have introduced our SABIC Sustainability Portfolio, which is designed to help customers lower their carbon and energy footprints, eliminate waste and ensure compliance with global regulations.

Khaled Al-Mana, executive vice president for Polymers, SABIC

*Eastman just announced to sell its PET business. Dow and BASF have both restructured and spun off their polystyrene businesses. Do you think the polymers producers have a need for further consolidation? Where will this consolidation leave the top polymers manufacturers and what part will SABIC play in the next M&A phase?*

**K. Al-Mana**: We are open to any opportunities. As you know, we are living in a very dynamic world where uncertainty is very high. We are always looking for growth in a profitable way, not just growth itself. Any opportunity that comes along that fits with our strategy, regardless of whether it's PET or polystyrene, we will consider it.

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## K+S Prepared to Invest $2 Billion with Partner


German potash miner K+S is prepared to invest as much as US-$2 billion with a partner in new mining projects, as the company seeks to tap resurgent global fertilizer demand. "We are looking into a number of projects, making us confident that we will mobilize additional capacity," Chief Executive Norbert Steiner said in remarks to journalists.

The company is ready to expand its current potash output capacity of 7.5 million tons a year by some 2 million tons, Steiner said. Developing annual capacities of 1 million tons requires investments of roughly $1 billion, he added. Lacking the financial clout to buy a larger rival, Steiner has for more than two years been looking for overseas partners to dig for potash, a key crop nutrient. But a longtime frontrunner, Russian tycoon Andrei Melnichenko and his fertilizer group EuroChem, last month walked away from negotiations. EuroChem said it was looking at various funding options, including an IPO, to develop the Verkhnekamsk potash deposits in the Ural mountain range on its own. K+S CEO Steiner said he was looking for a partner in all regions of the world but declined to provide details. He reiterated that the takeover of a rival potash producer was not an option: "That is beyond our reach."

The planned divestment of K+S's gardeners' supplies unit Compo, announced in June, was on track but a sale was not the only option, the CEO said."If certain expectations aren't met we will not let the process end with a divestment at all costs," Steiner cautioned. In a reversal of the diversification championed by his predecessor and now Chairman Ralf Bethke, Steiner had said he was looking to hive off Compo, with its palette of gardeners' fertilizers and potting soil. ■

## Styrolution: BASF and Ineos to Establish Styrenics Company

BASF and Ineos Industries Holdings have announced their intention to combine their global business activities in styrene monomers (SM), polystyrene (PS), acrylonitrile butadiene styrene (ABS), styrene-butadiene block copolymers (SBC) and other styrene-based copolymers (SAN, AMSAN, ASA, MABS) as well as copolymer blends into a new joint venture called Styrolution. A letter of intent was signed by the two companies on Nov. 29. The establishment of the joint venture is subject to approval by the appropriate antitrust authorities.

BASF has previously announced that it will carve out its styrenics activities by the end of 2010 and transfer them into separate entities. The carve-out will continue as planned and as of Jan. 1, BASF's styrenics activities will operate as a separate company with the name Styrolution. Ineos has also announced that it is to acquire the other 50% shareholding in its 50-50 styrenics joint venture, Ineos Nova, from Nova Chemicals. Upon completion of the proposed joint venture with BASF, Ineos will transfer these activities into the new Styrolution group. ■

## Dow Corning Names President

Dow Corning's board of directors elected Robert D. Hansen, president of Dow Corning Corporation, effective immediately. Stephanie A. Burns remains chairman and CEO.

Hansen has been employed by Dow Corning for 28 years and most recently served as executive vice president and general manager of the company's Core Products Business. Hansen joined Dow Corning's finance function in 1982 in Midland, Mich. Over the years, his leadership roles have taken him all over the world, including executive oversight as manager of the South American Region and President of the European Area. His diverse commercial experience eventually led to his most recent responsibilities as executive vice president for Dow Corning's Core Products Business. ■

## Q3: German Chemical Sector Grows 17 %

Germany-based chemicals businesses posted an increase in sales of 17% in the third quarter, trade group VCI said, adding that growth rates were levelling off as government stimulus measures fade out. VCI, which represents the nation's fourth-largest industrial sector, said it still expects chemical-sector revenues to gain 18% this year, with output volumes rising 11%.

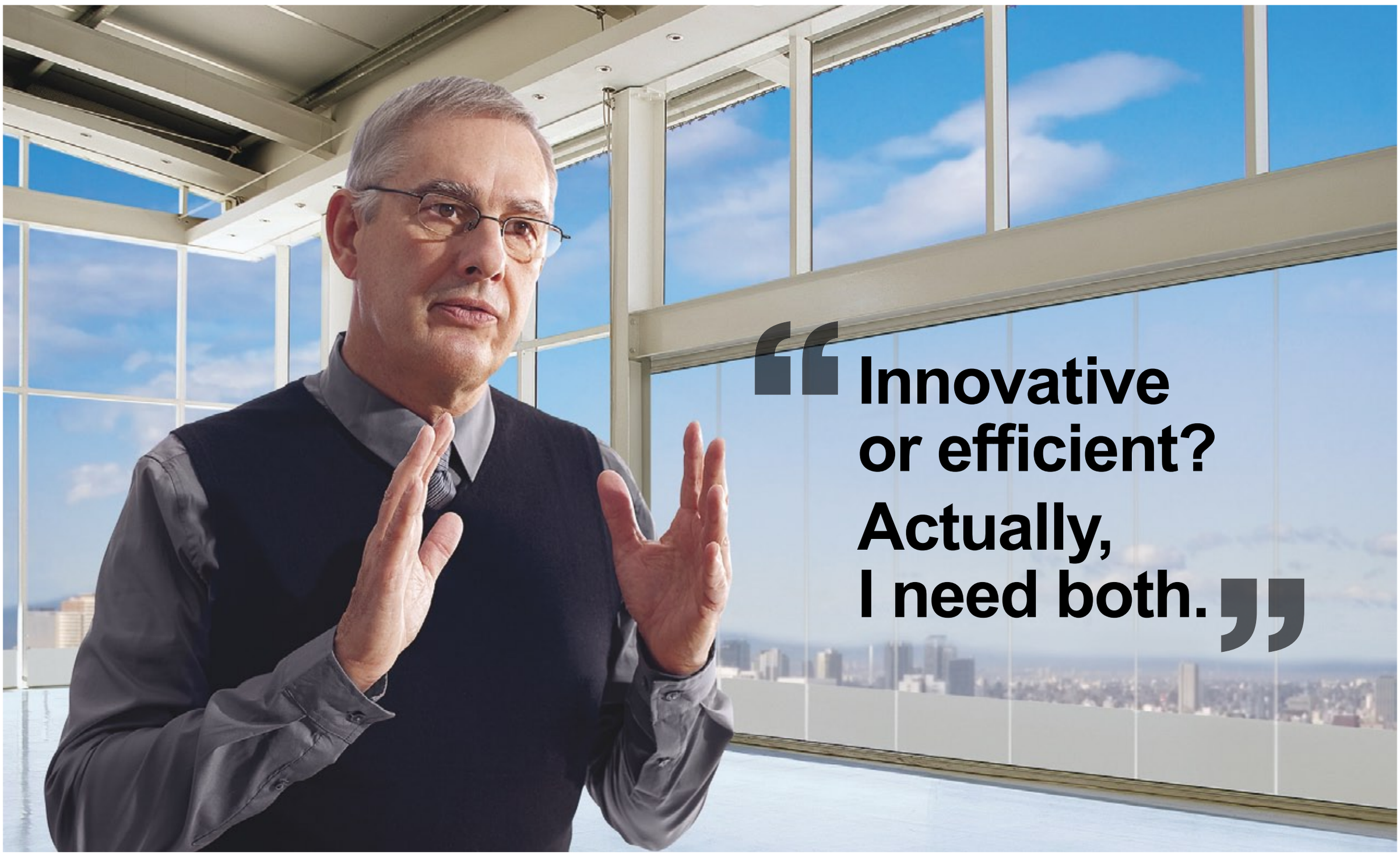
In the three months through September, output volumes were up ten percent year-on-year, driven mainly by exports, which have reached pre-crisis levels, VCI said. Strong results from Bayer, Dow Chemical and BASF last week showed the recovery in industrial demand for chemicals remained in full swing, while demand for construction plastics remained sluggish. ■

## BHP Tosses Out Potash Corp Bid

Top global miner BHP Billiton killed its $39 billion bid for Potash Corp, the world's biggest deal this year, and said on Monday it would return $4.2 billion to investors through a share buyback. Canada blocked BHP's bid for the world's largest fertilizer maker on Nov. 3 and gave BHP a month to prove the takeover would benefit Canada.

BHP gave up the fight in its third straight failure to seal a major acquisition under Chief Executive Marius Kloppers, and bowed to calls from some shareholders for a return of capital, signaling it has limited opportunities for other big takeovers. BHP said it would book $350 million in costs for the Potash Corp deal.

Kloppers has long said the company would prefer to spend its cash pile on development projects and acquisitions rather than giving it back to shareholders. ■

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# Intensive Cooperation

## Transparent Communication in the Pharma Supply Chain Vital to Patient Safety

Continued Page 1

After consultation and agreement of IPEC and its partner organizations, the GMP standard for excipients has been endorsed by Rx-360. In order to solve the complex problems that impact the pharmaceutical supply chain, it is tremendously important to intensify the collaboration between all associations and other involved parties.

*The U.S. FDA doesn't have an active program to assess excipients. What is Rx-360's take on that position?*

**N. Sehat**: That is correct that excipients are not as strongly regulated worldwide as APIs. In recent years, the excipients market and related requirements have changed dramatically. Certainly this will trigger changes in the regulatory environment. One of the value propositions of Rx-360 is that regulatory bodies will benefit from the improved security and quality, which will allow them to focus their limited resources on other areas that create public health risk.

*So there's no frustration on the part of groups such as yours that the FDA is sort of taking a back seat on excipients, letting industry-organized groups take the reins how its products – in the case of excipients – should be regulated?*

**N. Sehat**: Well, the government can't be expected to regulate everything. The new strategy of the FDA is to really emphasize that the real responsibility lies with the manufacturer. Manufacturers are obligated to ensure the quality of their suppliers and they are also obligated to endorse their own quality systems. That's why the FDA proactively asks members of the pharmaceutical manufacturing industry to physically audit the quality systems of their suppliers in the excipient business. Not only that, the FDA clearly states that manufacturers also have quality assurance contracts that share the burden of liability with the supplier side.

*Is there an expectation that FDA should regulate excipients?*

**N. Sehat**: An appropriate GMP for excipients would be the right direction. Generally speaking, creating regulation is not a real challenge, but the major challenge would be the enforcement of this in such a global market. The FDA started broadening the scope of the cGMP. In recent years FDA announced a significant new initiative "cGMPs for the 21st Century" intended to modernize FDA's regulations on pharmaceutical quality. The intent of the original initiative was to offer the industry the necessary tools to provide more post-approval flexibility, making continual improvement less of a regulatory burden, and to promote better self-regulation to improve regulatory compliance status. The implementation of the envisioned new framework and its elements require the use of risk-based and science-based approaches for regulatory decision-making throughout the entire life cycle of the product.

*Is it possible for companies to properly regulate themselves as far as excipients should go? Shouldn't government play at least a small but active role?*

**N. Sehat**: The industry itself began creating standards for excipients several years ago. As I mentioned earlier, IPEC and PQG created important standards that are well accepted by industries and regulators. One additional important step is the planned Excipients Certification Scheme from IPEC, EFCG, PQG and the FECC in order to establish common acceptable standards to improve excipients quality and patients' safety.

On the other hand, regulators in the EU in 2006 began an effort to regulate excipients, and the European Commission was obliged to bring forward proposals for the application of GMP standards to certain excipients, a list of which was to be defined. The application of GMP standards for certain excipients through legislation has subsequently been considered and discussed by DG Enterprise and interested parties. The decision was made based on public consultation and results were provided in the EU Excipients Impact Assessment Report in 2007. The report underlined clearly that in all cases the expected costs of the possible new policies are much greater than the benefits.

Currently, the EU includes excipients in the scope of the amendment of EU Directive 2001/83/EC, which is its proposal for a directive on falsified medicinal products. In this context, it is clearly noted that in order to provide for a high level of protection of public health, the manufacture of excipients should also be subject to appropriate GMP irrespective of where the excipients were manufactured in the EU or imported. For any medicinal product, excipients should be identified by the manufacturing authorization holder on the basis of an approach assessing the risk caused by the excipients in the medicinal product.

*What has Merck done specifically?*

**N. Sehat**: Merck as a pharmaceutical and fine chemical company has been committed to the high quality and safety of its products throughout its history since 1668. Today, as a trusted partner of Rx-360, IPEC, EFCG, etc., we are continuing this commitment to the improvement and enhancement of our state-of-the-art quality management system, always with the benefit of customers and patients in mind. We are committed to be an active member of the above mentioned organisations nd will bring both its expertise and resources to contribute to a global quality system to assure patients' safety and meet pharmaceutical industries' needs and regulatory requirements. Merck foresaw the need and requirement for the excipients in a fast-changing regulatory environment several years ago and launched its Emprove brand pharmaceutical raw materials product portfolio. This brand combines a high quality product with use-related and tailor made documentation.

*What do EU manufacturers think about the current market, which is flooded by low quality products from China and India?*

**N. Sehat**: My assumption is that the manufacturers of excipients in Europe do not have a problem with competition from outside Europe. What they want is a level playing field – that means the same competitive conditions and quality requirements independent of where excipients have been manufactured. The aim must be that the same quality and standards should the basis of obtaining safe medicinal products for the consumer.

*Where exactly does Rx-360 fit into this equation? When one looks over your member list, you've got the big Western players who truly have a vested interest in safe excipients. Aren't you just preaching to the congregation, considering that the real problem seems to be coming from Asia in terms of questionable excipients?*

**N. Sehat**: In Asia, you have to differentiate between suppliers who have high quality and the so-called garage industry, which do business with companies, only to suddenly disappear from the market in the blink of an eye. Generally speaking, we are starting to see quality products coming out of China, but the aim of Rx-360 is to share information among our members.

One of the primary aims of Rx-360 is to share information among members. This will help to ensure that members are sourcing excipients of high quality. One of the goals of Rx-360 in 2011 is also to intensify the activity between all stake holders in Asia and increase the awareness in this important region of the world. Aim is to have the same standard and requirement in place, regardless where the products are manufactured or originated from.

*It's clear that many low-grade excipients that make their way into Europe come from Asia, yet the market there is booming. How can companies take advantage of the Asian market without compromising safety?*

**N. Sehat**: It is possible to source high-quality products from China and elsewhere as long as the original manufacturer complies with the required high standards. It is important to note that the pharmaceutical manufacturers should qualify the supplier according to their company standards.

High quality has always its price! I remember a FDA employee once saying that any ingredient is at risk if there is a willing buyer more interested in obtaining the lowest cost ingredients rather than insisting on quality ingredients and insuring their integrity has been preserved throughout the supply chain. Most pharmaceutical ingredient safety problems have been due to a lack of good supply chain control throughout the entire distribution chain from the manufacturer to the user!

This clearly underlines the situation.

*Does Rx-360 see itself has having the responsibility to inform companies – both members and non-members alike – on these kinds of issues?*

**N. Sehat**: We see ourselves as having the responsibility to both inform and educate. The problems that we have within the excipient supply chain cannot be solved by just the supplier or manufacturer. As I mentioned before, the uniqueness of Rx-360 is that it brings both sides together under one roof with the aim to improve the supply chain. If both sides put forth enough effort to improve quality and to exchange information in a transparent manner, then the situation could be improved dramatically.

*This calls for a high level of trust between your members, who are often also direct competitors.*

**N. Sehat**: When we first began working together in this consortium, some of the members were concerned about this. Rx-360 has made the effort from the very beginning to ensure all activities would be done in accordance with anti-trust laws in the U.S. and anti-competition laws in Europe. Rx-360 has been very careful to build a framework which meets these requirements. In July, Rx-360 submitted information about the consortium activities to the U.S. Federal Trade Commission to seek an advisory opinion on the activities of the consortium. During our open meeting in September, we were thrilled to announce that we received a positive advisory opinion which allows us, to commence the audit sharing program.

It's true a high level of trust is needed among the members, but members realize this is necessary in order to achieve our common mission across industry – to serve patients.

*How much progress has been made on this front?*

**N. Sehat**: If we look back five years ago, this intensive exchange of information and cooperation between suppliers and manufacturers didn't exist. No one knew for sure where the products were coming from. The recent scandals, such as the melamine found in infant formula or tainted heparin – both of which cost many people their lives – made the industry wake up and really served as the catalyst for working together. Manufacturers wanted to know exactly where the products were coming from, and we are on a good path to intensify these relationships.

A supplier's role is no longer just to provide a product. Nowadays, we are moving toward having a much more intensified cooperation and transparent exchange of information based on intended use. As a supplier, if we know exactly what the manufacturer's intended use for a particular excipient is, we are able to provide a much higher level of service. If this doesn't exist, it makes working together very difficult. Intensive cooperation between suppliers and manufacturers is absolutely decisive in this business.

Transparency is not just a one way street!

*And has this really helped to improve the quality of excipients?*

**N. Sehat**: Absolutely.

*What problems still exist within the excipients market?*

**N. Sehat**: The major aspect is the security and integrity of the supply chain. It is essential to have information of the entire supply chain. There is a lack of information here, and this is what needs to be worked on going forward. Rx-360 and other organizations are working very hard on this. Of course, a lot of work still has to be done on the manufacturer and supplier sides as well.

However, I am certain that all of the industry initiatives and activities are going in the right direction and can help improve the quality of medicinal products, in which excipients play also a major role. At the same time, we are seeing new excipients regulatory developments in 2010 within the framework of Directive 2001/83/EC in Europe fighting falsified medicines. For the first time, the appropriate GMP aspects for excipients are highlighted. Based on the new proposal, the manufacturer of medicinal products should ensure that the excipients are suitable for use in their medicinal products by applying the appropriate GMP on the basis of formalized risk assessment in accordance with the applicable guidelines. The final voting is expected in EU parliament in January.

All these and new future challenges can only be overcome if all involved parties work together with the aim to assure patient safety by enhancing product quality and authenticity throughout the supply chain. Patient safety must never be compromised as a competitive advantage.

▶ www.merck.de

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## Campath Clause OK for Genzyme in Sanofi Bid

Genzyme, resisting a hostile bid from Sanofi-Aventis, is open to a deal that links its value to the success of key drug Campath, the U.S. biotech's chief executive was quoted as saying. But it was not up to Genzyme to suggest that to the French drugmaker, which has launched a $18.5 billion takeover offer for Genzyme, Chief Executive Henri Termeer was quoted as saying in French newspaper Le Figaro.

"This is one of the alternatives that could be explored. We are thinking about it with regard to the Campath molecule. This could be used by Sanofi or by other companies we talk to," Termeer told the newspaper in an interview.

"It is a means commonly used in the pharmaceutical industry when companies cannot manage to agree on a price," he said. Termeer declined to give details of any talks with other potential buyers, saying they were "private conversations." Sanofi declined to comment. ■

## Lanxess Takes Over Flexsys Businesses

Lanxess has agreed to acquire two businesses from Flexsys, a division of U.S.-based Solutia Inc. (St. Louis, Mo.) to strengthen the portfolio of its Rubber Chemicals business unit. Lanxess will acquire the primary accelerator business as well as the anti-reversion agent Perkalink 900. Employees will not be transferred to Lanxess. Both parties have decided not to disclose the acquisition prices. The acquisition of the primary accelerator business requires approval from the relevant antitrust authorities. Lanxess will take over selected parts of Flexsys' primary accelerators business and integrate them into its existing production facilities in Kallo, Belgium, and Bushy Park, S.C. Lanxess is already a leading supplier of primary accelerators, with its Vulkacit brand, and has invested €10 million over the last two years to upgrade its Kallo world-scale plant.

Accelerators help determine the speed of the vulcanization process and help to achieve the desired properties of the finished rubber product. Vulcanization is a chemical process for converting rubber into more durable materials via the addition of sulfur. In addition, Lanxess will take over from Flexsys the anti-reversion agent Perkalink 900. It is one of the leading products to avoid the risk of reversion during the vulcanization process and thus improve the service life of tires, as well as other technical rubber products. It also complements Lanxess' existing specialties portfolio, which includes products such as the anti-reversion agent Vulcuren. ■

# Productivity, Cost Discipline, Globality

## Lanxess' Basic Chemicals Has Strong Foundations for Success

**New Beginning – On Jan. 1 Dr. Hubert Fink, head of Lanxess' Semi-Crystalline Products (SCP) business unit, will take on a new position at the helm of the Basic Chemicals (BAC) business unit. He will succeed Dr. Hans-Georg Schmitt, who is retiring. CHEManager Europe spoke to both of them about what has already been achieved and the future of BAC.**

*CHEManager Europe: Dr. Schmitt, you've been in charge of the basic chemicals business for ten years. What's changed during that time?*

**Dr. H.-G. Schmitt**: When I took charge of this operation in 2001 – when it was still under the umbrella of the Bayer Group – there was a need for major restructuring. The future of this segment was at risk. As a manufacturer of commodities, or more "run-of-the-mill" chemicals, we only played a minor role in the specialties portfolio of Bayer Chemicals at that time. In the years that followed, we had to make a number of painful decisions, such as closing and selling facilities or parts of facilities. But even in difficult periods, I always felt that the employees had a real desire for success. The energy generated by that desire resulted in a major increase in productivity. This process repeated itself when Lanxess was first founded. Many people thought the purpose of this company was simply to administer unprofitable, "leftover" areas of business and didn't rate its chances of survival. They were about to get a big surprise.

The Lanxess board of management's decision to grant the business units a high level of autonomy proved very beneficial for BAC and gave it a real boost. Productivity rose by 70 % within five years. That strengthened our competitiveness and enabled us to improve our position as part of the global consolidation process.

*How would you assess BAC's position on the market today?*

**Dr. H.-G. Schmitt**: Basic chemicals business is a key factor in Lanxess' success. BAC now occupies leading market positions in all product lines. Our high degree of competitiveness proved itself during the crisis year of 2009 in particular, when we maintained a very high level of stability. In fact, we even managed to gain additional market shares in many product lines. This stability is also owed to the fact that our products are used in many different areas of industry, which were affected to different degrees by the crisis.

The crisis, however, confirmed that we cannot take success and growth for granted. Success is something you have to keep on fighting for. The BAC team's ability to respond quickly and efficiently to market challenges, cut costs and blaze new trails across the board was, and is, impressive.

*Dr. Fink, if we turn to future challenges, what's next on the agenda for BAC?*

**Dr. H. Fink**: Dr. Schmitt and his management team have done an outstanding job of organizing the production and global marketing of this large number of products. The task now is to keep strengthening the leading market position BAC holds in many product lines. As part of this, we will focus on the continuing strategic and commercial development of the internationalization process, with particular emphasis on the BRIC states – Brazil, Russia, India and China. The two acquisitions made in India and China last year are an important step toward making our asset structure more regional in character.

BAC is a strong platform for growth within the Lanxess group. To achieve sustainable success, such growth must be supported by appropriate production capacities. To that end, I plan to carry out a systematic analysis of all the potential ways of achieving efficient capacity expansion within the existing production facilities. And if there are interesting opportunities in relevant markets, I will also look into options for building new facilities and acquiring production plants.

*Dr. Schmitt, you began taking steps to expand BAC's production operations in Asia. What were the reasons behind this decision?*

**Dr. H.-G. Schmitt**: Our sales markets in Europe are experiencing very low growth, stagnating even. In contrast, the Asian markets are growing very dynamically, particularly in India and China.

In the past decade, the proportion of our sales attributable to business in Asia has more than doubled. This trend remains unbroken. If we are to expand our market position in that region of the world, we have to intensify our regional presence there.

*Dr. Fink, given this, what does the future hold for the production sites in Germany?*

**Dr. H. Fink**: Our sites and facilities in Germany were – and still are – the foundations our success is built on. Like my predecessor, I have no intention of neglecting these sites. But as a commodity manufacturer, we are obliged to implement rigorous cost management. BAC will have to continue to hold its own on the market in the future, primarily against competitors from India and China. Energy costs are among the main challenges facing our sites in Germany. On one hand, these threaten to become a burden on us and to weaken our competitive position due to the climate protection obligations initiated by the EU. I also expect to see a worsening of purchase prices for petrochemical raw materials compared to our Asian competitors. This will come as a result of the continuing capacity imbalance between Europe and Asia.

On the other hand, our competitors in Asia are also facing major challenges. These include a dramatic increase in personnel costs and the growing demands they have to face in terms of environmental protection, plant safety and energy efficiency.

*Are there any parallels between your new role and your previous responsibilities in the SCP business unit?*

**Dr. H. Fink**: Definitely! Over the past six years, SCP had to deal with two key challenges. For one, we had to completely reposition the high-tech thermoplastics Durethan and Pocan on the global markets. That included modernizing the product portfolio, building up production operations close to our customers and strengthening our global marketing structures. For another, we had to get the production facilities for plastics base products to a point where they would be able to compete on the international stage.

The team from SCP mastered both challenges successfully. With SCP, Lanxess now occupies a leading position in the relevant markets.

My experience in the production of plastics base products will be particularly useful to me in my new role – after all, they are commodities, too. In both areas, efficiency, optimal production processes, lean organizational structures and cost awareness are absolutely crucial to ensuring competitiveness.

*What do you consider the greatest challenge for you personally?*

**Dr. H. Fink**: To start with, my most important task and my top priority will be getting to know BAC as quickly as possible. To be able to lead the business unit successfully, it's essential to have an in-depth understanding of the business models.

BAC's international business rests on numerous products from six product lines. These are used in many different markets and by many different customers. We sell over 100 products that are produced in large facilities at the Leverkusen, Dormagen, Krefeld-Uerdingen and Brunsbüttel sites in Germany, and in the United States, India and China. Getting to grips with this production network will be one of my biggest challenges.

*Mr. Schmitt, what message would you like to pass on to the BAC team and to your successor?*

**Dr. H.-G. Schmitt**: BAC is in a good position to hold its own on the market and to make an important contribution to Lanxess' sales and results targets. I have grown very fond of the entire BAC team over the years and I wish them every success. I also wish Mr. Fink every success in gauging developments on the global markets and hope that he will thoroughly enjoy his new role.

Dr. Hans-Georg Schmitt, who has been in charge of Basic Chemicals since 2001, will be retiring at the end of the year.

Dr. Hubert Fink is currently head of Lanxess' Semi-Crytalline Products business unit. He will take over Basic Chemicals on Jan. 1.

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> *"The crisis confirmed that we cannot take success and growth for granted."*

Production plant for basic chemicals in Leverkusen, Germany.


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# Winning Back Trace Elements

## New Innovations Make the Use of Nano-Sized Materials in Cosmetics a Reality

**Downside of Modern Life – The technological development of the past few decades has grown at a considerable pace. Modern society has become saturated with high-tech gadgets, instant microwave-prepared meals, while living healthy has taken a back seat. Lack of sleep, long working hours, stress and irregular meals have become a significant part of today's lifestyle. As a result, it is difficult to maintain an adequate level of trace elements solely through a balanced diet.**

Mariya Novak
NanoUnion

### The Deficiency of Trace Elements – The Evil of The 21st Century

The problem of trace element deficiency has become a global issue, and looking for the cheapest and yet the most effective way to enrich the formulations with trace elements has become a common practice for R&D departments in the leading fast-moving consumer goods (FMCG) companies.

Element deficiency is an issue that equally applies to disadvantaged populations and industrialized countries, which is why the World Health Organization (WHO) has declared micro-elemental deficiency to be a global problem. In the modern world, more than two billion people suffer from micronutrient deficiencies caused largely by a lack of vitamins and minerals. The solution lies in fortifying medicines, food additives and cosmetics as main providers of trace elements into the human organism.

### The Role of Trace Elements in Cosmetics

Since cosmetic and personal care products have become commodities, it is advantageous to use them as a source of trace elements. The deficiency of microelements negatively affects tonus, causes dehydration and reduces the elasticity of cutaneous covering. Sufficient level of microelements favors cell metabolism, generation of collagen and elastin, which affect skin regeneration. Trace elements serve as catalysts of vitamin synthesis and assist in the production of proteins, which are vital for sustaining skin health and, therefore, the whole organism.

### The Market of Raw Materials

As a result of market demand, raw material suppliers are bringing out a wide range of trace elements. The presented raw materials can be distinguished by their origin, state and, in their qualities and price, accordingly.

Organic minerals (usually in the form of citrate, rarely lactate, gluconate or acetate) are found in natural foods, making them most familiar to the human body. In contrast, inorganic compounds, such as oxide, sulfate or phosphate are to a high extent alienated by our bodies. Liquid solutions of minerals outperform the powder analogues by the ease of use in various formulations.

### Nano: Pros And Cons

Additionally, trace elements vary in their production method. Recent technological developments have shown that metals are inclined to obtain obscure qualities, if taken as small particles, namely nanoparticles.

Metal nanoparticles often possess strong catalytic and absorptive qualities. Solutions containing nanoparticles are quickly immersed with the formulation, which means they have a rapid effect on skin.

When experimenting with nanoparticles, researchers and product engineers encountered a negative phenomenon – it is typical for nanoparticles to create agglomerates, which leads to their uneven spread in the formulation. Some would even argue that nanoparticles are toxic. The effect of metal nanoparticles on human beings, animals and the environment requires further scientific research, and the introduction of active and unpredictable nanoparticles of metals into cosmetics and food should be strictly limited. Nanoparticles can be used in production processes, but they should be entirely eliminated from end-customer goods.

The problem that scientists are pondering is how to preserve the special qualities of nano-sized materials, while creating stabilized non-toxic compounds.

### Nanocarboxylates – Breakthrough Innovations in Bionanotechnology

The solution was developed by a group of Ukrainian scientists who in June 2009 patented a state-of-the-art technology for obtaining metal nanoparticles. The innovation was named erosion-explosive nanotechnology.

During the first stage of production, pure metal granules (e.g. silver 99.99 %) are placed into de-ionized water. Electrodes facilitate the electric explosions in the reactor, which results in a drastic change of the metal state, and a vast amount of energy is generated. The energy produced heats the metal and, consequently, causes an explosive dispersion.

Adjusting the frequency of explosions enables the production of nanoparticles of 10 to 50 nanometers in size. The obtained particles are called nanoaquachelates (nanoparticles in aqueous solution). Throughout the second stage of production, a carboxylic acid (e.g. citric acid) is added. The reaction between positively charged ions and citric acid ensures the formation of ultra-pure ecologically clean non-toxic solutions of metal salts. The obtained aqueous solutions of metal nanoparticles were termed "nanocarboxylates."

Due to this cutting-edge technology, nanocarboxylates possess high bioavailability rate and are recommended for use in cosmetic and food formulations. The most suitable solution for cosmetic and personal care goods is offered by nanocarboxylates of citric acid – citrate complexes. Citric acid occurs in the metabolism of virtually all living organisms.

### Creating a Balanced Combination of Trace Elements

While the recommended doses of some of the existing trace elements

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are minuscule, their application is essential for reinforcing the bioavailability of other important minerals — for instance, copper, which is mostly used to balance high intake of zinc. Apart from pure single metal compounds, the Ukraine-based research and production company NanoUnion produces customized citrate complexes. For example, SumerSil, which is a mixture of silver and copper citrates, where silver is used as a strong antibacterial agent, while copper accentuates the antibacterial qualities of silver.

The modern consumer is well-informed about market trends, and most shoppers tend to purchase organic yet effective and reasonably priced products. To stay competitive, the manufacturers are searching for highly effective active ingredients with high assimilability rates and affordable prices.

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# The Labeling of Nano-Products

## Where Cosmetics Lead, Others May Soon Follow

**Not-So-Small Problem – The labeling of products to indicate their nanoscale chemical content may or may not be very welcome in the chemicals industry. Already coping with Reach, the last thing the industry would want, it might be said, are the complications and cost of labeling nanotechnology innovations. Then there is always the concern about sending the consumer the wrong message. Still, it may be worthwhile to weigh up the pros and cons before jumping to conclusions on a subject that will surely have to be faced sooner or later, as the cosmetics industry has recently discovered.**

Professor Geoffrey Hunt
Director of the Centre for Bioethics and Emerging Technologies, St. Mary's University College

### Consumer Nano-products

There are over 1,000 consumer products on the market containing nanomaterials, and very few of these carry specifically "nano" labels, except for promotional purposes. These products range from car wax, plastic products and self-cleaning surfaces to cosmetics, food and drinks, socks and go-faster skis.

It will be said perhaps that consumers are only interested in the effects of an application, not on how the effects are obtained. This was no doubt once largely true, but as an argument it is less and less convincing as the years go by. European buyers in particular are somewhat skeptical of novel technologies, especially if it concerns anything that enters or might enter the human body directly, as in food and cosmetics. In the U.S., Japan and elsewhere the consumer tends to be more pro-technology and arguably less questioning.

It is surely time seriously to consider at least voluntary labeling, and not only from a consumer perspective. Intermediate products, from the raw materials manufacturer down the supply chain, are increasingly using nanomaterials. What is needed is some balanced guidance that is sensitive to the different kinds of need (or no need) for labeling down the supply chain.

### Standardization

For four years, I have chaired a standardization project group on drawing up voluntary (not mandatory) guidance on the labeling of manufactured nanoparticles and products containing them. This was first at the national level of the British Standards Institution (BSI) and now continues at the level of a joint initiative at European and International levels: the European Committee for Standardization (CEN) and International Organization for Standardization (ISO).

The BSI's "Guidance on the labeling of manufactured nanoparticles and products containing manufactured nanoparticles" (PAS130), came into effect on Dec. 31, 2007, and was valid for two years. In that guidance the term "nanoparticles" was used broadly to include nanotubes and nanofibers, whereas that term has recently been more narrowly defined as an object with all three dimensions in the nanoscale and the broader term "nano-object" is being introduced more broadly to signify one, two or three dimensions in the nanoscale. This would include tubes and platelets.

The CEN/ISO voluntary guidance on manufactured nano-objects (MNOs) or products containing manufactured nano-objects PCMNOs is now in a complete draft and is under international ballot among the official delegates of national standardization bodies. It went through a long and rigorous negotiation process involving industry, consumer bodies and other stakeholders.

### Voluntary Guidance

To avoid misunderstanding, I must emphasize at once that the CEN/ISO guidance is not proposed as a new regulation but as voluntary guidance and would not substitute for any current regulations (the same was true of the BSI guidance.) The point of such guidance is to be helpful to all parties, whether they are neutral about labeling or reactively inclined to be for or against it.

The underlying conviction is that it is best to be open and consensus-building at an early stage on a matter that may otherwise generate divisive controversy that benefits no one and hinders the market. Hopefully, lessons have been learned from the past.

### What Is Nano?

With one exception, there are currently no requirements for labeling specifically aimed at the use of MNOs or PCMNOs. Neither is there any regulation specific to the nanoscale properties of nano-objects. There is at a more general level, of course, the requirements imposed by the Global Harmonized System (GHS) for classification and labeling of chemicals, that provides users with information on potential hazards, and this would implicitly include nanomaterials. There are sectoral labeling and safety requirements that may be relevant to nanotechnology

The exception is the EU Cosmetics Regulation of 2009, which does contain an explicit labeling requirement for nanomaterials. I might speculate that the next sector to meet with regulatory labeling in relation to nanotechnology would be food and drink and their packaging. But we shall have to wait and see. I suggest that companies that familiarize themselves with any voluntary guidance from a standardization body would be ahead of the game.

But what is it that we are labeling? It would be a certain class of nano-objects i.e. a material with one, two or three external dimensions in the nanoscale. The nanoscale is the size range from approximately 1 nm to 100 nm, and a PCMNO is product in which MNOs are deliberately added, mixed, attached, embedded or suspended. The guidance therefore does not address nanomaterials that are larger than 100 nm, nor is it concerned with natural (e.g. volcanic) or incidental (e.g. diesel combustion) nanoscale entities.

### What's In A Label?

Except to make some generalizations, I cannot go into the details of a document that is currently under ballot, and which may be accepted, amended or rejected. The guidance draft now being considered refers to MNOs and PCMNOs under certain specified conditions.

Clearly, a label which simply stated "this contains nanoparticles" would be meaningless. Among other things the draft guidance is clear on the acceptable use of the term nano in a label. It also keeps in mind what kind of information in a label is useful depending on the particular circumstances and purposes and who the reader of the label is. Minimally, consideration might be given by a relevant party to indicating in a simple fashion that a particular chemical substance in the product is in fact nanoscale in some dimension. Other information such as CA number, size range, surface area, aspect ratio and amount may or may not be relevant, depending again on the circumstances.

Parts of the document function as helpful reminders on what kind of thing specific to nanomaterials the manufacturer and anyone in the supply chain might wish to consider for the purposes of labeling. It adopts a life cycle approach.

Nothing is mandatory, and the changes proposed are simple to implement and have the benefit of enhancing communication and lessening misunderstanding.

### An Ethical Issue

There is probably now sufficient, if far from decisive, information from toxicologists concerning some nanomaterials to suggest that labeling would be a sound precautionary measure at this stage. Besides the issue of risk, which the CEN/ISO draft guidance neither deals with nor dwells upon, there is the simpler issue of public perception and the right to know.

Labeling is already perceived as not just an informational issue, but as an ethical one. It would only take one adverse incident, possibly misconstrued or magnified by the media, to result in the public demand: "Why weren't we told nanoparticles were being put into X, Y and Z?" This would damage the entire industry that is using nanotechnology techniques. The acceptance by a company of voluntary labeling for nanomaterials, under the appropriate circumstances, would undoubtedly help the corporate responsibility profile of that company.

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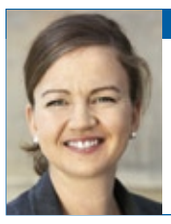
# Consumer Awareness of Health Ingredients

## Walking the Fine Line of Innovation Between Foods and Drugs

**Customer Is King – Innovations in food ingredients offer a plethora of opportunities to be tackled by different industry players. But these days, the European Food Safety Authority (EFSA) is to publish the third batch of its health claim assessments. Even though this development is fostering innovation as it initially sets a legal frame to it, communication of functional ingredients will be a challenging task in the future. Therefore, regulatory frameworks as well as consumer awareness at the B2B level are an ever more important task to consider before R&D funds are spent.**



Prof. Dr.
Stefanie Bröring
University of Applied Sciences Osnabrück

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The market for food ingredients has changed rapidly in recent years. However, not only regulation – especially the health claims regulation (EC 1924/2006) – but also industry structure is evolving only gradually. At the same time, health and well-being is the most influential food trend opening up a well-spring of innovation opportunities for the food, the specialty chemicals and the pharmaceutical industries. One can detect multiple trends of convergence and a gradual overlap of especially the food and the pharmaceutical industry leading to a new inter-industry segment at the border between foods and drugs.

That this new inter-industry segment (fig. 1) is no longer "just" an academic playing field to analyze competitive behavior, and innovation strategies of functional foods has become even more evident by facts to be observed in the industry itself nowadays. Nestlé´s recent announcements in September on the creation of "Nestlé Health Science S.A." and the "Nestlé Institute of Health Sciences" to confidently "… pioneer a new industry between food and pharma … " show that these opportunities will trigger more R&D and innovations in the future.

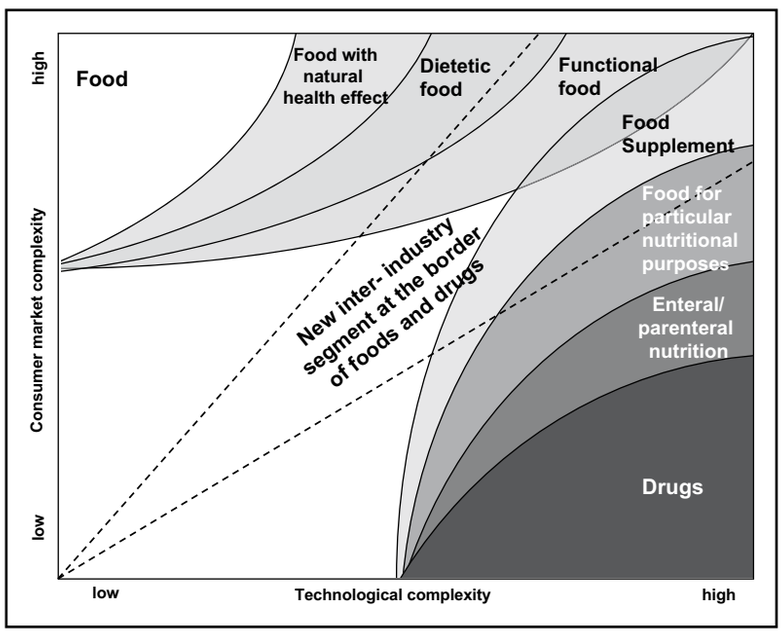


Fig. 1: The converging trend between foods and drugs

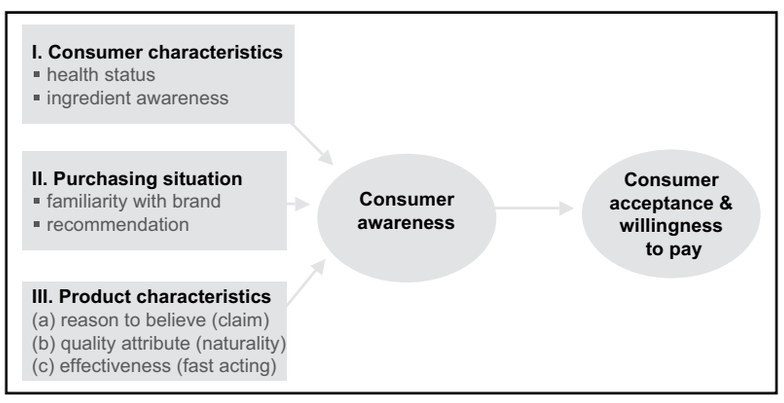


Fig. 2: Influencing factors of consumer acceptance

### Challenges for Innovations Between Food and Pharma

Nestlé has set a very ambitious goal, as the area between food and pharma doesn't just need competences from both industries. Moreover, product approval and communication of health benefits often seems to consume multiple resources. This is because the health benefits of these hybrid products between food and drugs need to be backed up by sound science. Accordingly, tendencies of industry convergence can be observed on the technological level in the application of the same technologies. Likewise, they increasingly manifest themselves on the regulatory level in similar regulatory requirements, such as clinical trials as required by EFSA as part of the assessment of health claims.

From the initially over 44,000 submitted dossiers to EFSA in order to obtain a health claim, and the consolidated package of 4,637 generic health claims submitted, only 5 % will be approved as assumed by industry experts.

What does that mean for innovation of food ingredients with health properties? In those cases where a health claim under EC 1924/2006 is approved – be it a generic one based on existing science (Art. 13), or a new one involving new science (Art. 13.5), or a more detailed risk reduction claim or a claim pertaining to children (Art. 14) – the legal way to communicate health benefits has then been established. If that is not the case, there might be an option to use a nutritional claim based on the policies given in the annex of the health claims regulation. However, in those cases where a food supplier only uses the word "contains …", it then depends solely on the consumers individual degree of involvement, their ingredient related-knowledge and awareness, to perceive a benefit from the product or not.

### The Importance of Consumer Acceptance and Awareness

So far, only a few innovations have turned out to be successful. Why is that? One key success factor for new products is consumer acceptance. New products on the market can only be successful if the consumer understands the product's positioning and the health claim. Therefore, consumer acceptance plays a pivotal role and needs to be assessed carefully before new product launch.

But how can one exactly predetermine consumer acceptance of a new product that carries a certain health claim? The construct of consumer acceptance is influenced by a number of endogenous and exogenous factors. Endogenous factors concern the relevant consumer characteristics that have an impact on the acceptance and later on, willingness to pay for a functional health benefit. These consumer-specific factors are accompanied by external influences such as the purchasing situation and external recommendation of the product.

The influence factor "consumer characteristics" concerns the health status of the consumer, the individual knowledge about ingredients leading to specific ingredient awareness (fig. 2). With respect to the "purchasing situation" as a second factor influencing the consumer acceptance, the consumers' familiarity with a certain company or brand plays an important role. This is followed by the impact of key opinion formers, such as health professionals, which may influence consumer acceptance by recommendation of certain products respective to their functional health benefits.

Another factor that needs to be taken into account are the "product characteristics" themselves. This third dimension presents a multifaceted phenomenon as product characteristics such as taste and other sensory functions can only be experienced ex post by the consumer. Therefore, the focus is on the initial purchasing situation and only takes into consideration search items such as the impact of the specific health claim and other attributes like quality claims and claims on the effectiveness of an ingredient.

### Study Determines Consumer Awareness and Acceptance

Given the necessity of consumer acceptance for the adoption of new functional health ingredients by the market, the aim of this study is to explore the impact of the three main dimensions as detailed in Fig. 2. These include the purchasing decision of consumer characteristics – like their health status and personal ingredient awareness – and the influence of the purchasing situation as well as the product characteristics. In this study, the focus is on a new active ingredient for joint health based on natural eggshell membrane, which Stratum Nutrition began marketing this year.

### Awareness Determined by Consumer's Personal Involvement and Health Status

First of all, it is very important to know how consumers categorize their joint health, because personal attitudes influence the acceptance of certain products and their ingredients. Within this study, most of the interviewed German adults aged 40 years or older are at least concerned about their joint health. Considering the age distribution, it has to be mentioned that the older the consumer gets, the more joint health becomes a problem. The interviewees show a rather limited awareness of joint health ingredients. However, the study reveals that the more joint health becomes a problem, the higher the consumer awareness of health ingredients is, while users of non-prescribed drugs know best about health ingredients. This may be due to the highest degree of involvement and attention among actively searching consumers who are probing a supplement. Interestingly, as soon as the consumer is under medical treatment, the awareness declines, possibly due to the patient having the doctor look after everything, leading to less own information searching.

### A Detailed Assessment Allows for Better Product Positioning

Product characteristics vary tremendously between different product categories. In this study, the focus is put on one special product for maintaining joint health. An important finding is that nothing seems more important to German consumers than a product recommendation given by health professionals. It is also important for German consumers that all contained natural health ingredients are declared on the package. Most interestingly is the relevance of the effectiveness of a functional ingredient that was tested with the statements "fast action on pain reduction" and "fast action on flexibility increase." These two "fast action" claims have been rated as higher-than-average important by the sample.

Hence, for a positioning of the product (for example for the PARNUT category = foods for particular nutritional purposes) a consumer assessment may help to verify the target group and potential communication strategies.

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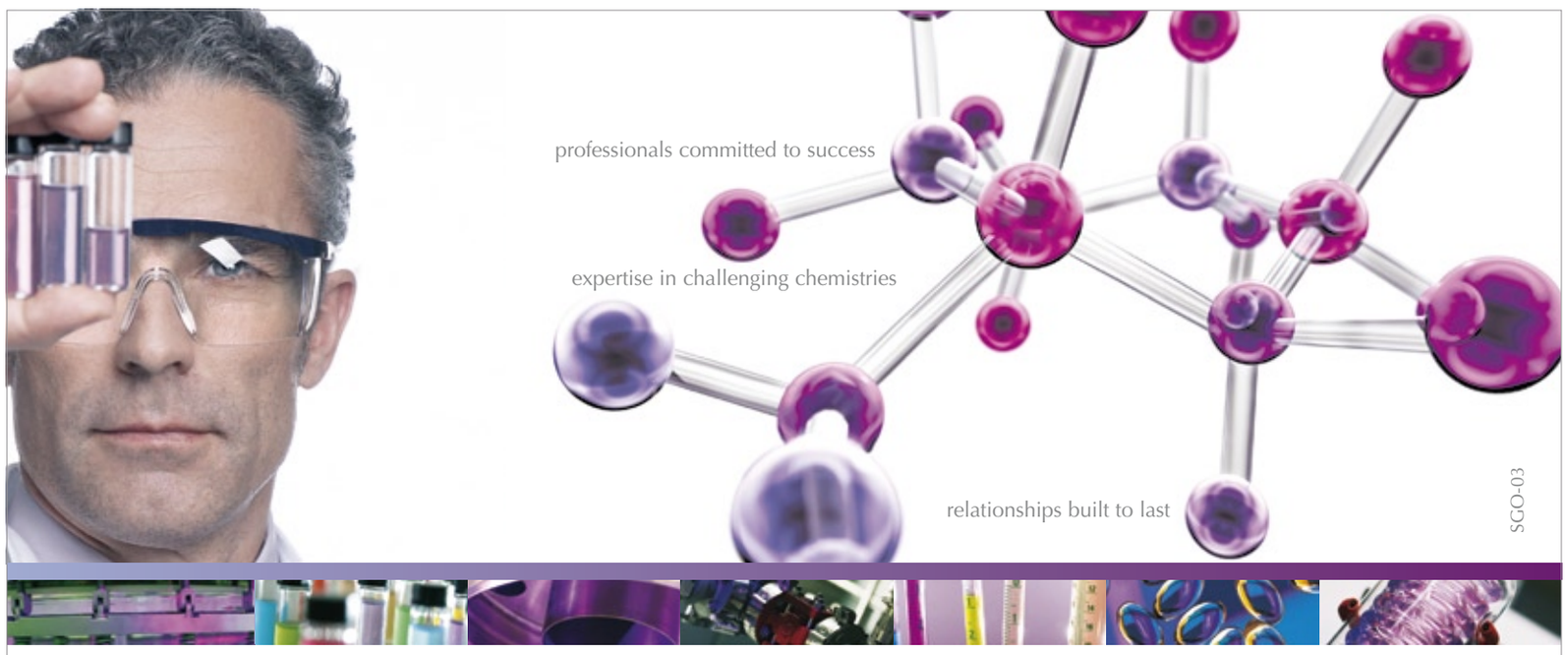


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# Hand In Hand

## Synergizing Pathways Between Food and Chemistry

**Good Together – Life is a series of chemical reactions encapsulated in a self-replicating system. Viewed from this perspective, life science disciplines including foods is basically chemistry. Understanding the chemistry of molecules and reactions is imperative for food and food ingredient manufacture.**

Today, most universities worldwide have groups researching the various aspects of food. Needless to say, the synergy between the chemical and food research groups is the key to successful innovation in these institutions. Industrial research has also taken a proactive stance in combinatorial product development, combining fundamental chemistry with exclusive biotech and food related subjects like fermentation and sensory analysis for new product development.

Advances in the field of nanotechnology, for example, have allowed nanofoods to be developed. Nano size particles of nutrient increase their absorption. Silver and magnesium nanoparticles are used for coating food packaging materials, to prevent microbial spoilage. Flavors are being nanoencapsulated. An innovative application of an emerging technology has happened in the foods arena to solve hitherto common problems.

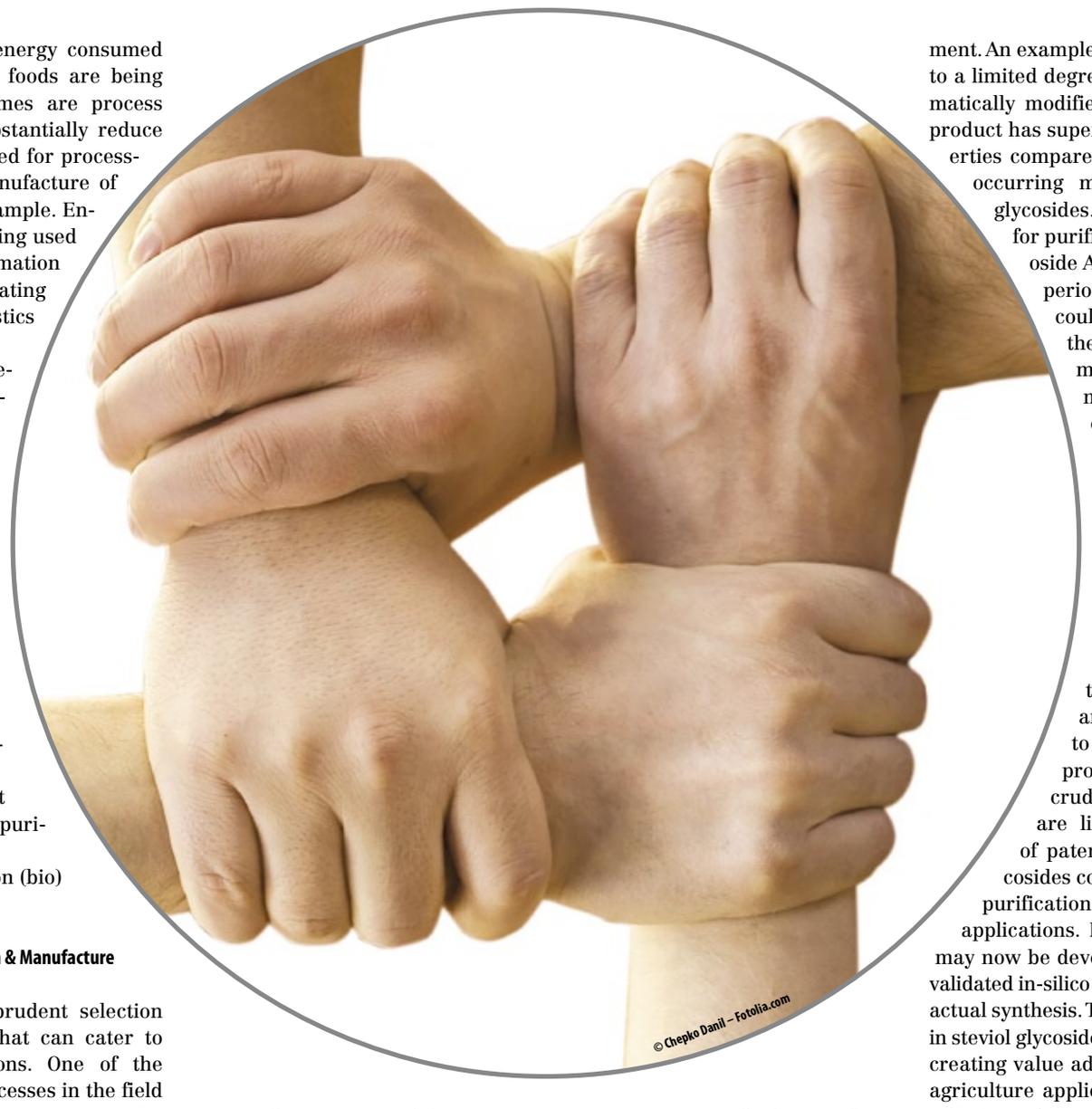
The synergy between the chemical and food industries is not restricted to "nano" alone. There are a lot of areas where chemical technology is an important area of food product development and manufacture. During the early 20th century, George Washington Carver's path breaking work to find value added uses for peanuts, lead to a change in thinking about agricultural commodities and their uses for modern industry. Today, the same thought process is being applied to nearly all crops. Soy, a traditional Asian legume, has become an important cash crop merely because its applications range from making biofuels, bioplastics and adhesives right up to its direct use as a protein supplement in human and animal diets.

### Unlimited Synergy Potential

Manufacturing industries in nearly all segments face two major challenges – renewable and sustainable feed stocks and reducing the embodied energy of finished products. The food industry is no exception. New technologies which address the issue of sustainability as well as reducing the energy consumed in manufacturing foods are being introduced. Enzymes are process aids that can substantially reduce the energy required for processing sugars or manufacture of fruit juices for example. Enzymes are also being used in biotransformation processes for creating biofuels, APIs, plastics and aromatics.

The synergy between the chemical and food industries has unlimited potential. The key areas where chemical industries have already found a synergy in working with or within the food industry are

- ingredient design and manufacture;
- natural product extraction and purification; and
- food formulation (bio) chemistry.



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### Ingredient Design & Manufacture

This involves a prudent selection of biochemicals that can cater to diverse applications. One of the breakthrough successes in the field of ingredient design is in the way the food industry has responded to the mounting need for nutritious and healthy food. Today, retail shelves proudly present a wide variety of healthy food choices. This includes low calories to zero calories, low fat to no fat, low salt, variants to choose from. One common challenge in all these foods is palatability. Fat, for example, when removed can make the food unacceptable in more than one way.

"Lipid Chemistry" came as a solution to this problem with fat replacers. These are individual or a combination of lipids, proteins or carbohydrates which – when applied – offers the functional and sensory attributes to the end-product. Olestra, a sucrose polyester is approved as a 100% replacement of fat in savory snacks. Though products containing olestra are required to comply with labeling information that presents the side effects of this ingredient, its successful principle of biochemical synergy is indisputable. Olestra was first developed by Procter & Gamble (P&G). This innovation complemented their leading position in the health and wellbeing foods sector. Companies like DSM, BASF, Cargill and Dow are examples for leading chemical suppliers who have in many ways extended the principle product chemistry in designing solutions for food applications.

### Natural Product Extraction & Purification

Phytochemicals are fast catching on the "natural foods" mega trend in the food industry. Since early 1990s, the industry is witnessing an ever increasing trend of replacing "synthetic" with "natural." Thus enzymes (replacement for emulsifiers), natural vitamins, natural pigments (replacement for synthetic colors), botanical extracts (replacement for synthetic antioxidant/antimicrobials) have gained steadfast pace of growth. Interestingly, many chemical houses compete with food ingredient suppliers in this space. For example, lipases range of enzymes produced by DSM targets DATEM emulsifiers widely used in bakery application. The comparison of growth rates of enzymes in the bakery industry against the total synthetic emulsifiers market is presented in Fig. 1.

Many such examples such as the growth of rosemary extracts in the food antioxidant market can be stated to endorse the increasing importance of natural product lines in the food ingredients/additives business.

Though, high cost is the main discouraging factor that slows down the rate of adoption of most of the natural ingredients, efficient sourcing & production are indicating brighter growth prospects.

### Food Formulation: (Bio)Chemistry & Analytical Techniques

While portraying food industry trends that have induced several changes in ingredient design and product chemistries with the use of more bioactive components, no one can deny the complex challenges that it brings along in the final formulation. Formulation is a tricky science of co-existence of ingredients without affecting, at the same time complementing each other. Analysis of functional, physical, physiological and biochemical parameters of every ingredient to offer a tasty, safe and healthy outcome is easier said than done. The expert technical support offered by ingredient houses is the key behind many successful products in the market. Microencapsulation technology has been well adapted by ingredient companies in keeping the bioactive components intact for both sensory and functional purposes. This not only requires expertise of a food technologist but also that of a chemist to apply apt analytical techniques for the biochemical assessment at a crucial stage of production. Leading suppliers of food ingredients are sensitive to these requirements and have been catering quite satisfactorily to the food industry.

Combinatorial chemistry is leading to a lot of new product development. An example of this, successful to a limited degree, has been enzymatically modified stevioside. This product has superior sensory properties compared to the naturally occurring mixture of steviol glycosides. Until the process for purification of rebaudioside A, a sensorially superior steviol glycoside, could be fine tuned, the enzymatically modified product remained the product of choice for many manufacturers.

A lot of the research work done on developing the steviol glycosides were carried out by Japanese chemical companies, which had the technology and infrastructure to make a purified product from the crude extract. There are literally thousands of patents on steviol glycosides covering extraction, purification, modification and applications. Molecular entities may now be developed, tested and validated in-silico before going in for actual synthesis. The recent interest in steviol glycosides revolves around creating value added molecules for agriculture applications. Analytical techniques for steviol glycosides run the entire gamut of qualitative and quantitative methods. Developing robust and replicable techniques is important for quality control in this emerging ingredient and the contribution of companies like Merck or Chromadex cannot be underestimated.

### Synergy Potential: Green Chemistry

"Green chemistry" was coined in the early 1990s and is defined as "the invention, design and application of chemical products and processes to reduce or eliminate the use and generation of hazardous substances." The food industry does not sound like a major polluting industry and therefore not a key area of focus for green chemistry initiatives. With its significant contribution to global GDP, the food industry is quite a large area where green chemistry can make a change for the better of the environment.

Enzymes are replacing synthetic emulsifiers in many applications, including bakery products. Enzymes are fermentation derived, with renewable feedstock and low energy consumption for manufacture. Replacement of the synthetic emulsifiers by enzymes represents a key green chemistry initiative, based on our understanding of the chemical makeup of dough and bread. One company has also gone ahead and claimed carbon footprint reduction for its enzyme used in Chinese bread manufacture.

Enzymes are the crossover point between traditional chemistry and modern biology. They are key components of both green chemistry and white biotechnology.

### White Biotech

White biotechnology is the third wave of biotechnology innovation after green and red covering agriculture and healthcare. White biotechnology has gained prominence of late due to the need for shifting the hydrocarbon-based economy to a more renewable and sustainable platform. Covering areas such as biotransformation, this wave of technology represents an opportunity for synthetic food ingredient manufacturers to shift to more environmentally benign technologies.

Many companies have been working on developing biotechnology based synthetic routes for terpene-based flavor molecules. Each company's strategy differs in degrees, but the aim of creating chemical aroma entities with renewable resources has been achieved. Environmental benefits, control over the supply chain and maintenance of quality gain prominence over cost in this case.

When talking of adapting chemical processes for food product manufacture, there are quite a few examples. An apt illustration is provided by supercritical carbon dioxide, which is used in the dry cleaning industry to replace perchloroethylene. Supercritical fluids, including carbon dioxide, are now being applied to extraction in high efficiency of phytochemicals. It provides advantages of higher purity, lower cost, lower toxicity and less environmental effects of using traditional organic solvents.

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## Most Hazardous Chemicals Registered

By the Reach deadline of Nov. 30, 24,675 registration dossiers had been successfully submitted for 4,300 substances including nearly 3,400 phase-in substances. The final number of registrations and substances, including a breakdown of "phase-in" and "non phase-in" will be available when all submitted dossiers have been processed in the coming weeks. The European Chemical Agency's (ECHA) website will regularly update the numbers of phase-in registrations and registered phase-in substances.

Approximately 86% of registrations were made by large companies and 14% by small or medium-sized companies. Only Representatives (companies representing non-EU manufacturers) made 19% of registrations, which demonstrates the ability of non-European companies to participate successfully in Substance Identity Exchange Fora (SIEF). Most of the registrations came from companies based in Germany, the UK, the Netherlands, France and Belgium.

ECHA will in the subsequent months examine any differences between the final number of registered phase-in substances against its earlier forecast, which was based on detailed input received from industry. In any case, the number of registrations is in line with the original Commission estimate, which was the basis of the revenue estimate for the agency, so that financing of the activities of the agency in the coming years is safeguarded. ■

## Bayer Plans to Reduce 2,000 Jobs Worldwide by the End of 2012

Bayer plans to invest its resources even more systematically in growing the company and enhancing its innovative capability. The focus will be on researching, developing and marketing new products, particularly in HealthCare and CropScience, and on expanding activities in the emerging markets. This will require a high level of investment in the coming years. However, sales and earnings are under pressure from generic products, rising development costs and the effects of health care reforms. "To finance the expansion of our growth activities, we therefore need to redirect resources, improve efficiencies and cut costs," explained Bayer Management Board Chairman Dr. Marijn Dekkers.

To raise investment in further growth, annual cost savings of € 800 million are planned starting in 2013. About half of this amount is to be reinvested. By the end of 2012 the company is likely to take one-time charges in the region of € 1 billion, with part of this amount already being incurred in the fourth quarter of 2010.

In connection with this program, it is planned to reduce the global headcount of 108,700 by an aggregate of about 2,000 by 2012. Approximately 4,500 positions – including roughly 1,700 in Germany – are to be cut, while some 2,500 new jobs will be created over the same period, particularly in the emerging markets. ■

## Sigma-Aldrich CEO Jai Nagarkatti Dies

Sigma-Aldrich Chairman, President and CEO Dr. Jai P. Nagarkatti died of an apparent heart attack on Nov. 13 in St. Louis, Mo., at the age of 63. Nagarkatti spent his entire career with Sigma-Aldrich beginning in 1976, with his positions spanning R&D, manufacturing, operations, sales and marketing. Nagarkatti was elected president and chief operating officer in 2004, elected to the additional roles of CEO in 2006 and chairman of the board in 2009. He had been a member of the board of directors since 2005.

Speaking on behalf of the board and staff of the company, Barrett Toan, Sigma-Aldrich's presiding director said, "The entire Sigma-Aldrich global organization mourns the loss of Jai and our thoughts and prayers are with his wife, Susan, and his daughter Shanti. Our deepest sympathies go out to them. He was respected by the company's 7,700 employees and will be missed."

Sigma-Aldrich's Board of Directors has had in place a careful succession plan for key officers, including the CEO. Drawing upon over a year of work on a succession plan for senior leadership, the board has elected Rakesh Sachdev as President and CEO. Sachdev most recently served as chief financial officer, chief administrative officer, and senior vice president of the International business. Sachdev was also been elected to the Sigma-Aldrich board of directors on Nov. 14.

The board also has elected Barrett Toan as chairman as of Nov. 14. ■

# Cutting Costs and Driving Efficiencies

## Why Energy Management Makes Sense in the Chemicals Sector

**Critical Consumption – Energy is widely acknowledged to be one of the largest operating expenses for chemical plants. In fact, total costs are often underestimated. Reported figures usually only include the cost of energy and power purchased or consumed. They typically do not account for the management of energy and the equipment that must be operated and maintained to distribute, use, recover and remove it. If you factor in hydrocarbon feedstocks, costs can sometimes approach 50 % of overall operational expenditure. They are also likely to increase further in line with expected energy price rises.**

Organizations across the chemicals industry agree that the need to cut environmental emissions is urgent. The International Energy Agency (IEA) predicts that by 2030, demand for energy will increase by 50 % compared to today. The increased demand will drive up carbon dioxide emissions and heighten the climate change problem, making the efficient use of energy key to resource conservation.

According to "Breaking the Climate Deadlock, Technology for a Low Carbon Future," a 2009 report produced by The Climate Group and The Office of Tony Blair, to put ourselves on a path to meet our emissions goals, we need to reduce global emissions by 19 gigatons (Gt) in 2020 and energy-related emissions by 48 Gt by 2050. In meeting these targets the potential offered by enhanced energy efficiency across industry alone is significant. The paper indicates that approximately 19 % of total savings in energy related emissions to 2050 could come from industry.

With the scale of the problem and industry's contribution defined, it makes sound business sense for industries to optimise their energy consumption.

### Adopting The Right Approach

Today's chemicals companies appreciate that there is much that they can do today to sustainably and cost-effectively reduce carbon emissions through the traditional practice of efficient energy management in their plants and assets.

If they adopt the right approach, chemical companies can reduce operational expenses, drive bottom-line improvements and increase business performance. This is particularly pertinent in the current economic climate, which continues to be challenging. With profitability levels still low, there is a shortage of money available for capital projects. Businesses will want to push assets to energy efficiency limits in order to reduce operating costs before considering investment – so they will need to focus on ensuring optimal energy performance.

Of course, the way in which organizations interpret energy management varies. Typically, the key challenge will be to identify the combination of improvements that best meets the demands of the existing production processes and utility systems and maximizes potential in line with business objectives.

An integrated and holistic approach to energy performance management can achieve significant savings in energy costs and hence greenhouse gas emissions both within the manufacturing units and in the utilities systems that support the manufacturing units.

An important component of the solution is provided by model-based energy management systems, such as those produced by AspenTech. These can be used to help take advantage of potential savings, which have hitherto been largely unexploited in addition to providing optimized and consistent information about a site's key processes and facilities for decision-makers.

This knowledge can be useful both in long-term, strategic decisions and in concluding energy supply contracts, in preparing budgets and in drawing up investment plans, as well as in optimizing the energy costs of ongoing operations – based on current demand, costs and plant availability.


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### Sustainable Benefits

The potential benefits to businesses of this kind of holistic approach to energy management are huge. Adopting best practice here can have a major bottom-line benefit since savings of between 5–10 % can be obtained using operations planning and optimization without needing to make any significant capital investment even in the most sophisticated plants.

By implementing an energy management program with elements focusing on both supply and demand, organizations can achieve significant returns – often over 15 % of their annual energy costs with very attractive payback on the capital invested. So, the best practice is to develop a sustainable approach, involving the continuous monitoring of operations and focusing on making improvements to the implementation.

For chemicals companies, the ability to see how they are doing against a plan, a contract or a budget is all part of being able to improve the energy side of the business. As energy becomes a constant metric for operational performance for the organization, users will begin to see sustainable and continuous process improvements.

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## Reliance to Reach Peak Gas Output in One Year


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Indian energy major Reliance Industries aims to reach peak gas output of 80 million standard cubic meters per day at its KG D6 block off the country's east coast in about 12 months, the Economic Times reported, quoting two unnamed government officials. This would be achieved by drilling more wells in the gas producing fields, a senior oil ministry official told the newspaper. Production at the D6 block, from which Reliance started pumping gas in April last year, currently stands at 60 mscmd, and Reliance has earlier said it would not increase output at the block until a full review of the reservoir is completed. It had originally expected to reach peak output in the current year that ends next March. The company could not immediately be reached for comment. ■

## Dr. Karl Kolter of BASF Wins International Research Award


Dr. Karl Kolter, BASF

Dr. Karl Kolter, BASF head of Pharmaceutical Excipients Research and Development, was honored at the AAPS Annual Meeting and Exposition with the 2010 International Pharmaceutical Excipients Council Foundation (IPEC) Industry Research Achievement in Excipient Technology. Dr. Kolter received the newly established award in honor of his outstanding history of research into novel pharmaceutical excipients.

"This award is a very special endorsement of many years of excipient development research and makes me very proud," Dr. Karl Kolter commented. "It shows that our innovative work in this complex area is appreciated by the industry."

Dr. Kolter has been working for BASF since 1993. He has developed more than 22 novel pharmaceutical excipients and has published over 120 research papers. Dr. Kolter's most recent accomplishments are Kollicoat IR, a film-coating system for tablets, and the novel excipient Soluplus – the new solubilizer launched in 2009 and the recipient of the Convention of Pharmaceutical Ingredients and Intermediates (CPhI) Silver Innovation Award. BASF's Soluplus helps customers in the pharmaceutical industry to develop and produce innovative drug products containing active ingredients that could not have been formulated with conventional excipients.

"This award is a tremendous motivation booster to keep on developing innovative excipients in the future," said Dr. Kolter. BASF plans to continue launching at least one novel pharmaceutical excipient every year to reinforce the company's leadership in this area. It makes BASF one of the few remaining excipient manufacturers to conduct groundbreaking research into innovative new excipients and bring them to market on a regular basis. ■

## SABIC Would Look at Bayer Polyurethane Opportunities

Saudi Arabia's SABIC would consider buying Bayer's polyurethane business, SABIC's chief executive told a German weekly.

"If Bayer approached us, we would certainly take a look," Mohamed Al-Mady was quoted as saying by Die Zeit. Bayer's MaterialScience business is the world's largest maker of chemicals for insulation foam and plastics used for data disks and car lights. Bayer Chief Executive Marijn Dekkers has indicated there were currently no plans to divest the division.

Al-Mady was quoted by Die Zeit as saying SABIC would only be interested in the polyurethane business of MaterialScience because of antitrust concerns. ■

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# The Vital Link

## Maintenance, Enterprise Resource Planning and Asset Management


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**Exchanging Data – ERP (Enterprise Resource Planning) systems are often a key technology in the operations and maintenance functions of the process plant industry. They include multiple applications, covering disciplines as diverse as supply chain management (e.g. purchasing, manufacturing and distribution), financials, human resources, decision support, and so on. But at some point, the ERP system has to be able to exchange data with the asset management system.**

Consider, for example, the work process for maintaining a pump. The information associated with the pump itself is, of course, largely technical, but the information about, for example, who is qualified to change that particular pump, and what the rest of their workload looks like on that day, can only come from a combination of other applications within the ERP system. Some operational and maintenance processes are actually very reliant on business data, and the reverse is also true, so there has to be an effective link between them.

### How It Should Work

Here is an example of how this process should work in practice in order to increase productivity and reduce project costs. The operations supervisor notes, from the shift handover report, that there is a leaking pump, tag reference PP-PUMP01, in the sour water unit. He creates a work order to notify the maintenance department. The maintenance planner receives that work order and recalls similar problems with this pump. Because he has an effective link into the plant's asset management system, he can search for the pump by name and can quickly display all the information related to it.

The maintenance planner sees that this pump has been mentioned in a total of four shift handover logs and that each time it was due to a leaking seal. He can then use the link into the asset management system to create a new change request asking the plant engineering group to further investigate this situation.

The engineering group receives notification of the change request and searches the asset management system for the pump specification sheet. The engineers determine that the pump seal material is not optimum for sour water service and that it should be replaced with one of a different material. Changing the seal specification is a "not in kind" change so, through the system, the change request must be documented as a true management of change (MOC) record and submitted to the MOC coordinator. Once the MOC is approved, the coordinator issues the change request back to the maintenance planner, the seal information is updated, and a work order is issued to a technician.

Naturally, there are challenges in achieving such a smooth interconnected process. First, the many different data formats involved mean that the component systems are often not able to fully exchange information. Second, information is often fragmented; held in many disparate, unconnected systems – so-called "silos" of information – so it's difficult to get at and to share, and applying consistent updates across all the sources of data becomes a problem.

Yet effective integration between applications is achievable. Two things are necessary, however. First, a "digital information hub" that is data-neutral and so enables information of any kind to be shared and used, without needing access to the original authoring applications. Second, an ERP system that connects fully to this environment, enabling data to flow in both directions.

### The Digital Information Hub in Action

As described, the existence of many different types of data, originating from many different applications and stored in many different silos, is a fundamental challenge for any operational or maintenance information system. The huge potential benefits offered by access to ERP data cannot be fully realized if there is no integration with the other sources of information already in place.

Yet the data-agnostic, ISO 15926-compliant digital information hub is not an ideal – it is a reality and already in use in many businesses worldwide. Equally real are its inbuilt ability to collect, maintain and share consistent equipment registers, enabling timely and well-informed decision making and the reduction of unplanned downtime and outages.

Business consultants Deloitte recently published a post-implementation review on the successes achieved by Woodside Energy in Australia, who deployed such an integrated solution as part of their ALIS (Asset Lifecycle Information System) program. Among other benefits, Woodside was found to have achieved productivity gains of 10%–20%, has reduced its training costs by some 97%, and has experienced cumulative benefits of over AUD $20 million. Woodside's experience is unique only in having been independently verified; similar benefits have been achieved by many other companies, including Shell in Nanhai. The Deloitte review is publicly available and can be downloaded from www.aveva.com/whitepapers.

Integrations between ERP data and operational/maintenance systems, using a digital information hub as the glue that binds all of the information sources together, are readily achievable using proven technology and are delivering measurable business performance gains in operations and maintenance environments. When will your business experience the benefits?

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# Quality Creates Trust

## CSB-System Optimizes Quality Management at DiaSys

**Leadership – DiaSys Diagnostic Systems is a leading specialist in the development and manufacture of diagnostic systems of high quality combined with ease of use and reduced environmental burden. Focusing on clinical chemistry and immunoturbidimetric tests, DiaSys has introduced more than 80 optimized reagents for routine and special diagnostics. In addition, the product range includes a large selection of suitable calibrators and controls as well as photometric systems and glucose/lactate analyzers.**

DiaSys has been ISO certified since 1996 (valid certificates ISO 13485:2003, ISO 9001:2000) and was one of the first diagnostic companies to label its products with the CE mark from June 2000 onwards. Today, customers and partners in more than 100 countries around the world rely on DiaSys quality.

### CSB-System Manages Business Processes

The diagnostics specialist from Holzheim, Germany, has been using the CSB-System since 1997 as industry-specific software solution for comprehensive management and control of its business processes. Alexander Schwarz, IT Manager, knows all the benefits: "The flexibility of the CSB-System allows us to utilize this IT solution according to our requirements. Together with CSB-System consultants, we tailored the software to optimally suit our company and our processes. We were able to considerably reduce IT administration costs and to noticeably accelerate the processes in many areas."

### Quality Management as Project Focus

DiaSys currently optimizes its quality management with the help of CSB-System: "We are reworking our processes in cooperation with our IT partner in order to be able to finally map them in their entirety. Our objective is to realize paperless quality management, which provides us with quality-relevant data from all areas in next to no time," Schwarz said. In doing so, DiaSys requires dynamic test plan management to economically manage the entire inspection scope, including e.g. the optical density of diagnostic agents, the activity of enzymes and the ph-value. The ph-value, for example, must be within a specified range and must not change during the defined life of the guaranteed specifications.

### Tests According to Predetermined Parameters

The reagent "CRP-FS," for example, has a life of 24 months and is being used successfully in heart and rheumatism diagnostics. Here too, the optical density must be within closely predetermined limits. Transparency and the wavelength of the light, in particular, are used as the main test parameters. The acceptable values are recorded in the CSB-System and can be retrieved at any time: "Based on the recorded values and the predefined test plan, the CSB-System will immediately notify us about any discrepancies, should the values be outside of the tolerance. This increases safety and saves time that we previously had to spend on unnecessary red tape for our quality controls," Schwarz said.


DiaSys has introduced more than 80 optimized reagents for routine and special diagnostics.

### Practical Example: Cholesterol FS

With the diagnostic agent Cholesterol FS, DiaSys is making a great contribution to the quick identification of high cholesterol level. DiaSys purchases the raw materials for the cholesterol diagnostic agent and tests them during delivery control with support of the CSB-System. The test specifications are stored in the CSB-System and are processed at goods receiving.

During this time, the raw materials are kept "in quarantine" and can not be used. If the tests are successful with no objections found, the CSB-System carries out a stock transfer of the raw materials and marks them as "approved." The raw materials are then posted to a warehouse for approved materials and can be used for batch production. Batch preparation follows a clearly defined manufacturing procedure and is reported to the CSB-System. Quality control takes the specified sample and performs the tests as listed in the test plan displayed by the CSB-System. Final approval of the cholesterol diagnostic agent can be given, if all required specifications have been met.

### Secure Traceability

Secure product traceability is essential for diagnostic agents. "With the CSB-System we can guarantee transparent traceability back to the original batch of the raw material in an extremely short time," Schwarz said. One master batch per component, made up of many raw material batches, is predefined for the production of reagents. This master batch accompanies the product throughout the entire production process. If a customer reports a suspicious batch number, DiaSys can quickly trace the origin of the raw materials.

"Utilizing the CSB-System, we can determine the origin of the suspicious batch in less than 60 seconds. This provides extensive safety to us and our customers. Traceability into the past and across all batches that have so far been produced is available at any time," Schwarz said.

DiaSys intends to stay among the leading diagnostic companies worldwide and will therefore continue to rely on the industry expertise of CSB-System.

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# Everything Under Control

## Parallel Condition Monitoring of Fieldbus and Field Devices

**Saving Time and Money – At last there is a tool that can monitor field devices and fieldbus at the same time. But why is this good news for the customer? Well, there are several good reasons. For one thing, the Trebing + Himstedt 2-in-1 solution considerably minimizes commissioning and maintenance cost and effort. And the clever solution not only saves time and money but increases plant availability at the same time.**

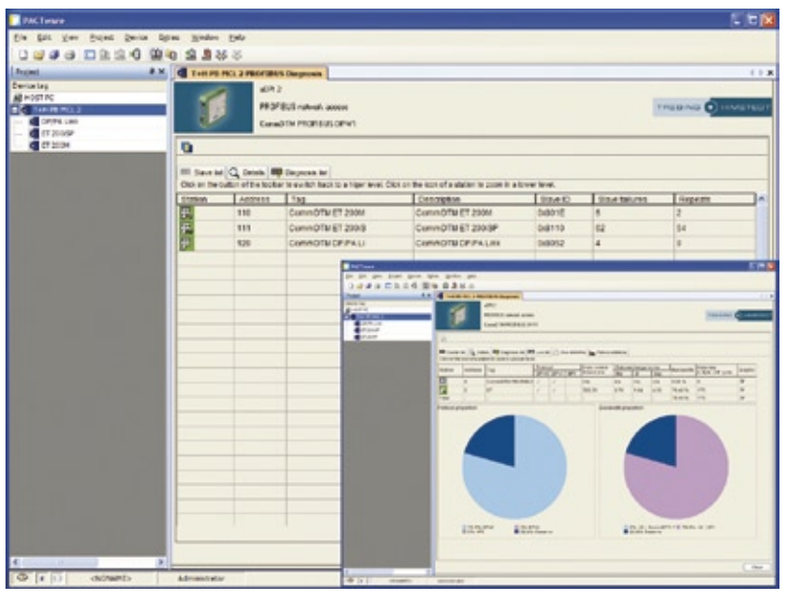
Trebing + Himstedt is well known for its innovative ideas. The latest proof of this is the Schwerin, Germany-based software provider's new generation of the (FDT-based) xEPI 2 diagnostics unit. Because the new CommDTM (Device Type Manager) or device driver for FDT communication has been designed with special features, this solution not only enables manufacturer-independent operation and monitoring of field devices, but also simultaneous, permanent network status scans. With this capacity, the diagnostics unit pioneers parallel condition monitoring of Profibus network and field devices in one single FDT frame application – with huge cost-saving potential. In addition to that, a 2-in-1 solution also means: Only one application instead of two, no constant back-and-forth between two programs, and a uniform "look and feel". Last but not least, for the user this overall concept also means one fewer software tool to install, handle and maintain – because the configuration tool functions as a diagnostics tool as well.

### At Any Place – From Anywhere

The basis for manufacturer-independent device operation, and thus for central field device management, is the FDT technology. With the Trebing + Himstedt xEPI 2, users can directly access all field devices in their plant or installation via Ethernet, directly from their desks for example, or remotely if necessary. Another bonus of central field device management: Device configurations and specifications are easy to manage and to archive. This in turn considerably facilitates version and driver maintenance in daily plant operations.

### One Solution – Double Benefit

In FDT environments, the xEPI 2 functions as a configuration access point and a diagnostics unit at the same time: It not only provides the Ethernet-based access point for central device access, but in parallel collects valuable diagnostic information on network and stations. In its latest version, the CommDTM of the xEPI 2 displays this Profibus diagnostic information in a clearly arranged and structured way in FDT frame applications such as the free Pactware configuration software, as well as in field-level Asset Management tools such as Endress + Hauser FieldCare or Yokogawa FieldMate.



The CommDTM Profibus DP-V1 of the xEPI 2 displays network and station states, supplies statistics on network parameters, and allows identification of critical network stations.

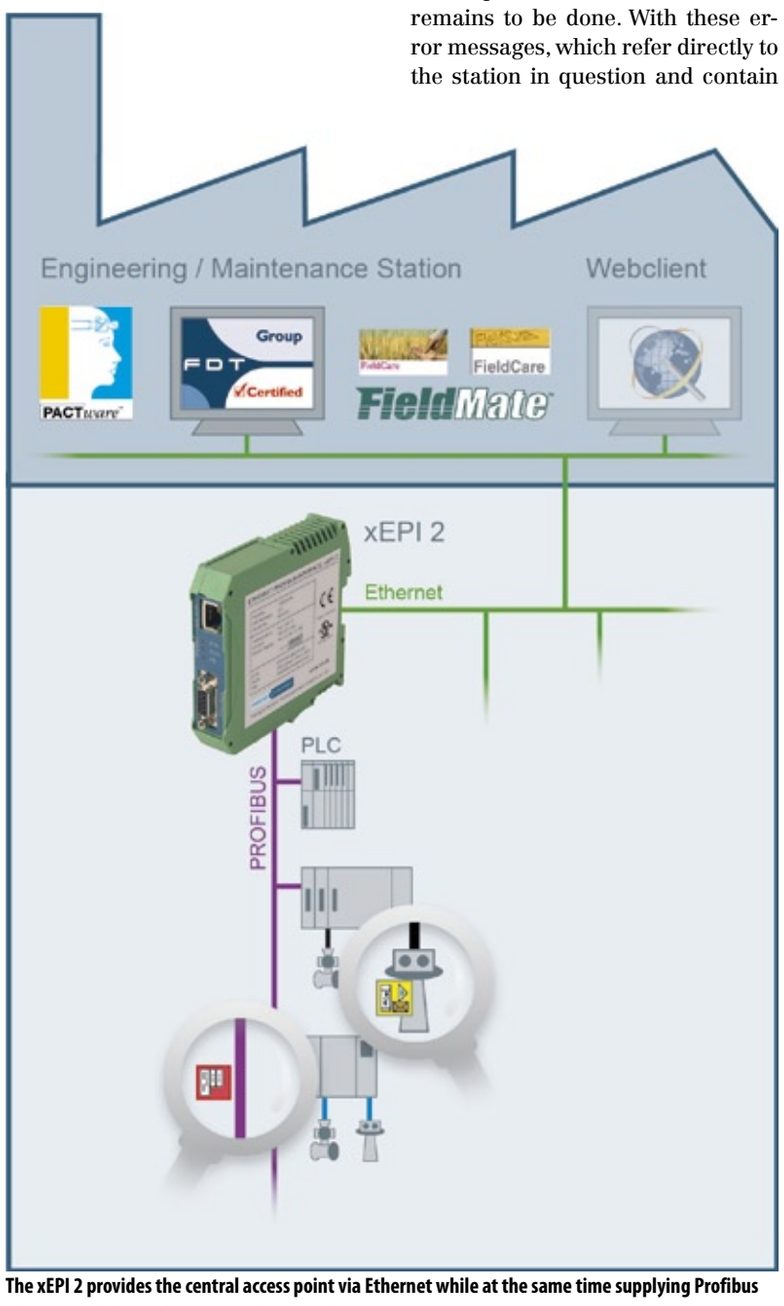
### Fault Analysis – In the Past …

When using the diagnostics unit's alert functionalities in connection with the network monitoring via FDT, the solution shows its full potential and saves a lot of time and effort in maintenance processes. In the past, fault analysis often was like this: Shop floor staff call to report a failure. Thereupon, the worker in charge sets out to gather the necessary equipment such as notebook, tools, Hart modem etc. – and mind the documentation! Having collected all this equipment, the worker takes the bike from his or her office to the plant in question – not, of course, without getting authorization from the respective plant operator. On site, the equipment is assembled and connected to the device – finally, everything is ready to begin analyzing. Between the information about the failure and the start of actual measurements, at least 60 minutes have passed.

xEPI 2 Diagnostics Unit

### … And Present

Not so when using the xEPI 2. If any device in the plant fails, the system automatically alerts the user by email. Opening the email, clicking the respective link – that is all that remains to be done. With these error messages, which refer directly to the station in question and contain information on the cause of fault as well as troubleshooting, staff in charge can decide what to do almost immediately. If a Profibus component is affected, a mechanic can be instructed to exchange the card or controller. In case of device errors, a precise diagnosis of the failure cause is provided. If necessary, a replacement of the device can be ordered. If it is a fieldbus failure, the telegram analysis will help. Whatever the reason, in many cases there will be no need to go down to the plant. And even in those cases where a maintenance worker does have to get on site, he or she knows where to take targeted action when he leaves his desk. And the best thing about it: The entire fault analysis takes just about 20 minutes. The Trebing + Himstedt tool can thus reduce response times by two thirds.




The xEPI 2 provides the central access point via Ethernet while at the same time supplying Profibus diagnostics information through its CommDTM.

### Always One Step Ahead

What do modern maintenance teams expect from monitoring concepts? Monitoring should ensure high plant availability and identify malfunctions before the device fails. Keyword: preventive maintenance. Tools and procedures have to become integrated into existing plant structures, be compatible with existent infrastructures such as Ethernet, and capable to be implemented into established monitoring mechanisms. Furthermore, state-of-the-art monitoring allows selective, targeted fault analysis via central (remote) access and facilitates commissioning.

With the xEPI 2 solution, users can continuously monitor status, failures and diagnostic messages of the single Profibus network stations – either via the diagnostics unit's website or directly in the FDT tool through the CommDTM. Detailed information is displayed down to modular level. A live list of the devices and bus statistics with physical network parameters as well as error statistics to identify critical network stations is a further useful feature.

### Valuable Help

And there is more. The additional telegram logger of the intelligent CommDTM (Profibus DP-V1) for xEPI 2 identifies communication errors during field device configuration in a quick and targeted way. The integrated link to the xEPI 2 website allows plant-wide monitoring of all Profibus networks with automatic email notification. In short, innovative tools such as this enable the implementation of time- and cost-saving remote maintenance scenarios and mobile service concepts.

Other features that provide high ease-of-use: engineering data, i.e. tags and descriptions from the FDT frame, can be automatically imported into the xEPI 2 website. The configuration is supported by a wizard. Last but not least, the intelligent tool checks automatically if all installed devices work non-reactively.

### Plenty Of Benefits

A parallel, web-based monitoring and operation concept for network and devices has plenty of benefits: The network basically monitors itself and, in case of failures, alerts maintenance staff well in time. In addition, the FDT tool enables central online access to the devices and their configuration. Fault analysis, supplying specific information for troubleshooting within a short time, can be done from the desk or even remotely. Significantly reduced response times increase plant availability. After commissioning or plant extensions, the versatile diagnostics unit quickly and easily scans Profibus systems for any faults. And, naturally, all-rounders such as this also meet the demand for less complexity. The Trebing + Himstedt xEPI 2 is your key to considerable time and cost savings – with minimum monitoring effort and maximum convenience.

Dr. Christine Eckert
Freelance journalist

*Dr. Christine Eckert for Trebing & Himstedt*

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# Defining New Borders

## Physical Combination of Nanometer and Micrometer Particles

**Small High Tech – Producing fine powders with highly specific characteristics is one of the most important targets of particle technology nowadays. Developments in nanotechnology allow the production of fine particles, which have – in comparison to the macroscopic world – different specific properties. It is akin to comparing the properties of a tree trunk to the finest plywood.**

The thinner and finer plywood permits to use the wooden raw material differently than the tree trunk. This is due to the structure of the wood. Consequently, the observed flexibility and strength is significantly different. In particle technology or nanotechnology, the new features of the submicron particle are applied directly to produce novel products with new or improved characteristics. Since micron and nanoparticles are versatile, they find applications in various industries, such as in pharma, metallurgy, electronics, food and chemicals.

In general, the particle technology distinguishes between chemical and physical processes.

In chemical processes, particles are produced by reactions in nanosize or fine particles are applied on larger particles or large areas. Characteristic for these processes is in general the use of solvent, which is necessary for the desired reaction. For the environment protection, the solvent is recovered and often reused after purification.

On the other side there are the physical processes that use thermal, mechanical, radiant or electrical energy to combine different substances – the physical laser deposition (PLD) is an example for this kind of operation. A laser beam ablates particles from a matrix substance. The particles then diffuse on to a carrier medium. For all these challenges, the mechanical hybridization system is a potential solution.

### Uses In Electronics

In electronics, it is crucial to exactly fix the conductivity of particle surfaces. One example for this process is the coating of carbon black with polymethylmethacrylate (PMMA). As figure 1 shows, a discrete layer of PMMA on the carbon black particle was established. The shape of the PMMA layer – that is the variable loading of the carbon particle surface with PMMA – can selectively adjust the conductivity of the particle surface. Examples of other products that have highly specific surface properties are toner powder, photo capacitors, rapid prototyping and gas chromatography.

### Uses in Powder Metallurgy

In powder metallurgy, it is possible to enhance applicability of powder metal by improving the flow or sintering properties. On the other hand, novel powder combinations, generated by kneading, compression and shearing, can work like an alloy in final application. Furthermore, it is possible to obtain special effects at the grain boundaries of metals by deposition of nanoparticles along the boundaries. An example for the improvement of flow properties and sintering is shown in figure 2.

In the process, the metal has been rounded so far that a round particle is created. It is easy to comprehend that the flowability of round particles is better because they do not get stuck together. For the sintering process this is beneficial, too, because the powder flows easier into the mould and this leads to a higher starting density of the pellet. Another way to improve the flowability or the sintering attributes of metal, except for the rounding of the processed material, might be a coating with lubricant like polyacrylates.

### Uses in Cosmetics and Pharma

The cosmetic and pharmaceutical industry also requires highly specific micron and nano products.

For example the cosmetic industry produces mainly skin related products. The different areas of the skin dedicate in this case the requested pH values of the processed substances. Fashion trends provide further requirements, such as specifications for the shade of colors. The touch and feel of a cream are other factors in the design of skin cosmetics.

Particle design is needed in order take all of these factors into account. Also, the reproducibility of a defined quality becomes increasingly important.

Figure 3 shows an example of such a specific powder – a white pigment applied to a soft, skin-friendly carrier.

The production of highly specific active ingredients is the main research aim of all leading manufacturers in the pharmaceutical industry. The docking of highly specific proteins on particles for targeted disease control, or ensuring an amorphous product consistency for a better absorption in the human body, are only two reasons for a very precise processing of substances.

### European Regulation

From 2012 on, a new European regulation will require cosmetic manufacturers to list any nanoparticles contained in products marketed within the EU. From a marketing standpoint, the term “nano” has a partly negative connotation – some people wrongly understand it as a warning. The

To avoid “nano” on the ingredient list of a product hybridization system offers many possibilities to process nano-scale materials in or on bigger carrier media without losing their properties and effectiveness.

### Conclusion

A consolidated view of all these factors indicates that the hybridization system is particularly suitable for the modification of surface properties and structures of powders. It is possible to create a large variety of clearly defined different structures on surfaces. The application of very fine particles that are plastically deformable enables the user to produce a film coating on a larger particle. In this case, the choice of the fine particle quantity allows not only a complete, but also a defined incomplete coating.

On the other hand, if a hard particle is used, it is not possible to achieve a film coating. In this case, only a structure similar to the compound eye of a bee can be obtained. Nevertheless, a surface coated in that way can also act hydrophobic in a liquid medium, if the interspace of the particles is smaller than the wetting angle of the liquid.

For hard coating particles, as well as for soft particle coatings, due to the amount of material used, it is possible to vary the coverage of the core particle surface. In this way, specific nano surface structure on micron particles can be established.

The dream of researchers to produce innovative and unique products has finally reached the next level. In a nutshell, the hybridization system can be used to produce new functional material composites or hybrids; to improve the particle and powder properties such as flowability, dispersibility and wettability; and to produce substitutes for expensive and rare substances by the effective, direct process.


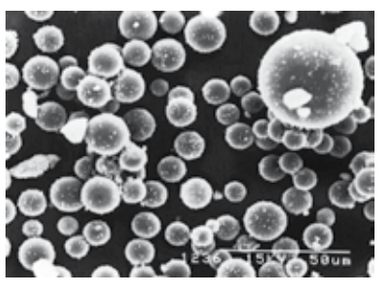

Fig. 1: Carbon black coated with polymethylmethacrylate

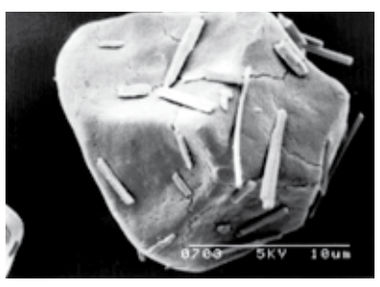

Fig. 2: Protein on organic substance

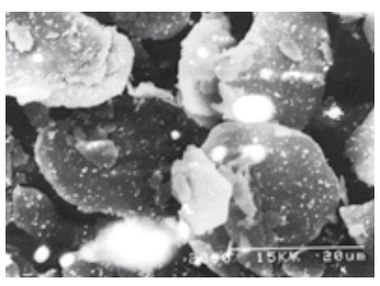

Fig. 3: Titanium oxide on mica

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# Poised For The Upswing

## China’s Sinorgchem Works to Offer a Sustainable Supply of Rubber Chemicals

**There’s no doubt about it – China is booming in nearly all regards and the country was better positioned to make it through the economic downturn than those in the west. Sinorgchem is a prime example – the Shanghai-based rubber chemical additives manufacturer expanded production capacity of PPD and 4-ADPA and is now well positioned to reap the benefits of a market that is now demanding more and more tires. Brandi Schuster asked the company’s CEO and CFO Stephen Choi about what he is doing to enter the European market.**

*CHEManager Europe: What is your company’s strategy for entering the European rubber chemicals market?*

Stephan Choi, Sinorgchem

**S. Choi**: As a global rubber antioxidant leader, our development in the market is based on our global strategy. Our subsidiary has been established in Western Europe and is ambitious about entering into the emerging market such as Eastern Europe. The aim of setting up the subsidiary at The Hague in the Netherlands is to better support a large variety of our customers here in Europe.

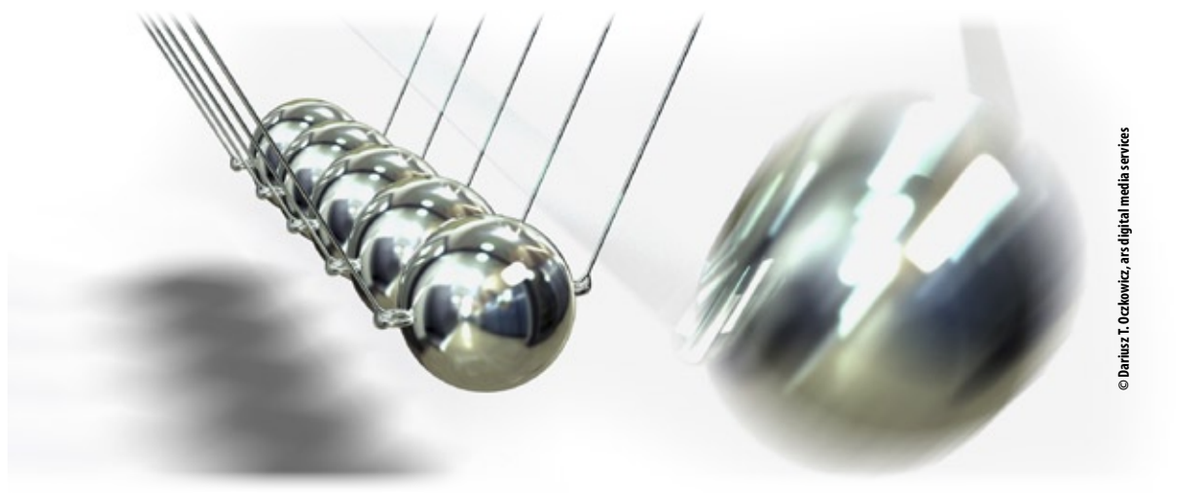
Meanwhile, we are also expected to successfully finish the application process for ; we started preparation from the very beginning when EU announced this regulation.

*How does your company compete with other leading European rubber chemicals manufacturers that have entered the Chinese market?*

**S. Choi**: Firstly, Sinorgchem is already a market leader in China. Our products cover most users in the domestic rubber antioxidant market. In terms of products, our rubber antioxidants are reliable with high quality, making us standing at a leading position in global rubber additives market segment.

Meanwhile, Sinorgchem is providing a sustainable supply to our clients globally. Sinorgchem invested around US-$147 million in a new production expansion, which was finished in September. Our total annual production capacity of PPD series and intermediate 4-ADPA has now been increased to 120,000 tons and 150,000 tons, respectively.

Moreover, we insist on green chemical concepts and aim to lead the industry to upgrade environmental protection through self innovation. Jiangsu Sinorgchem uses high technology to improve traditional rubber additives and actively develop environmentally friendly production technology.



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*Which markets (regionally speaking) are the most important for Sinorgchem? Where would you like to expand your global footprint?*

**S. Choi**: Sinorgchem has grown rapidly to become the market leader in China’s rubber chemicals industry with its outstanding products and services. Currently, Asia market, especially China is still one of our most important regional markets.

We also keep on building up long-term strategic partners with key tires producers at a global level. We have set up subsidiaries in Europe and U.S. to better serve our overseas clients in those areas. We have already entered into Eastern Europe, the Middle East, South America and other emerging markets. At present, our products are exported to nearly 40 countries across Asia, Europe, South America, the Middle East and Australia. By 2009, Sinorgchem had captured around 20 % global market share in the rubber antioxidant industry.

*How did your company fare during the recession? Has your business benefited from the increasing demand for tires in 2010?*

**S. Choi**: During the world economic recession, not only did our business operation run well, but also we achieved a historical high record of our product sales volume. Yes. Sinorgchem has been witnessed a steady growth in 2010. Through our continuous dedication on products, supply, and services, we hit another high sales volume both in domestic and overseas market in the year of 2010.

www.sinorgchem.com

chemanager-online.com/en/Tags/rubber-chemicals

# Keeping Fieldbus Communications Healthy

## Diagnostic Manager Got Even Smarter

**Added Efficiency – With its Advanced Diagnostic Modules (ADM) Pepperl+Fuchs provides intelligent components to monitor the quality of fieldbus communications of Foundation fieldbus H1 and Profibus PA networks. The associated Diagnostic Manager is a smart software tool to translate the information provided by the ADMs into actionable information. The very latest version of the Diagnostic Manager not only features a wealth of improvements. It also introduces a built-in expert system that takes fieldbus physical layer monitoring to new levels of insight and efficiency. It is able to accurately diagnose incidents based upon past experience and offers clear text information to direct the user to possible causes. Pepperl+Fuchs is convinced that more than ever before, advanced diagnostics add efficiency to the complete system lifecycle – all the way from commissioning to daily operation and targeted maintenance.**

The FieldConnex line of fieldbus interface products from Pepperl+Fuchs is designed to offer tangible benefits throughout the complete life cycle of a fieldbus installation. They are characterized by a unique set of features to optimize system design, speed up installation, simplify commissioning, increase plant availability and assist in troubleshooting. One key element to reach these targets are the ADM. Added to a fieldbus segment, these smart components serve as "watchdogs" to continuously monitor all crucial parameters, such as device polarity, jitter, noise or duplicate addressing. They automatically trigger an alarm as soon as any critical condition is perceived, because any of the monitored values falls below a preset value.

The Diagnostic Manager is the software that gathers all the performance values provided by the ADMs in order to analyze it and reveal possible problems way before they can effect system operation or even lead to a plant shutdown. The software can run on a server located directly in the control room. It turns the complete fieldbus infrastructure into an open book that can be read even without expert knowledge.

Pepperl+Fuchs are now introducing their latest version of the Diagnostic Manager.

"We have carefully listened to our customers. The result is an impressive list of improvements that turns the Diagnostic Manager more than ever before in a valuable tool that will dramatically speed up commissioning and take the guesswork out of troubleshooting," said Andreas Hennecke, FieldConnex product marketing manager at the Process Automation Division of Pepperl+Fuchs.

### Built-in Expert System

The most outstanding improvement of the new Diagnostic Manager is a built-in expert system. It automatically learns the communications behavior of a segment during commissioning and over time and is able to intelligently diagnose any situation on the basis of past experience. As a result, users are provided with specific warnings, as soon as the software detects any condition that might lead to a critical situation. Such warnings are complemented by incident-related information in clear text that points to possible causes and recommends remedies.

Equipped with such well-founded information, field technicians are no longer faced with the sometimes time-consuming task to search for the actual cause of a problem, but usually know what needs to be done before they arrive on site. In this way, the time needed for troubleshooting is reduced to an absolute minimum, plant shutdowns are avoided to a great extent and the availability of the complete system is improved considerably.

### Saving Time, Increasing Efficiency

The new, updated Diagnostic Manager software offers a number of significant improvements that will take commissioning of a fieldbus segment, monitoring of its physical layer and troubleshooting to new levels of efficiency.

One example is the commissioning wizard, which is now easier to operate and creates better reports. It is designed to check communication quality of the physical layer right from the start and has proved to reduce the time needed to put a segment into service by up to 80 %. Such impressive time savings are achieved, because verifying and documenting correct communication within a fieldbus segment requires only a few mouse clicks and can take place with all field instruments connected. This eliminates many of the time consuming and repetitive tasks previously associated with commissioning and guarantees best-possible and well documented performance levels.

**Andreas Hennecke MBA**
**Product Marketing Manager, Division Process Automation, Pepperl + Fuchs**

### Detecting, Reminding, Documenting

Due to automated tag reading, the ADM is now able to read and document tags and device IDs in combination with any Foundtion fieldbus host. Devices newly connected to the fieldbus infrastructure are detected automatically and the user is reminded to run the commissioning wizard to verify and document their correct operation.

Many displays are rearranged and show related tasks. The system overview now shows measurement values on sliders with color-coded limits for "maintenance required" – a user definable warning and "out of specification" – a violation of limits typically defined in the respective IEC standard.

### Total Control from the Control Room

In addition to the new software version of the Diagnostic Manager, Pepperl+Fuchs also introduced their new FieldConnex Diagnostic Gateway. This gateway greatly improves interoperation between the individual ADMs of a fieldbus infrastructure and the Diagnostic Manager in the control room. It allows information exchange in both directions via an Ethernet to enable features, such as remote setup of ADMs.

Along with the gateway comes another improvement – is the simple and self-configuring setup of the Diagnostic Manager. All ADMs are identified automatically and the software configures itself accordingly. This results in fewer configuration errors during installation and setup of the ADM infrastructure, which further adds to efficiency and reliability.

The combination of the Diagnostic Manager and the FieldConnex Ethernet Gateway results in a highly intuitive monitoring system which provides deep insight into the fieldbus physical layer directly from the control room. With this technology, the physical fieldbus layer becomes fully transparent and can be managed for maximum available without the need for detailed expert knowledge.

### Taking the Hassle Out Of Troubleshooting

The oscilloscope function of the Diagnostic Manager displays fieldbus signals in waveform, thereby offering the fieldbus expert valuable information about the actual signal quality. The updated software includes an improved version of the oscilloscope that offers more trigger events and automatically captures up to ten shots in a row. Each bit and telegram is identified with type and value, as well as source and destination address.

All these innovations and improvements turn the updated Diagnostic Manager into an invaluable tool to design stable fieldbus segments right from the start, keep a close eye at their everyday operation and assist the field technician in troubleshooting.

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**Physical layer diagnostic display: Messages with time stamps and clear-text interpretation identify potential causes – powered by the built-in expert system.**

## Constant Steam Pressure: Certuss Presents New Generator

**PRODUCT** Certuss presented its new "Elektro" steam generator of the series E 6-72 M in a new, elegant and user-friendly design for the first time on the Brau Beviale 2010 in Nuremberg. The technical highlight is the electronically controlled heating (M).

This controls the output of the heating elements continuously through semiconductor contactors, thus ensuring constant steam pressure under an even load of the power supply. A great advantage for the customers since this technology allows a symmetrical network load without consumption peaks to be reached. The respective pressure operating range can be preset steplessly from 3.5 to 11 bars as required. The E 6-72 M steam generators are supplied as a complete, ready-to-operate unit with built-in feed water tank and feed water pump as well as all the safety devices for pressure and temperature in the output range of 10 to 100 kg steam per hour. The customer only has to connect the supply lines. Thanks to their modular structure the steam generators can easily be extended to battery systems and are thus ideally suited to small and medium-sized companies in the chemical, pharmaceutical and cosmetic product industries. They supply, for example, individual units such as agitator vessels, autoclaves and trace heating systems. A permit is not required for installation and operation, meaning that they can also be installed in working areas. If desired, the housing can be realized completely in stainless steel. Generation of pure steam is ensured by the optional realization of all the steam generator parts coming into contact with water and steam in stainless steel.

In the context of the InnoCERT 2010 innovation program, Certuss has been working under high pressure on the further development of gas- and oil-fired steam generators. The recently developed Certecon exhaust gas heat exchanger is a further step towards increasing the efficiency and, in addition to reducing costs at the customer, furthermore contributes toward protecting the environment.

► www.certuss.com

# ‘Business in the Process Industry is Picking Up’

## IBIC Looks Back on Its First Year

**Birthday – Hans-Peter Beier has managed to pull off a feat that many would have considered to be too risky, too daunting. In 2009 – in the thick of the worldwide economic crisis – he founded IBIC, an international engineering and consulting firm that supports companies in designing new manufacturing plants for the process industry. When CHEManager Europe spoke to him a few months after the launch of his company, Beier said that everything had been developing according to plan and he had “no reason to complain.” Now, one year later, Beier reflects back with Brandi Schuster – and also looks to the months ahead.**

Hans-Peter Beier, IBIC

*CHEManager Europe: Your company has recently celebrated its first anniversary – congratulations! How have the last 12 months been for you?*

**H. Beier**: Although it was a very challenging year, our business development has been very successful. In fact, I would even dare to say that we have found our niche in the market as a European provider of engineering services for plant designers and operators.

*You established your company in the middle of a global economic crisis. How did the economic climate impact your business?*

**H. Beier**: We definitely felt negative effects. For example, it took a bit longer to achieve our growth targets than we had originally planned.

*Emerging economies such as China and Brazil have achieved the fastest recovery. Has this changed the scope of your international business? Which other regions are showing growing interests in building plants for the process industry?*

**H. Beier**: Since our target market is Europe, the scope of our international business has not really changed. Yet, even our European customers have a large share of projects for building or modernizing plants in the Middle East, India or the Asia-Pacific region.

*What kind of organic growth has IBIC experienced in the past year? Do you have any plans for expanding your business through acquisitions or partnerships?*

**H. Beier**: Our service business has grown steadily from the start, whereas our company growth has lagged a bit behind our forecasts so far. Although we are not planning with acquisitions at this time, we are building up our partner network step by step.

*What were the biggest challenges that you faced in the past year?*

**H. Beier**: Every company needs to make certain key investments during the start-up phase – whether sales are developing as planned or not. Spending, however, always feels awkward when you hit a weak business cycle.

*Is there anything you would do differently if you could start over again?*

**H. Beier**: As far as the fundamentals are concerned, I would make the same decisions today that I did a year ago. I would, however, make a few small tweaks based on what I know today. For example we could already have recruited even more project engineers earlier based on the regained strength of our industry sector these days.

*Where do you see your company in the next 12 months?*

**H. Beier**: Business in the process industry is really picking up in general, and I think that our company will profit from this development. We’ve already seen a jump in the demand for services in late summer. As a result, we have good reason to be optimistic in attaining our ambitious targets.

▶ www.ibic-gmbh.com

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## Lanxess Opens New Plant for Ion Exchange Resins in India

Specialty chemicals group Lanxess opened Asia’s most state-of-the-art plant for ion exchange resins in India on Dec. 2.

The new plant was constructed over a period of two years in the new chemical park in Jhagadia in the Indian state of Gujarat. It boasts an annual capacity of 35,000 metric tons.

Around 200 employees from the Ion Exchange Resins (ION) business unit manufacture products for industrial water treatment for the semi-conductor and pharmaceutical industries, the food sector and the power industry.

The opening marked the successful completion of the second expansion phase in Jhagadia. The first project phase, which was completed in March of this year, saw a rubber chemicals production plant taken into operation.

Overall, Lanxess has invested around €50 million in the site to date.

“Demand for clean water is set to increase by around one-third worldwide by 2030. In Asia in particular, and in India especially, demand will grow disproportionately due to rapid population growth and increasing urbanization,” said Chairman of the Lanxess Board of Management Axel C. Heitmann at the official opening ceremony, which was also attended by the State Premier of the Indian state of Gujarat. “Production has therefore started at exactly the right time to benefit from this development.” ■

## LG Chem, Samsung Total to up Naphtha Cracking Capacity

South Korean petrochemical makers are racing to upgrade their naphtha cracking facilities to cash in on resurgent demand for plastics in Asia, led by China, after its worst slump in late 2008 due to the recession. LG Chem will raise its Daesan naphtha cracker capacity by 100,000 tons per year (tpy) to 900,000 tpy next March, bringing its total cracking capacity to 1.9 million tpy, industry sources said. The expansion at the country’s No. 2 petrochemical maker will bring its total capacity on par with top ethylene maker YNCC. Another South Korean petrochemical maker, Samsung Total, will raise its capacity by nearly 18 % to 1.0 million tpy next year.

It will shut the cracker, where current capacity is 850,000 tpy, in May for about 45 days for the upgrading works.

The higher cracking capacities from LG Chem and Samsung Total will add around 750,000 tons of naphtha demand a year from South Korea, keeping the market for the petrochemical feedstock in a healthy mode. Come 2012, Honam Petrochemical, currently the No. 3 ethylene maker, may even replace YNCC and LG Chem to take the top spot if it decided to push on with plans to raise total cracking capacity to 2 million tpy from 1.75 million tpy, sources said. ■

## Wacker and Dow Corning Open China’s Largest Site

After four years of construction, Wacker Chemie and Dow Corning Corporation officially inaugurated their joint integrated silicone manufacturing site in Zhangjiagang, Jiangsu province, China. The facility will serve fast-growing demand for silicone materials in China and Asia. The combined $1.8 billion investment, covering 1 million m², is China’s largest facility of this kind and is among the world’s biggest and most advanced integrated silicone production sites. The integrated site includes a siloxane plant and a pyrogenic silica plant, both of which are jointly owned by Wacker and Dow Corning. The site also features finished silicone production plants which are owned and operated independently by each company.

Siloxane and pyrogenic silica are key ingredients in the manufacture of finished silicone products. Silicone-based materials are used in nearly all sectors of China’s booming economy, including automotive, construction, cosmetics and personal care products, electronics, power generation and distribution, solar energy and textiles. The landmark project began in 2006 and the first phase of raw material production was launched in 2008. The combined capacity for siloxane and pyrogenic silica is expected to reach approximately 210,000 mt/y. ■

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# Concepts With A Future

## How European On-Site Service Providers Can Best Position Themselves

**Perfect Placement – There now appears to be no doubt that the landscape for chemical park operators will look different in the medium term. There has been talk time and again that on-site service providers currently under the ownership of chemical companies could be taken over by independent enterprises or investors. At present, the takeover rumor mill surrounding chemical parks has quieted down. Reports of a potential takeover of Infraserv Knapsack by the Asian company Sembcorp have faded away in the course of the economic crisis, and the planned sale of the ThyssenKrupp subsidiary Xervon was called off, too. It remains to be seen whether Xervon will still emerge as an active consolidation player in the near future despite this.**

Now that the crisis has abated, and business activity and economic data have markedly recovered, renewed movement can be expected in the market – time for both independent and integrated service providers to take a thorough look at what strategy is right for the future. In what way, though, will the market develop for European providers of on-site services? Many parameters are still unsettled; what is certain, however, is that there are three key thematic areas that will play a central role in the definition of future positioning: internationalization, sub-contracting and investment concepts in the event of a change of ownership.

### Internationalization of On-Site Service Providers

Potential synergies between different sites are becoming ever more important. An infrastructure service provider operating at several sites, for example, is able to bundle know-how in numerous functional fields. In such cases, an international line-up holds considerable advantages – not only for the site service provider himself but also for the chemical company. If a chemical company decides to relocate a certain part of its business to Asia, for example, the infrastructure service provider is able to provide it with comparable services in their Asian industrial park and thus help to ensure that the transfer is carried out quickly. At the same time, through active marketing of the vacated areas, the on-site service provider is able to make up for the missing volume with new product segments that have greater affinity to Europe, such as biotechnology or nanotechnology. Furthermore, with their local access to government agencies and political networks, they are able to tap into state support budgets. This location marketing function will become more and more vital in future.

**Ingo Schröter**
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By way of example, at the end of 2009 Currenta entered into a cooperation agreement with Nanjing Chemical Industry Park (NCIP), one of the biggest chemical parks in China. The declared aim was first and foremost to exchange know-how, but over and above this it is hoped that the cooperation will also arouse interest among Chinese companies for Currenta's locations in Europe.

Some players have also begun to market their services on the international stage. Both Höchst Infraserv and Sembcorp, for instance, are now also offering their consulting services in the emerging markets such as the Middle East, China or Eastern Europe. Models such as these make it plain that internationalization strategies are quite clearly gaining ground. This is also precisely where an important opportunity arises for integrated on-site service providers: the amount of know-how carried forward in their international production networks offers immense optimisation potential, which is often not comprehensively exploited today.

### Sub-contracting of On-site Service Provision

It is also questionable whether in future the core competence of on-site service providers will indeed lie in the physical performance of on-site services or whether in fact on-site service providers will not instead develop into property owners with a management function – in other words becoming a "theater director" for service provision.

A similar model can be found in the case of airports, for example, which have long been withdrawing more and more to the role of a property administrator, only offering certain core functions themselves. It is already possible for most of the functions performed by on-site service providers to be supplied by specialists. BASF, for example, states that 98 % of the services performed by its global Engineering & Maintenance competence centre are capable of being contracted out.

What is important in this context is above all the combination of competence and price. It is only when competence is identical or better and costs are lower that outsourcing should be set as the aim. That said, aspects such as availability and flexibility should not be disregarded, either. Especially during the crisis, it has been shown that changes lying within one's own area of responsibility can be implemented more quickly than those in which numerous contract interfaces have to be modified and investment processes have to be run through in various service enterprises.

### Choice of the Right Ownership Structure

Definition of the optimum ownership structure for on-site service providers is also a matter of central significance. Investment in a new power station, for example, belongs more to the core business of a power utility. In particular, investment in new forms of energy or $CO_2$ storage plants is a core trend and is a top priority for site development. An energy supplier has excellent synergies in this respect, for example in grid load balancing, but also in the purchasing of fuel, whether gas, coal or waste.

However, this is not necessarily an argument that the on-site service provider should be independent. Rather, it is an argument that the physical performance of the service may be sub-contracted. In this way an integrated service provider can employ a different partner at many international locations, with each partner offering site-specific or regional advantages for service provision as a result of local synergies. Alternatively it is also conceivable to have cooperative arrangements in which it is made easier for energy suppliers to enter the market by building and operating a power station at an international location belonging to the chemical company.

### Conclusion

Integrated on-site service providers will above all be successful when, in addition to continuously improving their operational excellence, they manage to exploit regional and international synergies and contract the best service providers in each case for each location.

Independent on-site service providers, on the other hand, should look for their opportunities in particular at smaller sites, which might be under threat of partial relocation of their business. As well as contributing investment resources and know-how, they can then introduce concepts to establish alternative capacities and raise the profile of the location.

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# Location, Location, Location

## Following Trends to Market Industrial Parks

**New Innovations – The environment for industrial parks and infrastructure service providers is still difficult and has worsened during the financial and economic crisis. Nevertheless, continued optimism is needed; this article deals with the prospects of location marketing through the recognition and implementation of important trends. Which concepts will win new settling companies and investors? Which marketing strategies promise the highest success for chemical and industrial parks?**

### Trends and Unique Selling Points

There are many fundamental trends that are important for industrial parks and, e.g., can be assigned to the areas markets/technologies, business models and frameworks. For instance, the transition to a bio-based economy will make a lasting change to production structures, as new supply chains, based on a changed raw material base, make other demands to infrastructures. Further important trends are related to business models, such as outsourcing trends and the importance of alliances and partnerships as well as frameworks – environmental legislation and the discussion on climate change.

The relevant trends important to a certain industrial park should be individually recognized and evaluated in the scope of the strategy development process. Naturally, no "standard recipe" can be given for this.

The change to a bio-based economy and the development of new technologies with the example of biofuels will be looked at here in more detail. First, there are many established and new technologies for the production of fuels (see fig. 1). When developing a settlement strategy, it has to be decided as to which technologies based on which raw materials will prevail long term and be attractive to a location. Thus a competent opinion has to be acquired as to whether a chemical thermal process or a biological process will dominate in the area of biofuels and with which raw material basis and conversion technology the biofuels industry will further develop.

Based on a fundamental understanding of the trends, the evaluation of these should result in the identification of attractive technologies and/or markets. A sensible linking with own strengths together with the necessary resources to realize the developed strategy supplies the unique selling point, in order to achieve "first choice" status with new settling companies. It has been shown that without clear unique selling points the competition for new settling companies is toilsome and does not usually promise success. There are various types of unique selling points, which can be defined on the basis of different strengths, such as composite structures (production, product, infrastructure), the specialization on certain companies and value chains or the positioning through the geographical location.

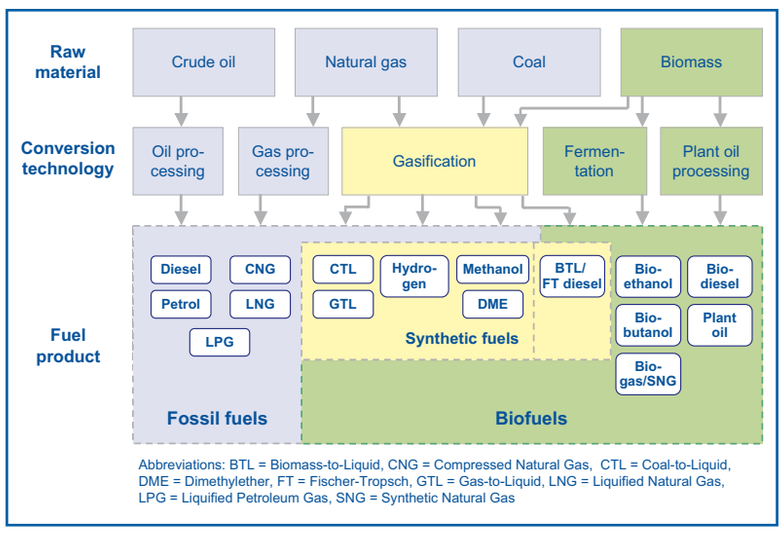


**Fig. 1: Technologies for the production of fuels**

### Implementing the Marketing Strategy

The marketing strategy should centre on these unique selling points. Therefore, untargeted advertising methods should be avoided and the financial means be used for focused actions in the chosen areas. Focus can be difficult, but is a critical factor for success.

When implementing a settlement strategy, it is important to pay attention to sound financing at company level. Not every new settlement can be assessed as positive, as a long term lucrative partnership for both sides should be aimed for. The sometimes negative experiences with biodiesel producers shows that here a thorough evaluation and careful choice is of vital importance.

Should trends be recognized in time and the necessary actions systematically implemented, the optimism mentioned at the beginning of this article is justifiable. In order to be attractive to new settling companies a competitive cost basis is, however, absolutely necessary. This aspect has been described often in the past and will therefore not be gone into further here. It has to be said that when implementing the described strategy, patience is necessary and positive effects cannot be expected short term.

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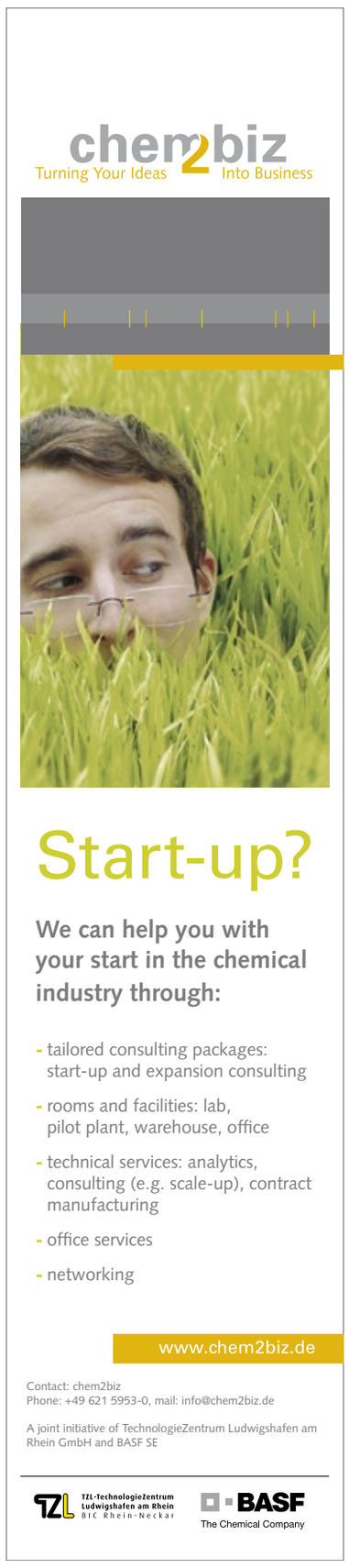


# Where Life Science Thrives

## Ontario Is a Popular Province for Pharma and Biotech

**Northern Exposure – When global companies expand into new countries, these firms often co-locate in local areas that are a business hub for other companies in the same industry. These hubs, or industry clusters, are regional concentrations of inter-connected companies, specialized suppliers, service providers, and associated institutions that allow all of these companies to do business with each other efficiently. Ontario's $15 billion commercial life sciences cluster, based in the Toronto region, is an example. The availability of these business resources is a powerful draw for life sciences companies that want to access the lucrative North American market.**

The region is anchored by the city of Toronto and covers a 100-kilometer radius to include the cities of Hamilton, Guelph and Kitchener-Waterloo. With over 700 pharmaceutical and medical device companies, the area is home to one of North America's largest commercial life sciences clusters. Expansion-minded companies recognize the value of locating where peer companies are already established.

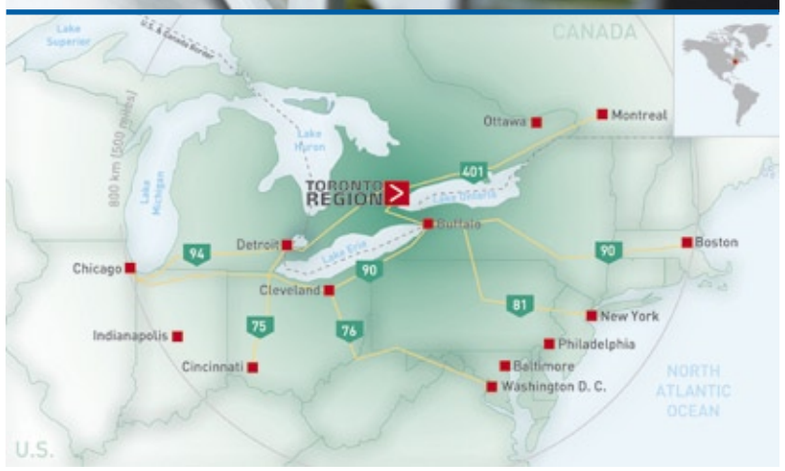
Thirty-two of the top 50 global pharmaceutical companies have Canadian headquarters here, along with dozens of small and medium firms. Many of these companies are geographically concentrated in Mississauga, a community just west of Toronto.

**Sam Lee**
Director of Life Sciences and Health Care, Toronto Region Research Alliance

The largest global medical device firms are also well represented in the region. 3M, Agfa HealthCare, Boston Scientific, GE Healthcare, Medtronic, Siemens, and over 250 other companies are located in three hubs in Toronto, Mississauga and Markham, a community just north of Toronto.

In addition to an experienced workforce of close to 40,000 people, international life science companies are well-served by an established base of business and support services. All the essential functions to support commercial operation are locally available, including more than 220 companies that provide specialized services for the life sciences sector: research; clinical; manufacturing; sales and sales operations; marketing and market research; supply chain management; regulatory; and market access.

- **Global logistics and distribution**
  Integrated firms manage the unique requirements associated with the acquisition and transport of chemicals and temperature-controlled ingredients and products. Sector-specific services include cold chain storage and delivery, clinical trial supply logistics, and reverse logistics. Wholesale and retail channels are well-developed.
- **Health care marketing**
  The industry calls upon an extensive range of marketing, advertising and communications firms that specialize in prescription, over-the-counter and direct-to-consumer products. Graphic design, illustration, photography, direct mail, market research, and professional publication services are also available.




**Pivotal North American location: One day drive or 60 minute flight to most major cities in the US Northeast and Midwest**

- **Physician education and training**
  Two dozen suppliers develop and manage continuing health education (CHE)/continuing medical education (CME) symposia and events for the industry.
- **Contract research**
  Sixty contract or clinical research organizations (CROs) are located in the Toronto Region. These firms provide pre-clinical studies, study design, regulatory, patient monitoring, site management, biostatistics, data management, bio-analytical and medical writing services to meet the sector's needs.
- **Manufacturing**
  More than 30 contract manufacturing companies supply active pharmaceutical ingredients and excipients, and perform custom synthesis, purification and analysis. Packaging services for liquid, semi-solid and solid products include: site licenses and cGMP/ISO certification, encapsulation, tableting, blending, blistering, bottling, shrink wrapping, labeling, card sealing, cartoning, lot and date coding. Manufacturers also produce regular or small runs, first runs, pilot batches and experimental runs as well as packaging for clinical trials.

**Ontario Life Sciences Sector**

| | Revenue ($CAD) | Employees | Companies |
|---|---|---|---|
| Pharma | 8.3B | 15,500 | 25+ |
| Medical Devices | 4B | 22,000+ | 675+ |
| Biotech | 2.8B | 5,000+ | 140+ |

Source: Government of Ontario

### Exceptional Research Infrastructure

The pharmaceutical and medical device industry also benefits from a wide range of clinical, research and educational resources in the region. It is home to one of North America's largest health sciences complexes, with more than 60 hospitals, 37 medical institutions, 8,200 physicians and 54,000 health professionals. The University of Toronto and McMaster University medical schools have 12 affiliated research hospitals.

Several state-of-the-art research facilities are located in Toronto's one-square mile Discovery District, including: The Toronto Centre for Phenogenomics; Ontario Cancer Biomarker Network; The Centre for Applied Genomics; Structural Genomics Centre; Terrence Donnelly Centre for Cellular and Biomolecular Research; and Industrial BioDevelopment Laboratory. McMaster University in nearby Hamilton is globally-recognized as a center of excellence in coordinating large, international clinical trials.

### Economic Stability and Positive Business Environment

Canada's economy has weathered the economic downturn better than the other G7 countries and is expected to continue its relatively strong performance. In 2010, the World Economic Forum ranked Canada's stable and well-managed financial system as the soundest banking system in the world. In addition to a relatively strong and stable economy, Canada offers some of the most generous R&D tax incentives of any industrialized country, and corporate income and capital taxes are lower than in the U.S. With the fewest steps and shortest time required to set up an enterprise, companies will find a positive business climate.

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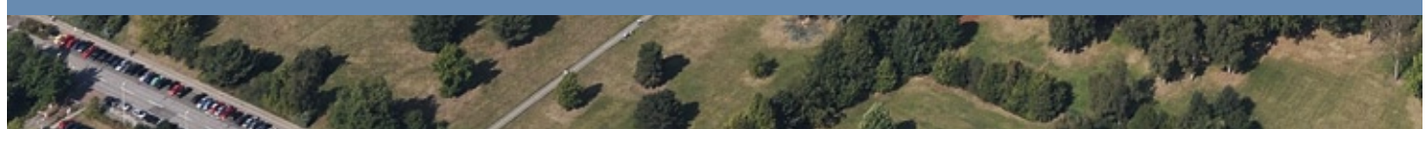

# The Energy is in Germany

## With Innovative Technologies, Deutschland is Ahead of the Game

**Willkommen – Germany's reputation for high-tech products and engineering know-how is known the world over. The country, nestled in the heart of Western Europe, is now using its innovative culture to push forward energy storage, technology that has a multitude of benefits for both the public and private sector. CHEManager Europe asked Germany Trade & Invest's Chief Executive Dr. Jürgen Friedrich about the strides his country has made when it comes to energy.**

**Jürgen Friedrich**
**Chief Executive of Germany Trade and Invest**

*CHEManager Europe: What are the most significant developments in the field of energy storage in Germany to date?*

**J. Friedrich**: Due to the increasing share of renewable energies from wind and photovoltaic systems in Germany's energy mix, we are currently the country with the greatest requirement for new and innovative storage capacity in Europe. Of the various technologies available and in development, one of the promising paths is to utilize hydrogen. Germany is currently leading Europe in research and development in fuel cells and hydrogen technology. Within the EU, Germany has the largest research program in place – the National Innovation Program Hydrogen and Fuel Cell Technologies, or NIP. The initial implementation of this technology is already taking place in demonstration projects driven by national and regional initiatives. These projects will help to further develop the technology and to reach a critical mass for local production.

*Has the industry shown interest in these efforts?*

**J. Friedrich**: Multinational energy companies are already involved in these developments, which accelerates the entire process. As early as 2008, the French petroleum company Total entered a partnership with Enertrag within the framework of the Clean Energy Partnership to construct the world's first hydrogen refueling station stemming from renewable energy sources. It is an exciting time for this field.

*What advantages does Germany offer in the field of storage technologies?*

**J. Friedrich**: Without energy storage technologies, the integration of renewable energies in the energy mix would not be possible to the degree already legally mandated by the federal government. Today Germany has the largest share of fluctuating renewable energies in Europe. Forecasts predict that this will continue to be the case in the future. Due to its geographic conditions, Germany is limited in its reliance on conventional technologies like pumped-storage hydroelectricity. In the future, innovative technologies like smart grids and storage technologies will be increasingly necessary. Paramount to the achievement of these goals are the innovative, export-driven companies in the renewable energies industry.

*What kind of smart grid concepts are currently being developed in Germany?*

**J. Friedrich**: The development of smart grids has created a need for multidisciplinary research and development efforts and coordinated projects. In Germany, six model regions have been selected as part of a renewable energy technology competition. Each of these regions is applying an integrated approach that spans the value chain and covers all energy-relevant economic activities. These range from the approach to commercialization all the way down to core technical research and development. These six regions have access to €140 million from the federal and regional governments for the period 2008–2012. The six winning regions are called eTelligence, E-DeMa, MeRegio, Modellstadt Mannheim, RegMod-Harz, and Smart Watts. The projects focus on areas ranging from developing and demonstrating decentralized energy systems to utilizing IT to intelligently manage energy and lower carbon dioxide emissions.

*What is the current level of renewable energy in the electricity mix in Germany?*

**J. Friedrich**: Renewable energy currently makes up over 16% of the total electricity mix in Germany. The German government's new energy concept foresees the share of total electricity consumption from renewable energies to increase to at least 35% by 2020 and 50% by 2030. Currently, Germany is the world's leading producer of photovoltaic electricity with approximately 9.8 GWp of installed capacity through 2009 as well as the European leader in wind energy generation with approximately 25 GWp installed last year.

*What opportunities are there for companies in Germany in the energy storage industry, especially foreign companies?*

**J. Friedrich**: Considering the rapid development of renewable energies, the energy industry in Germany is expected to see massive investments in energy storage. According to the German Energy Agency DENA, several billion euros are expected to be invested in this area by 2020. Foreign investors spanning the value chain are welcome to participate in R&D programs together with international and national partners. Component and system manufacturers, power plant technology providers, players from the IT industry as well as the conventional and renewable energies industries and utilities are all actively cooperating. This allows international companies to actively take part in innovation and gain important first-mover expertise.

*What are the current challenges in the field of energy storage technologies?*

**J. Friedrich**: It is clear that there is not one single storage technology that meets all requirements, such as storage time, capacity, availability, and cost. These factors depend in part on the geographic location and the legal framework, among others. For this reason it is pertinent to develop a broad portfolio of technologies. If you consider, for example, solar energy versus wind energy, you can clearly see the various requirements. The sun's cycle is consistent, whereas wind doesn't follow a pattern. Solar and wind energy have different input voltage levels ranging from low to high voltage. In the offshore wind industry, hundreds of megawatts of electricity can be generated quickly, but there are a large number of seasonal and other unpredictable fluctuations, less cycles, and the necessity to handle high voltage input. This means that a mix of technologies – including batteries, hydrogen, smart grids, and other forms of intelligent management – is necessary to cover all necessary requirements.

The most important technical challenges that are currently being researched in Germany and worldwide cover a broad spectrum. Scientists are working diligently on improvements in battery technology, for example. The development of materials, battery management electronics, network integration, and a number of other topics are currently in focus. Challenges are posed by the availability of storage, investment and maintenance costs, compatibility with the environment – which we can see with Cadmium – resource scarcity, such as Lithium, and recycling.

*What characterizes Germany in terms of hydrogen production and storage?*

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**J. Friedrich**: Germany has already developed a great deal of technical expertise in hydrogen. In electrolyser technology, ELT is a technology leader. Linde, WEH or Dynetek are advancing tank and other storage and filling methods. Germany's storage capacity is very high due to the presence of salt caverns, especially near the current and future offshore wind parks in the northern regions of the country. KBB is making great strides in underground storage technologies in this region.

For both mobile and stationary applications, Germany has the necessary R&D infrastructure that is highly specialized in this field. As the smallest molecule in the universe, hydrogen necessitates innovative materials – such as metal hydride and nanotubes – as well as chemical processes – namely hydrogen storage in the form of tetrahydrofuran, to handle the temperature and pressure load and to reduce the loss of materials or energy.

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Operating advanced infrastructure

# Central European Chemical Network

## The Internationally Successful Network of the Central German Chemical Sites

Chemical Site Leuna Source: InfraLeuna GmbH

Dow ValuePark® Source: Dow Olefinverbund GmbH

ChemiePark Bitterfeld Wolfen Source: P-D ChemiePark Bitterfeld Wolfen GmbH

Chemie- und Industriepark Zeitz Source: Infra-Zeitz Servicegesellschaft mbH

BASF Schwarzheide Site Source: BASF Schwarzheide GmbH

**PROFILE – The network of the Central German chemical sites, the Central European Chemical Network (CeChemNet), combines the six sites in Bitterfeld, Leuna, Schkopau, Böhlen, Zeitz and Schwarzheide with about 5,500 hectares. There are 600 companies operating with 27,000 employees. CeChemNet is a network of chemical companies and chemical park operators, which successfully links competencies and know-how of chemical park management. The network concentrates regional strengths of chemical park development, creates synergies with the feedstock integration in the Central German chemical triangle and forces the knowledge transfer among its six chemical sites in three federal states such as Saxony-Anhalt, Saxony and Brandenburg. Moreover CeChemNet coordinates the exchange between industry, sciences and politics and supports the marketing of chemical park area in close collaboration with investment and marketing agencies at national and federal state level.**

### Chemical Site Leuna

Investments and competence have made Leuna into a leading industrial site in Central Germany. More than twenty international groups and numerous SMEs are relying on its location at the heart of Europe and have invested some 5.5 billion euros to date. InfraLeuna GmbH and its affiliated companies are owners and operators of the infrastructure facilities at the chemical site Leuna. The attractive range of services provided by InfraLeuna comprises, inter alia, power generation and supply, water supply and effluent disposal, security services, including fire brigade, analytics, logistics, telecommunications. InfraLeuna acts as site development company and supports and assists new firms in every respect.

### Dow ValuePark®

Dow ValuePark® is not just a normal industrial estate in Schkopau. It is also far more than a mere Industrial Park where different firms do their business at the same site. As Dow is one of the biggest global players in the chemical industry and one of the most modern chemical companies in Central Germany, we ensure that all our partners in the ValuePark® are an integral part of our feedstock and supply chain. That is why we work on site with companies that process our raw materials into high-quality products as well as with potential raw material suppliers for Dow. This concept generates genuine added value for both – these medium-sized businesses and Dow.

Whether we are talking about the quality of feedstock, reliability of delivery or availability of special services, Dow ValuePark® provides almost everything investors may need. Our partners here are handpicked to optimize potential synergy effects and our selection criteria guarantee a well-balanced mix of manufacturers, logistics service providers and suppliers. What's more, a broad range of research and development services makes the Dow ValuePark® particularly interesting for innovative companies. To date, 20 new businesses have invested 500 million euros in the ValuePark® in Schkopau.

® Trademark of the Dow Olefinverbund GmbH

### ChemiePark Bitterfeld-Wolfen

Bitterfeld is one of the oldest chemical sites in Europe with large-scale chemical production commencing in 1893. In 2001 the ChemiePark Bitterfeld Wolfen GmbH was privatised to Preiss-Daimler Group. 230 million euros were spent on the complete renewal of the site infrastructure. The total area is 1,200 hectares of which 170 hectares are immediately available for new business siting. 360 firms with 11,000 staff are working here.

Some 4.5 billion euros have been invested to date by companies from Chile, Great Britain, Holland, Israel, Japan, RSA, Sweden, Switzerland, the USA and other countries. The industrial profile of the chemical park is characterised by chlorine, phosphorus, dyestuff, pharmaceutical, quartz glass, fine and high-tech chemistry as well as metallurgy. With Q-Cells SE the region has established as one of the highest performing solar locations in Europe. The chemical face of the site is characterised by comprehensive feedstock integration. One example of eco-friendly feedstock integration is the production of synthetic quartz glass.

### Chemie- und Industriepark Zeitz

The Chemie- und Industriepark Zeitz was established in 1996 on the premises of a disused hydrogenation plant as a completely new developed industrial location with modern chemistry infrastructure. Industriepark Zeitz provides optimal framework conditions both for new large-scale firms and SMEs. Companies such as Radici Germany GmbH, Puralube GmbH, Jowat Klebstoffe GmbH, Deurex Micro Technologies GmbH have already sited on the 237-hectare site. In the future the site will implement projects for material and energetic utilisation of biomass and indigenous raw lignite by producing synthesis gas by modern gasification technologies. In addition, Investments for industrial utilisation of biomass and renewable energies and implementation of research results in large-scale production of organic chemical products and polymers from renewable raw materials are planned. The local 'Kompetenzzentrum für industrielle Verwertung von Biomasse Burgenlandkreis' acts as binding link between the innovation owners in this process.

### Chemical Site Schwarzheide

Schwarzheide is an industrial site with more than 75 years of tradition and more than 35 years tradition of plastic production and development. Today the BASF Schwarzheide GmbH is one of the most modern BASF sites in Europe. There are 21 plants on the 230 hectare site.

BASF has invested €1.4 billion in Schwarzheide in recent years. The portfolio of products includes polyurethane base products and systems, crop-protection agents, water based coatings, engineering plastics, dispersions, and Laromer brands.

Investors and competent partner firms compliment the profile of the site and carry forward the Verbund idea of The Chemical Company. More than 2.500 staff are manufacturing a variety of products.

Companies in the plastics or chemical sector are particularly welcome to join the team as new arrivals, and for more reasons than just their importance within the value-added chains.

Restructuring efforts cleared up nearly 100 hectares of available and connected land on the BASF site and neighbouring Processing and Industrial Center. 15 companies decided to invest at the Schwarzheide site till this day, attracted by

- the excellent connection to road and rail incl. Container loading terminal
- the high available infrastructure regarding supply and disposal, logistic and free areas
- the comprehensive know-how about processes, products and projects
- the availability of feedstocks, as natural gas via pipeline or products from BASF-Group and Third party companies
- the benefits of high-quality services ranging from supply, analytic and technical services to logistics and security.

CeChemNet
Central European Chemical Network

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# chem2biz

## The Ideal Partner for Establishing a Business

**PROFILE** Since 2004, the TechnologieZentrum Ludwigshafen am Rhein GmbH / BIC Rhein-Neckar (TZL) has been running chem2biz in partnership with BASF SE. The core aim of this initiative is to expand the chemical cluster and to boost the Ludwigshafen site.

The chem2biz initiative acts as an ideal partner for establishing a business as well as for all existing small and medium-sized enterprises (SMEs) in the chemistry-based fields of chemistry, nanotechnology, new materials, biotechnology and pro cess engineering.

On the BASF premises, companies have access to office space and laboratories, as well as numerous services, such as maintenance, technical advisory and personnel services, and energy supply. Alongside the possibility of using technical facilities, chem2biz clients can also count on support in authorisation procedures and can make use of analytical services.


◀ The companies in the chem2biz building
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Enterprises are accompanied by TechnologieZentrum Ludwigshafen in their business management affairs. TZL offers advice on company formation and growth to all technology-oriented and innovative businesses. Furthermore, clients are provided with office services as well as the possibility of integration into the network activities of TZL.

The availability of existing infrastructure enables the level of investment by companies using chem2biz to be minimized. This not only reduces capital requirements but also shortens the lead-time to market entry – aspects which, in turn, significantly improve the prospects for success.

▶ www.chem2biz.de

chem2biz
Turning Your Ideas Into Business

▶ chem2biz
A joint initiative of
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# Alsace: The European Rendezvous

**The French Connection – A French cluster dedicated to life sciences and healthcare, Alsace BioValley is an ideal starting point to develop any bio-business on a European scale. Located in France's Alsace region at the heart of Europe, its tri-national environment offers a unique concentration of businesses and services dedicated to the life sciences and healthcare.**

**Nicolas Carboni**
**Managing Director of the Alsace BioValley biocluster**

This cosmopolitan region is extremely attractive, as proven by its internationally acclaimed experts, multiple platforms offering scientific services, and a dynamic life sciences network spreading across three countries – France, Germany and Switzerland – and including 600 businesses, 15,000 scientists and a workforce of 50,000 people in life sciences.

Offering the highest concentration of R&D in Europe, Alsace is home to one of France's largest universities, which counts among the foremost European academic research institutions thanks to the world-renowned excellence of its research teams. Furthermore, three of Alsace's "Grandes Ecoles" are in the top 30 engineering schools for innovation. It is hardly surprising that Alsace holds the second national position for scientific publications and the third for European patent registration. A land of outstanding research, Alsace ranks first among France's regions in terms of attractiveness for foreign students, second for foreign researchers, and it is France's third scientific hub, reaching 300 million European consumers within a 500-mile radius.

Alsace BioValley enjoys a global presence thanks to Alsace International's (the economic development agency of the Alsace region) network of branch offices including offices in the U.S., Japan, China, Israel, India etc. Within Alsace BioValley, each company or laboratory is in contact with a dedicated scientific and business advisor who follows a project throughout all phases.

The cluster also actively supports the development of Alsace's infrastructures for scientific excellence, including specialized real estate, platforms offering targeted scientific services, logistics and pooled services.

Alsace's geographic position makes it possible to save time, since all life sciences players are located within the immediate area. That means that a company or laboratory's potential partners are all within driving distance (90 min.), obviously making it easier to expand faster.

What's more, a number of financial and fiscal benefits are available in Alsace, as current French tax laws are among the World's most favorable to R&D investment. Companies eligible for what are the most attractive research tax credits in Europe can claim up to 50 % back of their R&D expenditures as tax credit and double their R&D tax credit return if they outsource to a French public research laboratory. The French government has confirmed that it will increase its R&D tax credit incentives in the next three years. In addition, France offers even more specific forms of R&D support: national and local funding, aid in the form of grants or 0 % loans, and public aid combinable with the Research Tax Credit. Public-private R&D projects can receive up to 60 % state funding, while businesses can get additional aid for R&D projects designed in partnership with French public laboratories.

Last but not least, the region is well known for its exceptional quality of life. With a cosmopolitan population, multilingual educational structures, excellent transportation systems, and a multicultural tradition rooted in a rich setting of historic cities and pristine nature, Alsace offers all the best to do the best business.

The Alsace region

### A Region Teeming with Bio-Business Advantages

In addition to this favorable environment, life science companies and laboratories find many advantages that help optimize their business in Alsace, notably the presence of the Alsace BioValley, a bio-cluster dedicated to therapeutic innovations, focusing particularly on biopharmaceuticals and medical technologies.

Alsace BioValley has attained the French government's official "Healthcare Cluster" label and works to federate and support the region's companies, research laboratories, and universities active in life sciences and healthcare. Thanks to a structured network including institutional and economic partners, the cluster provides a vast range of free

Consequently, many companies have already recognized all the benefits this region has to offer to R&D projects: over 1,200 foreign-held firms are established in Alsace. Around 40 % of the world's biggest pharmaceutical companies are located in the area covering France, Germany and Switzerland, the national boundaries of which have been virtually swept away, opening the region to Europe and the rest of the world.

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# BioCampus Cologne

**PROFILE** One of the Leading Biotech Parks in Europe Cologne, located in the heart of Europe, is a city of science, economy and culture. With its well-known universities, research institutes and companies it is the heart of one of the most significant Life Science clusters in Europe. This is where BioCampus Cologne is located. With its total area of 254,000 square meters and 21 Life Science companies located there it is one of the leading biotech parks in Europe.

BioCampus Cologne offers Life-Science companies a pre-financed infrastructure, S1 and S2 laboratories ready for occupancy with associated office space and sufficient expansion possibilities. Utilisation of the shared facilities, such as the representative conference center, the campus restaurant with catering service and the 24/7 security service relieve the organisational and financial burden on the companies. BioCampus Cologne¹s concept gives the chance to reveal synergistic effects early and take advantage from them.


BioCampus Cologne is member of the Biotech network 'BioPartners Cologne', which provides service from foundation and financing up to establishment and consulting as a 'one-stop-shop'.

Until now successful companies like Lonza, Direvo Industrial Biotechnology, Intavis Bioanalytical Instruments, Bayer Schering Pharma and NonWoTecc Medical profit by BioCampus Cologne's advantages.

▶ www.biocampuscologne.de

BioCampus Cologne

▶ BioCampus Cologne Grundbesitz GmbH & Co. KG

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References:
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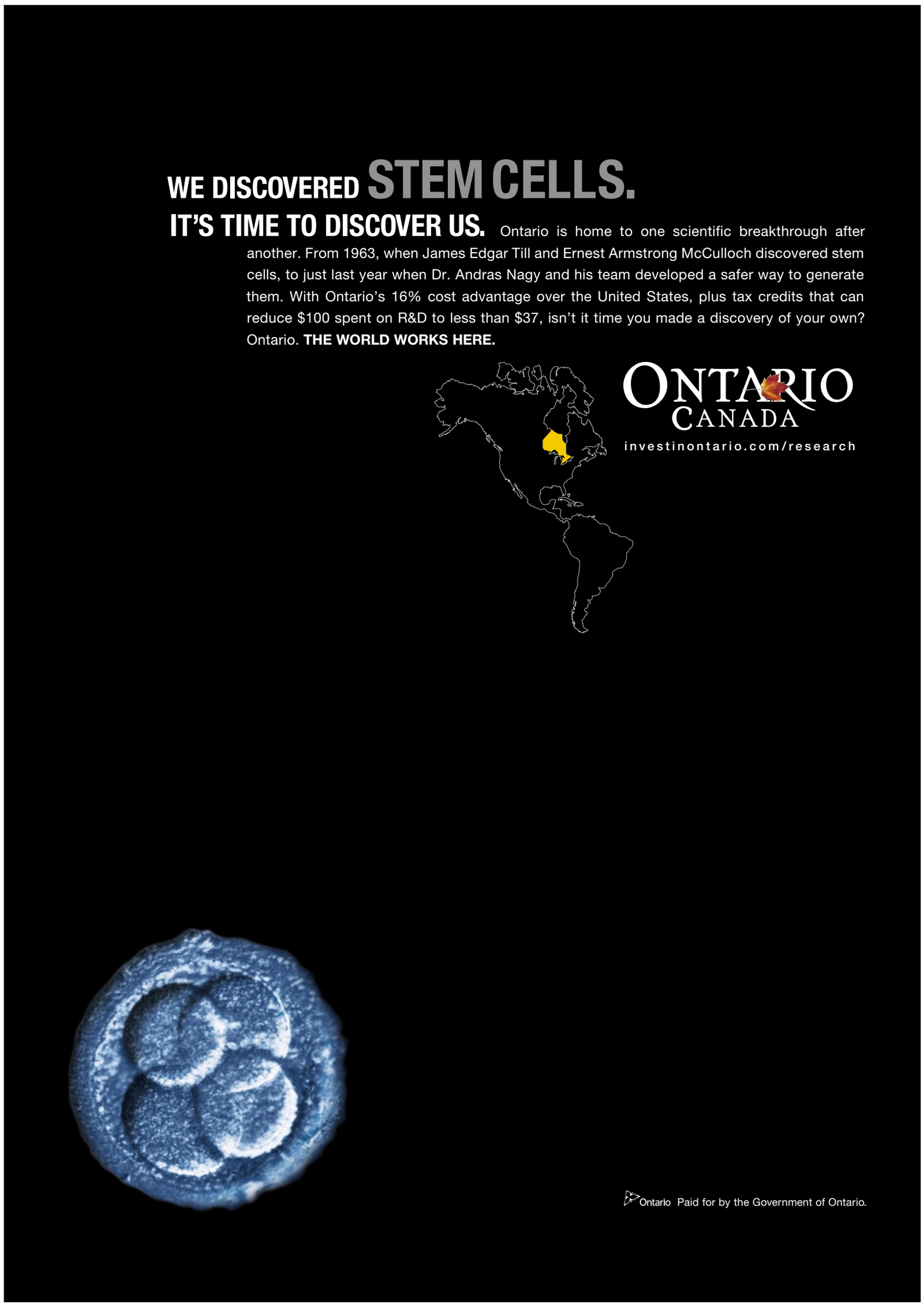
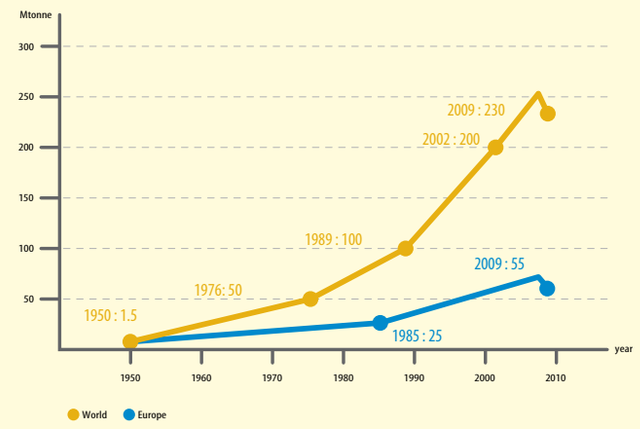


## Plastics in Perspective

**World Plastics Production 1950–2009**

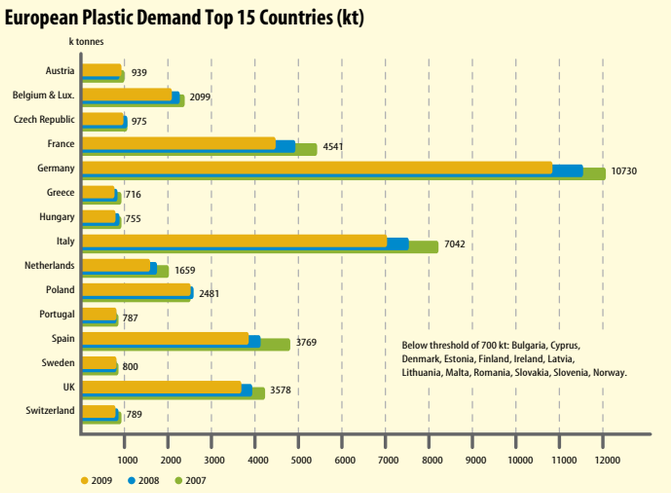



Source: PlasticsEurope Market Research Group (PEMRG) © GIT VERLAG

### Slow Recovery

The plastics industry has grown continuously all over the world for more than 50 years. Over the years, production has increased from 1.5 million tons in 1950 to 230 million tons in 2009, which translates to approximately 9% growth per year on average. However, the annual growth was hit hard by the worldwide economic crisis, and manufacturers witnessed a drastic decrease in demand, especially in Europe. This bottomed out at the beginning of 2009, and with the slow recovery rate, it will still take the plastics manufacturing industry several years to reach the high levels from previous years.

**European Plastic Demand Top 15 Countries (kt)**

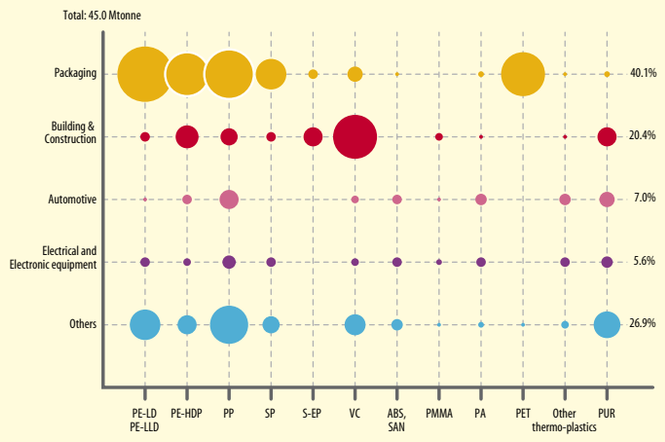



Source: PlasticsEurope Market Research Group (PEMRG) © GIT VERLAG

### Room For Growth

In the long term, the plastics success story is expected to continue. Plastics have far from tapped all substitution potential that comes on top of GDP growth. Global per capita demand is growing at a long-term trend of 4%. Despite high growth rates, per capita consumption in Asia and Central Europe is significantly below the levels of mature industrial regions. Mature industrial regions are also expected to see growth rates slightly above GDP. This all adds up to room for further growth.

**European Plastics Demand by Segments 2009**

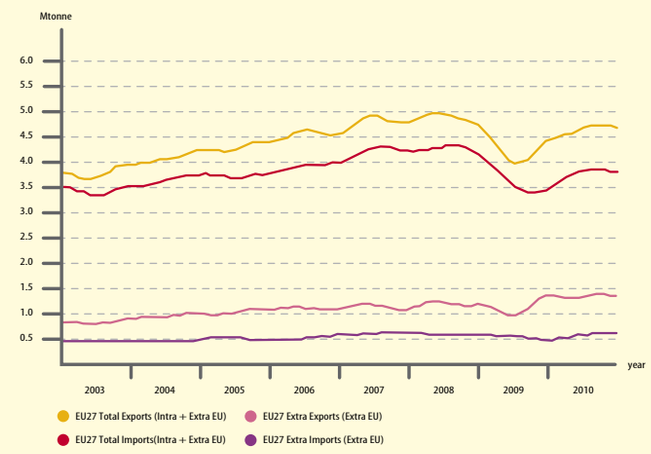



Source: PlasticsEurope Market Research Group (PEMRG) © GIT VERLAG

### End-Use Applications Remain Stable

Demand from European converters fell back 7.2% from 2008 to 45 million tons in 2009. The market share of end-use applications remained stable with packaging the largest segment representing 40.1% of overall demand. This is followed by building and construction (20.4%), automotive (7%) and electrical and electronic equipment (5.6%). Others include different small segments like sport, leisure, agriculture, machinery engineering etc.

**Trends in EU27: Trade with Primary Plastics, Trend Cycle**




Source: PlasticsEurope Market Research Group (PEMRG) © GIT VERLAG

### Stiff Export Competition

The EU export rate of plastics and converted products grew by over 100% between 2000 and 2009, reaching a high of €13 billion. For plastics materials the biggest export markets remain China (including Hong Kong), Turkey and Russia. For converted products EU exports go primarily to the U.S. (12.2%), Russia (11.6%) and China (5.4%). However, China has become a significant exporter of plastic products, accounting for 33% of all global exports in 2009. This situation must be monitored closely by EU institutions if Europe is to remain a plastics exporter.

## RoHS Review Fails to Restrict New Substances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The review of the EU RoHS Directive, restricting the use of hazardous substances in electronics, has failed to add any new chemicals to those already restricted under the directive. EU legislators did not add a list of substances to be prioritised for future restrictions. The European Parliament voted for a compromise with the European Commission and the Council of Ministers regarding the review of the RoHS directive.

"It is disappointing to note that the review of RoHS does not add a single new substance to the directive," said ChemSec project coordinator Frida Hök. "This in spite of the fact that the electronics industry is moving away from chemicals causing severe problems, such as brominated flame retardants and PVC."

However, the review does include a methodology for identification of substances for future restrictions under RoHS. The methodology focuses on the waste and end-of-life phase. It states that substances which, under current operational conditions in the e-waste sector, could give raise to hazardous transformation products should be restricted in RoHS. Brominated flame retardants and PVC, when incinerated at insufficiently high temperatures, produce very hazardous dioxins and furans.

"We welcome this strong methodology which includes brominated flame retardants and PVC and opens up the possibility of future restrictions on these substances under RoHS," Hök said.

The European Commission will apply the new methodology to HBCDD and three phtalates within three years of the revised RoHS Directive entering into force. The legal text states that during this period the Commission "should re-investigate the substances, which were subject to previous assessments." The substances are not specified in the legal text. However, the EU-commissioned Öko-Institute report from 2008 lists a range of hazardous chemicals in electronic goods, including brominated flame retardants and PVC. ChemSec believes the Commission should use this report to prioritize chemicals for assessment under the new methodology. ■


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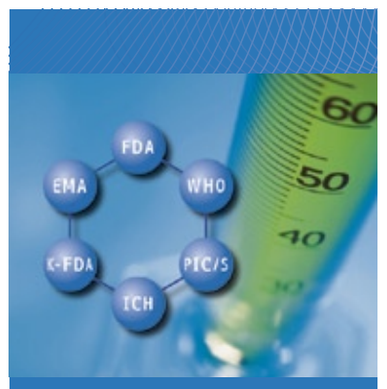

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