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THE NEWSPAPER FOR THE CHEMICAL AND LIFE SCIENCE MARKETS

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Beyond Molecules

BASF Aspires to Accomplish the Paradigm Shift from Molecules to Systems, Components and Materials

Evolution – After announcing the framework of a new R&D strategy in the spring of last year, BASF is beginning to reveal in detail just how it is affecting its research operations. One important aspect of the strategy was that its R&D activities would be globalized so that by 2020 50% of its research would be conducted outside of Europe – in Asia and North America – compared to 27% at present. However, a key aspect of the new R&D policy, which is now underpinning its research objectives, is that the company is moving the focus of its research beyond the discovery of new molecules.

"Developing and producing chemicals is no longer enough to manage the challenges of the future," Dr. Andreas Kreimeyer, BASF's research executive director and member of the board of executive directors told CHEManager Europe at the company's recent annual research press conference in Ludwigshafen. "BASF has to offer chemical competence in the broadest sense to accomplish the paradigm shift from molecules to systems, components and functional materials — from chemicals to chemistry," he continued. "This means that BASF must be well positioned to offer a combination of chemicals, application know-how, IP and service."

The views expressed by Dr. Kreimeyer echoed those he had written in paper earlier in the year in the German academic chemistry journal Angewandte Chemie (published by Wiley, CHEManager Europe's parent company) in which he had argued that the aim of innovation in the chemical industry is now "on intelligent chemistry in the form of holistic systems".

The direction in chemicals R&D was "increasingly toward functional materials – from raw materials, basic products and intermediates towards system solutions", he said.

As a result, in the chemical industry and also in academia, chemistry research had adopted interdisciplinary, cross-sectional approach in which different areas of expertise were brought together to meet specific societal needs.

"While at the beginning of its history, chemistry was characterized by the discovery and development of substances, today we investigate and design complex systems as well as the functions of materials, constantly bearing in mind their use along the entire value chain," Dr. Kreimeyer said in the paper.

BASF has the biggest R&D budget in the chemical industry, amounting in 2012 to €1.7 billion against €1.6 billion in the previous year. It has 10,500 employees working on around 3,000 R&D projects. The focus on materials is reflected in its targeting of 11 growth areas in its seven customer industries of transportation, construction, consumer goods, health and nutrition, electronics, agriculture and energy and resources.

In most of the growth fields the company sees innovative materials and their interaction with other materials as being a crucial means for meeting major social needs across much of the world. They include segments like batteries for mobility, electrical power management, wind energy, water solutions, organic electronics, medical solutions, heat management in construction and lightweight composites.

In addition to having business potential, the growth areas have been selected because they have high barriers to entry in terms of technologies and financial and human resources, and they require chemistry as an enabler.

With population growth and increasing living standards forecast to drive up global demand for energy by over 50% by 2050, BASF has singled out energy efficiency and climate protection as a big area for research. They account for around a third of current total R&D expenditure with innovations in materials and their application being a priority.

In wind energy, for example, whose installed electricity-generating capacity is expected to rise by over 50% in 2011-2020, BASF is already providing a broad range of products, including coatings, adhesives, resins, foams, grouts and admixtures. This portfolio enables it to develop multi-material systems to raise the performance of wind turbines.

"Developing and producing chemicals is no longer enough to manage the challenges of the future."

This multi-material research covers matrices for composites, interfaces between composites and coatings, simplified processes for making blades and other turbine components and modeling systems for testing component materials.

"Needs in the wind energy market like greater energy efficiencies, cost reductions, longer blades and more durability can benefits from innovative materials, systems, processes and design," Dr. Holger Ruckdaeschel, BASF's head of systems research wind energy, told the press conference.

In solar energy the company has a long-term research project for the development of materials for a roll-on-roll (R2R), low-temperature coating process for photovoltaic thin films to enable solar power to compete cost effectively with other energy sources.

"The prime target is the reduction of PV system costs," explained Dr. Peter Erk, BASF's head of research for organic photovoltaic (OPV) systems. "Thin film PV technologies provide flexible, low-weight solutions for the cost efficient integration of solar power (in buildings and vehicles)."

But there are major challenges ahead. The amounts of materials used in PV systems needs to be considerably reduced. At the same time the energy efficiency levels of OPV cells have to be raised from a current 8-12% to over 15% to be commercially viable.

"By replacing active materials used in existing organic PV materials with inorganic dyes (for dye sensitized solar cells) we are now getting higher efficiencies," said Mr. Erk. "We need a large number of different scientific competences to get from chemicals to PV systems, because it includes synthesis, modeling, formulation, printing, device building and testing."

Because its research has become more multidisciplinary, BASF now recruits a wider range of scientific competences to its R&D staff, both in Europe and elsewhere. At the same time the company's research staff is interacting more with scientists and experts outside BASF.

The recently opened Innovation Campus Asia Pacific in Shanghai, BASF's largest research site in the region, has 450 scientists from 17 different business units focused on functional materials and system solutions in areas like household and personal care appliances, lighting, coatings, sealants and polyurethanes for shoes.

"This wide variety of topics requires co-operation between material scientists, engineering experts, business partners and customers—and also active exchange with the scientific community," said Dr. Kreimeyer.

The company now has what it calls an interdisciplinary know-how Verbund comprising a string of R&D centers around the world linked to universities and other scientific institutions and business partners. The Verbund includes an interdisciplinary global network of over 600 universities, research institutes and companies with a wide variety of scientific expertise.

Within the network are collaborative entities set up by the company itself. One of these is the North American Center for Research in Advanced Materials. This gives it access to researchers from Harvard University, Massachusetts Institute of Technology and the University of Massachusetts Amherst in the study of micro and nano-structured polymers, lightweight materials and nature-emulating biomimetic materials.

In Germany it has helped set up with partners like the Fritz Haber Institute of the Max Planck Society a joint BasCat laboratory at Technical University Berlin on the development of catalysts for projects like the conversion of methane to ethylene.

However, the company is also using the traditional approach of making acquisitions to gain more knowledge of specific areas of research. Over the last few years it has gained substantial expertise in battery materials with the aid of takeovers of companies and businesses specializing in the field.

In June it strengthened its position in the growth field of electrical power management with the acquisition of Deutsche Nanoschicht, a Rheinbach, Germany-based developer of a process for using chemical solution deposition for making thin layers of a broad range of materials.

BASF had already been working with the company on the low-cost manufacture of high-temperature superconductors which are able to carry electric current virtually without loss, considerably improving the efficiency of electricity distribution.

The company is continuing to measure its innovative strength in the amount of sales of new products. By 2020 it wants to achieve €30 billion sales from products launched on the market since 2010. This compares with €8.5 billion of sales in 2012 from products that had been on the market less than five years.

Last year BASF introduced 250 new products. But in the broader context of its concept of 'intelligent chemistry (within) holistic systems', the numbers were much higher. "If new formulations and optimized existing products are added, the total reaches several thousand," said Dr. Kreimeyer.

Sean Milmo, freelance science and business journalist, Essex, UK

chemanager-online.com/en/tags/innovation

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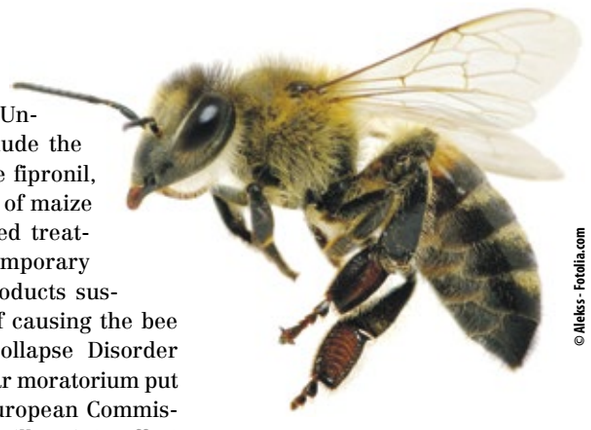
BASF Criticizes Inclusion of Fipronil in EU Bee Protection Restrictions

Germany — BASF has taken issue with the European Union's move to include the group's insecticide fipronil, used in treatment of maize and sunflower seed treatments, in its temporary restrictions on products suspected by some of causing the bee disease Colony Collapse Disorder (CCD). The two-year moratorium put in place by the European Commission in late April will go into effect in December of this year.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The inclusion of the BASF product follows a recommendation by the European Food Safety Agency, EFSA, which also recommended restricting the use of the neonicotinoid class of insecticides produced by Bayer and Syngenta. The German and the Swiss agrochemical giants also have protested the plan.

After two years, the newest scientific information will be considered and conditions of approval reviewed, the Commission said in April.

Remarking that the EU's decision "was derived from an assessment that focused heavily on new technical area for which no established regulatory evaluation criteria are yet available," BASF added that "sound data that underpin the safe use of our product for bees were not considered sufficiently."

Along with "the majority of experts," the German chemical giant said it "remains unconvinced" that the decline in bee populations is caused by multiple and complex factors and does not believe restricting fipronol will contribute to protecting bees.

In the U.S., where the Department of Agriculture (USDA) and the Environmental Protection Agency (EPA) have so far rejected environmentalist calls for action, several beekeeping organizations are now suing the EPA for approving Dow Chemical's new insecticide sulfoxaflor, which the groups say is "considered by many to be a fourth-generation neonicotinoid." This marks the second time the U.S .environmental authority has been sued for failing to protect bees.

The agriculture department in the state of Oregon meanwhile has temporarily restricted the use of 18 pesticides containing the active ingredient dinotefuran that killed an estimated 25,000 bumblebees in a store parking lot in June. The pesticides had been sprayed on 55 blooming linden trees. (dw) ■

Court to Decide Fate of PVC Producer Kem One in September

France — A commercial court in Lyon, France, has given itself time until Sept. 26 to examine bids to acquire insolvent PVC producer Kem One, the former Arkema business, which filed for bankruptcy in April.

In early July, insolvency administrator Bruno Sapin told French trade unions he had received seven letters of interest from companies, individuals and organizations mulling plans to buy the PVC producer. While the potential buyers were not identified, one proposal was said to be from a European strategic investor, three from U.S. and European private equity funds and two from private individuals. A seventh is said to have come from the trade union CGT, which aims to establish a consortium of public and private interests to run the company.

Production is believed to have returned to near-normal levels after the insolvency administrator asked Arkema's parent, French oil and petrochemical producer Total, to continue ethylene supply at a rebate against the contract reference price. Arkema also promised the insolvency administrator and the French government to contribute €68 million to keep the PVC producer afloat until a new owner has been found. In April, reports said €105 million was regarded as necessary to keep production going for a six-month period. (dw) ■

Monsanto to Withdraw EU Approval Requests For New GMO Crops

U.S. — Monsanto said it will withdraw all pending approval requests to grow new types of genetically modified crops in the European Union, due to the lack of commercial prospects for cultivation there.

Jose Manuel Madero, Monsanto's European president and managing director, said the decision would allow the company to focus on growing its conventional seeds business in Europe, as well as securing EU approvals to import its genetically modified crop varieties widely grown in the United States and South America.

The decision covered five EU approval requests to grow genetically modified maize, plus one soybean and one sugar beet. The company said it would not withdraw its application to renew the approval for its insect-resistant MON810 maize — the only GMO crop currently cultivated commercially in Europe.

A spokesman for the European Commission, which manages the EU's GMO approval system, confirmed that Monsanto had informed it of its intention to withdraw the applications.

The move reflects the frustration felt by many biotech companies towards the EU's approval system for GMOs. Decisions routinely face years of delays, and only three varieties have ever been given the green light for cultivation. ■

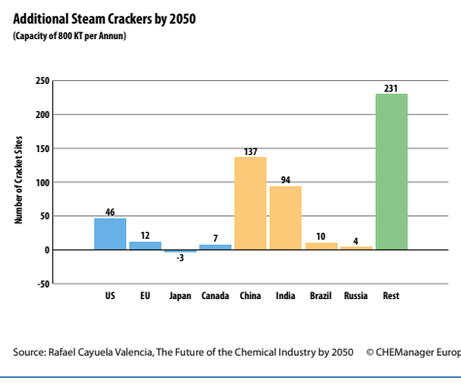
Spanish PET Producer La Seda de Barcelona Files for Bankruptcy

Spain — After Spanish PET producer La Seda de Barcelona filed a voluntary insolvency petition in June, proceedings were still in limbo at press time. An insolvency administrator appointed by the Barcelona commercial court resigned after two days on the job due to a possible conflict of interest, but the hearing – which involves the parent company and 12 European subsidiaries – was due to resume following the appointment of a new administrator. The filing does not mean the company will be liquidated, La Seda explained in its initial statement.

As one move to stem losses, plans to permanently shutter the unprofitable 80,000 t/y PET polymerization plant at Volos, Greece, were announced. The unit had been off stream for some time. The bankruptcy proceedings are designed to buy time to allow the company to reorganize. In recent years, La Seda has pursued an aggressive expansion course, ramping up PET capacity throughout Europe, buying up plants put up for sale by companies such as Eastman and also taking over rivals such as Volos of Greece and packaging producer Schmalbach-Lubeca of Germany. Along with Asian competition, La Seda's polymerization business was pressured by an oversupplied market and weakening demand. In 2012, the company began an unsuccessful search for a joint venture partner or strategic buyer. It also sought to integrate its production chain, or to separate or even sell the businesses. For full year 2012, the PET producer reported sales flat at €1.17 billion, with operating losses widening to €68.8 million from €10.6 billion a year earlier. The net consolidated loss rose to €133.7 million from €49.6 million, as Ebitda was halved from €48 million to €24.8 million. The bottle manufacturing end of the business, by contrast, increased its EBITDA from €43.8 million to €49.6 million. (dw) ■

Erratum

In the June issue of CHEManager Europe, we printed the wrong version of the following graphic in the article Long Term Trends: Demographic Shirts and Growing GDPs Bode Well for the Industry by Rafael Cayuela. Here is the correct version.



Source: Rafael Cayuela Valencia, The Future of the Chemical Industry by 2050 © CHEManager Europe

Beyond Emerging

Latin America's Pharma Industry is Coming into its Own

Adaptation and Growth – For years, pharmaceutical companies have turned to emerging markets as low cost manufacturing destinations, utilizing lower wages and, frequently, less stringent environmental, health and safety regulations. As emerging markets capture a greater share of the global pharmaceutical market, these countries are altering and adapting their regulations to compete with the quality expectations of highly regulated markets like the EU and U.S., while addressing their own sourcing needs. Led in large part by substantial growth in Brazil and Mexico, countries in Latin America are firmly establishing their place in the market.

Soccer is not the only world-class export Brazil and its neighbors have to offer; Latin America is gradually capturing more and more of the global pharma market.

Latin America has been a long sought after, though difficult to penetrate pharmaceutical market. With the market size of Latin America at $66 billion as of May 2012, many companies have developed strategies to enable access to a portion of this growing market. Part of these strategic discussions center around how to address different regulations between countries in the region and the various components required to register a product from country to country.

Reciprocity Agreements

In order to help alleviate some of those difficulties and promote trade between Latin American countries, several regulatory bodies have entered into reciprocity agreements. In January of this year, one such agreement between health authorities in Argentina, Brazil, Colombia and Cuba came into effect. This agreement allows Good Manufacturing Practices (GMP) inspection reports for the member countries to be the basis of GMP certificates in any of the other member countries, allowing regulators to expend resources elsewhere.

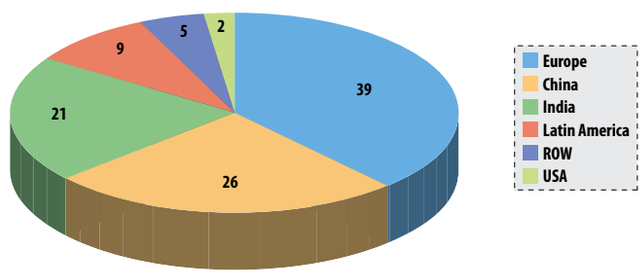
Several similar reciprocity agreements have been reached including one between Mexico and Chile, and a recent one involving Mexico, Chile, Colombia, and Peru. The Mexican regulatory agency, the Federal Commission for the Protection from Sanitary Risks (COFEPRIS) has also been in talks with the European Medicines Agency (EMA) regarding mutual recognition of GMP information as well, indicating a strong interest in pursuing more regulated markets.

To this point, Brazil has sought inclusion on the European Commission's "White List" as part of the Falsified Medicines directive, which was tightened in July. Inclusion on this list would allow manufactures in Brazil to be among those in select countries that do not have to submit written confirmations with their shipments of APIs into the EU, enabling easier trade between the two regions. The EU's equivalence assessment of Brazil is still ongoing; the U.S., Japan, Switzerland, and Australia have been accepted as third countries.

The Importance Of Brazil

Among Latin American countries, Brazil has the largest market share with an estimated worth of $25 billion. In addition to the required registration documents and fees; the Brazilian Health Surveillance Agency (ANVISA) requires GMP certifications for each product imported into Brazil. ANVISA has been conducting inspections of finished dose (FD) manufacturers for some time and began to require registration of active ingredient manufacturers in recent years. Currently, ANVISA is conducting inspections of companies that are manufacturing APIs on the list of priority products established by the health authority and, earlier this year, asked companies to delay certification requests for products not included on this list.

Geographic comparison of successful ANVISA API GMP audits (excluding Brazil)



Source: Thomson Reuters Newport Premium © CHEManager Europe

ANVISA has conducted inspections in a number of countries with almost half of successfully inspected sites being located in China and India combined, and the remainder coming from European, Latin American and rest of world sources (fig. 1). With a substantial number of API suppliers located in Europe, maintaining existing and creating new opportunities for cooperation is vital to growth in Latin America. In addition to inspecting manufacturers importing into Brazil, ANVISA requires inspections of local manufacturers of API and FD products as well. To meet increasing oversight demands, ANVISA published a list of state and local authorities that cooperate with the national authority to conduct inspections within Brazil. Similarly, COFEPRIS announced that GMP certificates from a number of regulatory authorities will be recognized in Mexico.

Is It Local?

Along with increasing quality expectations for products being imported to and exported from Latin America countries, there is greater focus being placed on growing local manufacturing. This comes as governments strive to curtail burgeoning health expenditures in the face of increasing cost of prescription medications and incidences of chronic lifestyle disease.

A number of countries are offering incentives to companies to bring production to the region as a means to cut costs through decreased reliance on imported medications. In addition to offering incentives, some countries require a local presence in order to sell medicines on the local market. The local governments have created a number of private-public partnerships (PPP) to boost local production and to bring technology transfers to regional companies.

Building up local manufacturing capabilities for specialized technologies, like biologics and cytotoxics, has become an integral part of the healthcare discussion. In recent years, a number of agreements have been made that center around increasing biologic drug manufacturing and biotech development.

Recently, the Brazilian government entered into two such agreements with biotech companies Indar and Protalix for sourcing agreements and technology transfers of insulin and taliglucerase alfa, respectively. Along with development deals between Latin America and companies outside of the market, there are a number of deals between Latin American countries. Brazil and Argentina are collaborating on biosimilar development with Libbs investing $100 million into a new plant in Sao Paolo and transferring technology from mAbxience's facilty in Buenos Aires, PharmADN.

Conclusion

As quality requirements and the cost of compliance continue to increase globally, Latin America and other emerging markets will continue to be in focus. Manufacturers continue to seek ways to decrease costs and capitalize on these rapidly growing markets, leading to greater partnership opportunities as governments strive to increase their local capabilities as a means of decreasing healthcare expenditures. Specialized manufacturing necessary for biologics, high potency, and cytotoxic medications will also drive continued deal-making and regional investment in Latin America. Foreign market players looking to expand their footprint and established players in Latin America will benefit from emerging companies seeking to further develop their manufacturing and expertise in this growing region.

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Pfizer, Merck Weather Weak Quarter

U.S. — Big Pharma is still relying on belt-tightening to prop up financial results. Pfizer and Merck & Co said their quarterly results were again hit by generic competition for once top-selling products and the toll of a strong dollar on overseas revenue. Controls on marketing and administrative expenses, and other costs, helped them report earnings slightly above Wall Street estimates.

But neither company offered investors a quick return to growth based on new products, even if the worst of the patent cliff for best-selling drugs that have lost marketing exclusivity is behind them.

Merck said full-year sales were likely to be about 5 to 6% below last year's levels, Even so, it stuck to its full-year profit outlook of $3.45 to $3.55 per share, excluding special items.

Pfizer, the largest U.S. drug maker, said second quarter revenue fell 7% to $12.97 billion, with 3% of the decline due to an unfavorable foreign exchange rate.

But Pfizer also trimmed costs and expenses by 3% and reiterated its full-year earnings forecast of $2.10 to $2.20 per share.

Pfizer said income, excluding special items, fell 10% to $4 billion, or 56 cents a share, from $4.45 billion, or 59 cents a share, a year earlier.

Merck earned $906 million, or 30 cents per share, down from $1.79 billion, or 58 cents per share, a year earlier. Excluding special items, Merck earned 84 cents a share. ■

Altana to Buy Rockwood Holdings' Global Rheology Business German specialty chemicals group Altana has agreed to buy the global rheology business of U.S. chemicals maker Rockwood Holdings for $635 million to expand its additives portfolio. With the acquisition – expected to close in the fourth quarter of 2013 – Altana's sales are expected to reach about €1.9 billion from more than €1.7 billion in 2012, Altana said. Rheology additives are used in coatings, construction materials and personal care products. The business is part of Rockwood's additive division, which it had bundled with its titanium dioxide business.

Former Dow Business Styron to be sold to Ravago Styron Europe, part of the former Dow Chemical styrenics activities spun off in 2010 and subsequently sold to private equity, is selling its European expandable polystyrene (EPS) business to RP Compounds, subsidiary of privately owned Belgian compounder and distributor Ravago. The agreement foresees a Ravago acquiring Styron's 70,000 t/y EPS plant at Schkopau, Germany, as well as related intellectual property and the Sconapor brand name.

Kemira Reviewing Options for ChemSolutions Kemira said it has retained Swedish bank SEB for a process to review strategic options for its ChemSolutions segment. In a push to realign its portfolio, the Finnish chemical company divested ChemSolution's food and pharma businesses and sold its shares in its Sachtleben JV in the first quarter of 2013. Kemira is looking to focus on the core industries of pulp & paper, oil & gas, mining and water treatment; ChemSolutions has limited synergies to the core business, the company said in a statement. (bhs)

Huntsman Agrees to Acquire Polyols Producer Oxid U.S. chemical producer Huntsman has signed a binding agreement to acquire polyols specialist Oxid for an undisclosed sum. Under the Terol brand name, the privately owned company headquartered in Houston, Texas, manufactures a diverse product line of specialty urethane polyols used mainly in thermal insulation applications. Oxid had sales of $86 million in 2012. The deal is planned to close during Q3 and is expected to be immediately accretive to earnings. (dw)

Air Liquide Cements Supply Relationship with LyondellBasell Industrial gases producer Air Liquide is cementing its supply relationship with petrochemical giant LyondellBasell. The French-based company said it has signed a new long-term contract to provide steam, air gases and water to three LyondellBasell sites in the Bayport chemical district of Texas.

As part of the plan, Air Liquide will spend €180 million on expanding its state of the art energy-efficient co-generation unit at the LyondellBasell complex, which will have capacity of 300 mw of electricity and more than 1,300 t/h of steam. The company is also upgrading capacity at an air separation unit and investing in infrastructure at the site. The French gases producer said the additional capacity will also allow it to supply other companies in the Bayport area. Co-generation plants are deemed to be more energy efficient compared with separation electricity and steam units, while at the same time saving CO_2 emissions. (dw)

SGL and Samsung to Jointly Develop Carbon Fiber Composites Germany's SGL Group and Korean electronics and petrochemicals group Samsung have founded a 50:50 joint venture to develop the market for carbon fiber composites. The partners say the new marketing company, Samsung SLG Carbon Composite Materials, will combine their core competencies. SGL will contribute its knowhow in carbon fiber-reinforced materials, Samsung its experience in application development. The collaboration is expected to secure a long-term stable supply of materials for Samsung. Headquarters of the joint venture will be at Ulsan, South Korea, the marketing office at Seoul, South Korea. SGL products will be given preference in all transactions.

In the medium term, the companies plan to expand the business across Asia. Targeted applications, alongside electronics, are windmill turbine blades, pressure vessels, automotive and household appliances, seen as growing by 20% annually in Korea and China. Currently, Korean applications focus on prepregs and sporting goods. (dw)

Invista Agrees Offtake from New Saudi PA 6.6 Plant at Al Jubail As part of its global effort to increase the availability of PA 6.6, producer Invista has signed an exclusive long-term purchasing agreement with Saudi Arabia's Petrochemical Conversion Company (PCC) to take an unspecified amount of engineering resin from the Saudi company's new 50,000 t/y plant scheduled to start up at Al Jubail late this year or early next year. Invista, which became world's largest producer of PA 6.6 by acquiring the DuPont franchise in 2003, is owned by Koch Industries. Outside Saudi Arabia, the product will be marketed under Invista's Torzen brand. The agreement with PCC, a 50:50 subsidiary of Saudi Industrial Investment Group (SIIG) and Chevron Phillips Petrochemical, is Invista's second move to extend supply of the polyamide to markets outside the U.S. In May, the company reserved land for a world-scale PA 6.6 plant as part of an integrated complex within the Shanghai Chemical Industry Park in Shanghai, China. The plot is adjacent to the Invista's planned facilities at SCIP for 215,000 t/y of PA feedstocks hexamethylene diamine (HMD) and adiponitrile. (dw)

Linde Confirms 2013 Forecast after Strong H1 After a strong first half, which saw operating profit rise nearly 14% to just under €2 billion and sales by 10.5% to €8.2 billion, German gases and engineering group Linde has confirmed its full-year 2013 forecast of generating earnings of "at least" €4 billion. From January to June, sales of the gases division improved by 14.5% to €7 billion and operating profit by 14.1% to €1.9 billion, said CEO Wolfgang Reitzle. In the engineering division, order intake was double the 2012 volume but revenues related to existing projects increased only 1.5% to €1.25 billion, and operating profit was flat at €148 million. (dw)

BASF Aims to Top 2013 Figures Despite Weaker H1 The world's largest chemical producer found the going tougher than expected in the first half of 2013. Sales revenue increased by 4% to €8.1 billion, and EBIT before special items by 2.5% to €4 billion, In Q2, sales added 3% year-on-year to just under €18.4 billion, thanks to higher volumes and a strong performance of the Agriculture and Oil & Gas segments. However, EBIT before special items declined 5% to €1.8 billion. Meeting the earnings forecast announced at the beginning of 2013 now appears "significantly more challenging," CEO Kurt Bock said, but stressed that the group still aims to top the 2012 figures. (dw)

LyondellBasell Boosted by U.S. Polyolefins Business in Q2 In Q2 2013, sales of Rotterdam-based petrochemical and plastics giant LyondellBasell weakened by 1.3% year-on-year to $11.1 billion but improved by 4% against Q1 2013. EBITDA declined by 4% year-on-year, while increasing by the same margin against Q1. A strong performance by the U.S.-based olefins and polyolefins segment is largely credited for the positive results. Business in Europe and Asia was better than expected, but CEO Jim Gallogly warned that pricing conventions and maintenance turnarounds at competitors had boosted quarterly figures. "Underlying fundamentals within Europe remain weak," he said. (dw)

Dow Chemical EBITDA up 9% in Q2 Dow Chemical saw adjusted EBITDA gain nearly 9% year-on-year to $2.1 billion in Q2 2013, thanks mainly to strong business in the Agricultural Science and Performance Plastics segments. The unusually large adjustment reflects a payment of $2.2 from Petrochemical Industries Company of Kuwait in arbitration over the K-Dow joint venture canceled by Kuwait in 2009. Quarterly sales were flat at $14.6 billion. Led by activities in emerging markets that more than offset a decline in Europe, volume growth averaged 9%, said CEO Andrew Liveris. Prices receded by 2%, due in part to currency translations. (dw)

DuPont Operating Profit Recedes by 16% in Q2 DuPont sales were virtually flat in Q2 2013, with the slight revenue setback of 1% to $9.8 billion blamed on poor pricing for the titanium dioxide business it plans to sell or spin off. Operating profit fell 16% year-on-year to $1.9 billion. Among business segments, Agriculture is credited with the best quarterly performance. For full year 2013, CEO Ellen Kullman said she expects DuPont to deliver earnings "modestly above 2012 results," thereby overcoming "steep declines" in the TiO_2 market and economic headwinds in Europe. (dw)

Wacker Chemie Tops Forecast As Polysilicon Price Steadies German chemicals company Wacker Chemie beat second-quarter earnings forecasts and said a plunge in the price of polysilicon has ended. The company said its EBITDA fell 22% to €188 million in the second quarter, which beat analysts' average forecast of €169 million in a Reuters poll. Second-quarter sales, however, were €1.15 billion euros, just below the average forecast of €1.18 billion, and Wacker Chemie trimmed its 2013 sales forecast to €4.5 billion, having previously targeted a figure close to last year's €4.63 billion.

MaterialScience Drags Bayer Down in Second Quarter Germany's Bayer, like compatriot BASF, is upholding its forecast for 2013, "even if this appears increasingly ambitious," CEO Marijn Dekkers said in presenting Q2 results. The figures show adjusted group sales up less than 2% to €10.4 billion and EBITDA before special items up only 1% to €2.2 billion. Strong growth in Healthcare and CropScience was offset by an "unexpectedly weak" MaterialScience. Growth rates for H1 were similar. For the full year, Bayer is predicting a sales rise of 4-5% against 2012 to €40-41 billion (previously €41 billion) and a mid-single-digit percentage increase in EBITDA before special items. (dw)

Clariant Q2 Profit Rises as Restructuring Bears Fruit Restructuring boosted Swiss speciality chemicals maker Clariant in Q2. Swiss franc-denominated EBITDA before special items improved by 6% to 211 Sfr as sales from continuing operations in grew 1% in Swiss francs to € 1.5 billion and 2% in local currencies. CEO Hariolf Kottmann said he is "confident" that the group will achieve its full-year target for 2013 by focusing on innovation, growth and cost efficiency." Last year, Clariant sold three of its lower margin cyclical units and reorganized itself into four business units. (dw)

'Challenging Trading Conditions' Stymy Solvay in Q2 Challenging trading conditions depressed sales and earnings of Belgian chemical producer Solvay in Q2. Group revenue fell 4% year-on-year to €3 billion, sales volumes by 1% and selling prices by 2%. CEO Jean-Pierre Clamadieu said recurring EBITDA (REBITDA) sank by 14% to €487 million against "last year's demanding comparables." The few "weak signs of improvement" have not shown up in order books but Solvay nevertheless is "confident" of generating 2013 REBITDA comparable to 2012, adjusted for the impact of guar pricing problems and the sale of carbon credits, the CEO said. (dw)

Evonik Cuts Outlook, To Step Up Cost Cuts Evonik said it would step up cost cutting measures and slash its investment budget as it became the latest specialty chemicals maker to caution investors about its business prospects. The company, which made its stock market debut on April 25, said it now saw 2013 sales at the year-earlier level and operating income down. It had previously forecast higher sales and flat operating earnings. EBITDA fell 23% to €489 million in the second quarter, slightly more than the average of 10% analyst estimates of €486 million posted on Evonik's website.

DuPont Exploring Sale or Spin-Off of Performance Chemicals Unit

PORTFOLIO Company to 'Expore Strategic Alternatives'

Not unexpectedly, DuPont has announced plans to "explore strategic alternatives" for its Performance Chemicals business segment, which includes the units Titanium Technologies and Chemicals & Fluoroproducts with annual sales of $7.2 billion and pretax operating profit of $1.6 billion in 2012.

Ellen Kullmann
CEO, DuPont

U.S. — The businesses were under increased pressure in the second quarter, when the segment's operating profit fell from $594 million to only $264 million, blamed by DuPont on deteriorating prices and higher operating costs.

Separation from the Performance Chemicals is part of a move to create a "higher growth, less cyclical company that integrates its unique scientific capabilities in biology, chemistry and materials to develop differentiated, high-value solutions," said CEO Ellen Kullman. The group has been seen as eager to become a bigger player in the agriculture and biosciences sectors. Earlier in 2013, it sold its automotive coatings business to alternative asset manager Carlyle Group of the U.S for $4.9 billion.

A different strategic alternative may be pursued for each business, the U.S. chemical giant said, noting that it has no firm timeline for closing any deal. Possible moves could include a full or partial separation of each of the businesses through a spin-off, sale or "other transaction." Private equity groups are regarded as the most likely buyers of many of the businesses.

It has been rumored for some time that DuPont – the largest producer – would seek to exit the highly volatile titanium dioxide (TIO2) market, which has been pressured by pricing problems, overcapacity and soft demand and is seen as ripe for consolidation. The largest companies active in the market include U.S. players Huntsman, Tronox and Kronos, along with Cristal Global of Saudi Arabia and Ishihara of Japan. As the DuPont business is the sector's largest, anti-trust considerations would bar a takeover by any of them, observers say.

Until the end of July, Huntsman was in exclusive negotiations with Rockwood Holdings about acquiring that company's subsidiary Sachtleben, a smaller German TiO_2 producer. (dw) ■

Germany Makes Big Industry Pay More For Power Grid

ENERGY Government Says Role of Large Companies Stabilized

Germany is to reduce exemptions that big power-using firms have enjoyed from grid fees following EU criticism that they might amount to state aid and anger among consumers that industry was not sharing the cost of a shift to renewable energy.

Germany — Chancellor Angela Merkel's cabinet agreed to reduce the exemptions, which last year saved power-intensive companies around €300 million. The exemptions, which affect sectors such as chemicals, metals, glass and building materials, began in 2011 and have helped German industry to remain competitive despite some of the highest power prices in Europe. However, the European Commission expressed concern they could amount to state aid, while a German court ruled there was no legal basis for the special treatment. Consumer groups were also angered that some firms were being spared the cost of Germany's transition to renewable energy at the expense of households. The changes introduce a staggered system of payments depending on grid usage, and still offer big power users some relief. Companies that use more than 8 gigawatt hours of power for at least 8,000 hours will from next year have to pay 10% of the grid fees. That will rise to 15% for those using 7,500 hours and 20% for 7,000 hours.

Currently companies using more than 7,000 hours are completely exempt, benefiting around 200 companies. The government said the new system ensured the continued stabilizing role of big companies on the network. Large firms such as BASF have their own on-site power generation units which can feed power into the public grid. ■

Fracking Discussion Heats up on 2 Continents in Summer

DEBATE Hydraulic Fracturing in the News on both Sides of the Atlantic

Fracking on the Haynesville Shale near Shreveport, Louisiana. © danielfoster437/flickr

In the summer heat of June and July, the discussion over hydraulic fracturing showed no signs of cooling. There was no shortage of breaking news from the world's fracking fields.

U.S./Europe — As the UK government announced plans to lift its two-year moratorium on fracking and offer tax breaks for companies engaging in shale gas exploration, the first independent study of the country's gas potential, conducted by the British Geological Survey, obliged fracking proponents by estimating the potential in northern England's Bowland Basin to be somewhere close to 1,300 trillion ft3 (40 billion m^3) of gas.

The figure was substantially higher than earlier numbers, and some skeptics thought the calculation on the high side, especially as almost concurrently the US Energy Information Administration (EIA) revised American potential downward to 19 billion m^3 from 25 billion m^3 estimated earlier.

France is believed by the International Energy Agency (IEA) to have some of the most extensive shale gas reserves in Europe, but President Francois Hollande continues opposed. He used the occasion of a Bastille Day television interview on July 14 to insist that there would be no fracking activity during his term, which ends in 2017. Shortly afterward, the French Constitutional Court agreed to hear an appeal of the ban in place since 2011 – brought by a U.S. company whose exploration permits were withdrawn.

Amid strong anti-fracking sentiment in the general public, the German federal government's wait-and-see stance was still intact in July, with no change expected until after September parliamentary elections. In its stead, three of the country's geological institutes said they planned to campaign for greater acceptance of the technology by making it more environmentally friendly. An estimate by the BGR institute estimated recoverable German reserves at 1.3 billion m3. Despite the euphoria over the potential cheap light feed may offer chemical producers, experts warn that no matter how vast actual shale gas reserves may be, they must first be extracted. Along with the vagaries of technology, peripheral issues complicate the discussion.

The UK Energy and Climate Change Committee already has poured cold water on the prospect of a shale gas bonanza in that country. While recovery would help secure domestic energy supply, the Committee said it doubted that British gas prices would drop to U.S. levels. Westminster has skirted around the issue of public opposition by requiring companies with exploration licenses to share the revenue with communities affected.

Other issues have had their day in the spotlight this summer, if the outcome has not always been to the satisfaction of all involved. In July, U.S. oil and gas companies expressed their displeasure with plans by the Obama administration to toughen rules governing fracking on public lands. The proposed measures, even if less stringent than initially proposed, would cost the industry at least $345 million in additional costs annually, industry groups said. The Bureau of Land Management has forecast costs of $12-20 million.

Earthquakes are another issue muddying the exploration waters. Tremors in the UK's Blackpool area, close to the Bowland Basin, led to the government's erstwhile ban on fracking. While the government in London is now downplaying the issue, a report in the US magazine The Scientist last month said newest evidence shows that the practice can damage earthquake fault lines and cause tremors from quakes elsewhere in the world.

A definitive verdict is still out on the effects of hydraulic fracturing on drinking water, but its U.S. proponents may have at least scored public relations victories recently. Shortly after the Environmental Protection Agency (EPA) was obliged to cede control of a water pollution investigation to pro-fracking state authorities, the DOE's National Technology Laboratory reported that in monitoring eight new horizontal wells in Pennsylvania's Marcellus Shale basin, it had found "no evidence" that fracking chemicals contaminated drinking water. The fluid remained "thousands of feet below the shallower areas that supply drinking water, the researchers said. (dw) ■

Peter Greven Starts Up New Production Facility for Ester Lubricants

Peter Greven, a leading producer of oleochemical additives with sites in Germany, the Netherlands and Malaysia, is starting up a new production facility for ester lubricants at its headquarters in Bad Münstereifel in summer 2013 – exactly 90 years after the foundation of the site.

The total investment amounts to €8 million, in which beside the actual production facility and the required infrastructure (tanks, power, operating resources) investments for a pilot plant and for laboratory equipment and testing facilities have also been made. The investment supports the growth strategy of the company to be, along with the metallic soaps, more intensely focused on the production and marketing of esters in the future. The main applications for the ester line, sold under the brand name Ligalub, include the plastics and the lubricant industries. Especially in the lubricant sector high potential is expected based on the increasing environmental demands and the trend for biodegradable and sustainable lubricants. Medium term it is assumed that due to the investment in the site, 10 new jobs in production, laboratory and application technology will be created.

The new production facility is based on state-of-the-art technology; the focus of the development was primarily based on the highest cost and energy efficiency. The utilisation of the fatty acids produced at site and the existing energy and operating resources presented decisive factors for the choice of location. In the new over 30 meter high production building an additional production line with the same capacity can be integrated with relatively low effort, if needed.

During 2013, the new laboratory and administration buildings on site will be started up. Through the demolition of the former buildings, sufficient expansion space will be available for any production growth in the next years.

The broad building on the right hand behind the tower is the new production line for esters.

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Buyer Beware, Patient Beware

The FMD Does Not Guarantee Safe APIs

Tightened Directive – On July 2, the Falsified Medicines Directive (FMD) went into full force: All APIs imported into the EU must be accompanied by written confirmations of quality by the regulatory body from the country of origin, have a valid EU GMP certificate (for shortage cases only) or come from a country listed by the EU Commission. So far, the only countries to have been granted "equivalency status" are the U.S., Switzerland, Australia and Japan. According to Rx-360, applications from Singapore and Israel "have been declined pending changes in their GMPs to adequately address APIs that are exported rather than manufactured into drug product in domestically." Other countries, including China, India,Canada and New Zealand have begun providing the necessary written confirmations.

The goal of the directive is to increase the safety of pharmaceutical products, particularly generic APIs, being imported into the EU; however, many within the industry have voiced concern that implementation will be difficult. The UK Medicines and Healthcare Products Regulatory Agency (MHRA) has already announced plans to let drug makers import APIs that lack written confirmation of quality if there is a danger of a shortage.

"The National Health Authorities in Europe have become dependent on low cost generic APIs sourced in third countries to meet patient needs and to maintain budgetary control," said Tony Scott, adviser to the European Fine Chemicals Group (EFCG). "As such, they will want to ensure that every possibility of continuing supply of these medicines is allowed,"

He expressed understanding for the concerns of the pharma industry and its associations, but he added that many companies in the generics business in Europe were well aware that they were risking their continuity of supply if they didn't have another supplier, ideally in Europe.

'Think Of Heparin'

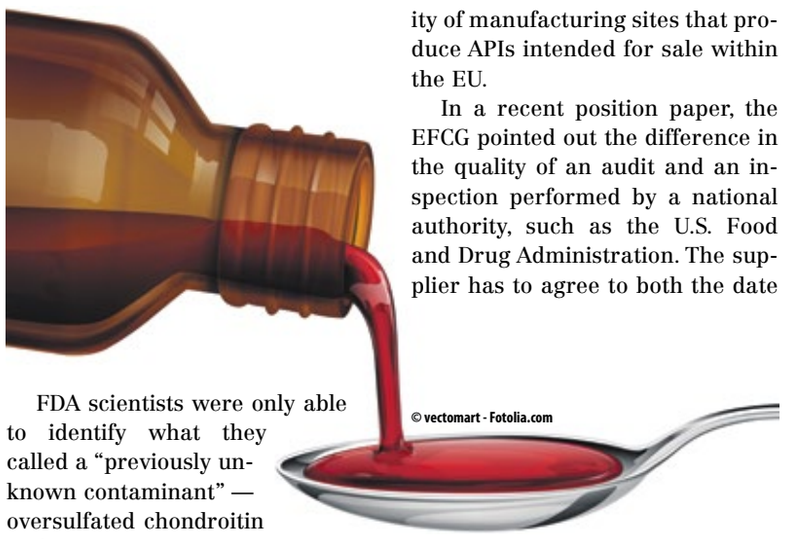
Another weak point in the legislation is that only bulk APIs are covered; if an API is mixed with a second substance or if it is not the final API but the crude or moist "pre-API", it then becomes exempt.

The EFCG said they wrote to the Commission regarding this loophole. Scott said the Commission said in those cases, the substances would be analyzed to make sure it is in line with specifications. This was a red flag for the EFCG.

"Think of the heparin case," Scott said.

In 2008, The U.S. FDA recalled several batches of the anticoagulant injectable due to contamination of the raw heparin stock imported from China.

"You couldn't fully analyze it because you didn't know what you were analyzing for," he said. "And the unregistered substance you didn't know you were analyzing for was killing people."



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FDA scientists were only able to identify what they called a "previously unknown contaminant" — oversulfated chondroitin sulfate — in the tainted heparin after an extensive investigation. The FDA said the adulteration was intentional in order to maintain supply during a shortage of raw heparin in China and to reduce the cost of production.

As many as 81 deaths were reported in the U.S. between January and May 2008; the tainted blood thinner was also found in 11 other countries, including Denmark, France, Germany, Italy and the Netherlands. While European deaths were not documented, it remains unclear if patients died from the use of tainted heparin here.

Joint Inspections Still a Rarity

What remains unchanged in the directive is the burden of responsibility to verify compliance. That still lies with the EU Marketing Authorization Holder auditing the supplier themselves or via a third party; the FMD does not require mandatory inspections of all global API manufacturers or the traceability of manufacturing sites that produce APIs intended for sale within the EU.

In a recent position paper, the EFCG pointed out the difference in the quality of an audit and an inspection performed by a national authority, such as the U.S. Food and Drug Administration. The supplier has to agree to both the date and scope of an audit, whereas the timing of an inspection is up to the discretion of the national authority, and the supplier must offer access to all records and all areas of the site.

"Many small European medicine manufacturers do not have adequate qualification, experience or resources to conduct API audits abroad," the group wrote. "In addition, Qualified Persons (QPs) are often in conflict between their company's ethics and its financial objectives."

The EFCG has also criticized the European Commission for basing the FMD on false information; Scott said they wrongly assumed there were 15,000-20,000 API manufacturers importing into the EU, therefore arguing that there were too many facilities to physically inspect.

"They're now proven to themselves that it's not that many," Scott said. "There are about 1,600 maximum. If every member state of the EU and certain other countries with EU-equivalent standards shared the responsibility of inspecting facilities, then it wouldn't be a burden, and it could be done at a relatively low cost. But presently, as the FMD is the new law, there is not a political will."

Under the proposed EU-U.S. Free Trade Agreement, which includes a chapter on pharmaceuticals, regulatory agencies will have to align industry standards for pharmaceuticals; pharma associations on both sides of the Atlantic recognize that a Mutual Recognition Agreement (MRA) covering inspections is a prerequisite for ensuring the safety of imported APIs. The idea itself is not new; a pilot program for joint inspections by the U.S. FDA, the European Commission and the EMA ran successfully from 2009-2010. A continuing cooperation between the FDA and the EMA was confirmed at the beginning of 2012, but the joint inspection program is limited to a few sites. The EFCG, the American Society of Chemical Manufacturers and Affiliates (SOCMA) and the Active Pharmaceutical Ingredients Committee (APIC) submitted a proposal to the EU-U.S. High Level Working Group for Jobs and Growth and to the High Level Regulatory Cooperation Forum in October 2012 regarding the importance of mutual recognition and securing an MRA.

"Mutual recognition would save an enormous amount of time and money," Scott said.

Outlook

Who are the winners under the directive?

"The winners ought to be the patients," Scott said. "But there's no guarantee of that."

Implementation and enforcement of the directive within the EU member states remains a concern for the EFCG. In its position paper, the group argued that the majority of current suppliers in third countries will need a long time to get their API manufacturing standards on par with the EU's.

"And until they do," the group stated, "the risk control mechanisms to protect the EU public — a written confirmation and/or an audit by a Marketing Authorization Holder — are less reliable than that provided by an inspection by an EU or equivalent authority."

Scott said that the FMD should, with strong regulatory enforcement, make it more difficult for companies whose sole strategy is to "make profit by cheating the system."

There is need for tough, prompt and expensive sanctions for individuals, producers and client companies for deliberate non-compliance or counterfeiting, Scott said.

Such sanctions should include product recalls, withdrawal of marketing authorizations, seizure of profits, debarring of individuals, blacklisting of companies and prison terms for guilty management, he said.

Brandi Schuster,
CHEManager Europe

chemanager-online.com/en/tags/fmd

The Latest From SOCMA

SOCMA Applauds Progress Made in U.S. Chemical Control Law

In the wake of a groundbreaking U.S. Senate bill to reform the country's chemical control law, leaders in both chambers of Congress are convening hearings on the Toxic Substances Control Act (TSCA), indicating an interest in updating the 1976 statute.In May, U.S. Senators Frank Lautenberg (D-NJ) and David Vitter (R-LA) introduced a surprise bipartisan compromise – the Chemical Safety Improvement Act of 2013. The Society of Chemical Manufacturers and Affiliates (SOCMA) believes the legislation, as it stands, would be favorable to the concerns of specialty chemical manufacturers, including small and medium-sized companies. On June 3, after struggling with his health over the past few months, Lautenberg passed away at the age of 89.

The Lautenberg-Vitter bill currently has more than 20 cosponsors and has been endorsed by The New York Times, The Washington Post and prominent environmental groups. Some of the positive highlights include:

- Protection for confidential business information (CBI). Ensuring adequate protection of CBI is a top tier issue for SOCMA, and the bill treats this section reasonably.
- Clearer trade secret protection of chemical identity. The current law is ambiguous in this regard, but the new bill clarifies that aspect of TSCA.
- A largely unchanged new chemicals program.
- Resetting the TSCA inventory, mandating prioritization of existing chemicals, separating cost-benefit analysis from the safety standard and alleviating some procedural burdens involving risk-management.
- No mandated minimum data sets.

In mid-June, Boron Specialties President and SOCMA member Beth D. Bosley testified in the U.S. House of Representatives that any changes to the nation's chemical control law must provide adequate protection of trade secrets and promote innovation while protecting human health and the environment. The hearing, which examined TSCA and its impact on the economy, as well as public health and safety, was the first in a series of hearings on the current law. On July 11, the House held its second hearing on new chemicals, CBI and innovation. While several witnesses called for a minimum amount of toxicity data for all chemicals, chemical industry experts explained the U.S. Environmental Protection Agency (EPA) already has many different ways to evaluate chemicals in lieu of toxicity data. One lawmaker referenced Bosley's earlier testimony in which she stated that companies outside the U.S., rather than curious members of the public, are requesting access from the government for information on chemicals and product development.

The Senate, for its part, held a hearing in late July to compare the original Lautenberg bill, the partisan Safe Chemicals Act of 2013, with the bipartisan Vitter-Lautenberg bill.

Over the years, TSCA has been criticized on many fronts, largely due to the emergence of international chemical control regulations, a growing patchwork of state and local laws, and de facto "retail regulation" or consumer de-selection.

Advances in the ability to detect chemicals at extremely low concentrations have also helped raise awareness of the pervasiveness of chemicals in the environment, although a detectable presence of a chemical does not equate to harm. The EPA, responsible for implementing the law, has had trouble implementing some parts of the statute. Some have attributed this to massive shortcomings to TSCA while others believe the agency could do a better job. Nevertheless, stakeholders agree the law should be revised; the degree to which it needs revision is still being ironed out.

The Lautenberg-Vitter bill shows quite a bit of promise, but it still has a long road ahead of it. SOCMA looks forward to working with lawmakers to progress this legislation.

ChemStewards Symposium

Chemical process safety expert Dr. M. Sam Mannan told representatives of the U.S. chemical industry last month that in order to prevent repeat industrial tragedies, companies must focus on technical safety, human factors and culture, and management systems. Speaking at the National Chemical Safety Symposium in Houston on May 22, Mannan told about 100 attendees that accidents define process industries. „The question is, after years of learning from previous incidents, why do accidents continue to happen and why do we repeat our mistakes?" The answer is not an easy one, he said.

The event was sponsored by ChemStewards, SOCMA's environmental, health, safety and security (EHS&S) management program.

In terms of process safety goals, Mannan said company leaders must ask themselves where they want to be. "You must have a vision," he said. „The goal for every company should be zero accidents. We haven't defined what safety culture is, but we have to get there."

Quoting the late Irv Rosenthal, a former member of the U.S. Chemical Safety Board, Mannan said, "Ninety-five percent of accidents happen because we didn't do what we knew how to do. Only 5% occur because we didn't have the information. We didn't have the knowledge."

In the aftermath of the West, Texas, fertilizer plant explosion, a great deal of attention has focused on imposing more government regulations on industry. Mannan:

- Cautioned against U.S. agencies wanting to make comprehensive changes to federal laws governing industry, saying that tweaks would be appropriate;
- Argued that we should not rush to change the nation's chemical safety program because, if substitutes were mandated, for example, we could actually raise a facility's risk of a terrorist attack;
- Lamented the severely outdated state and local zoning laws that permitted a nursing home and schools to be built around chemical facilities, like West Fertilizer; and
- Concluded that fixing only the facility's mistakes overlooks other factors that need to be addressed to help prevent against repeat tragedies.

Like Mannan, John Herber, staff consultant to the AIChE Center for Chemical Process Safety, touched on the tragic events in Texas. As an industry, "we are held to highest standards, yet we're compared to the lowest performance," he said.

It is critical for management to understand they hold the livelihoods of their employees in their hands, Herber said. Employees need the tools and training to do their jobs and must feel empowered by company leaders.

SOCMA is a U.S.-based trade association dedicated solely to the batch, custom and specialty chemical industry. Since 1921, SOCMA has represented a diverse membership of small, medium and large chemical companies and has now a global membership of more than 210 companies.

SOCMA Society of Chemical Manufacturers & Affiliates

Change In China

Transformation of the Chinese Economy and Consequences for the Chemical Industry

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Predicting Threats And Opportunities – The transformation of the Chinese economy is a major topic in the media, covered by publications as diverse as The Wall Street Journal, Al-Jazeera and the Xinhua News Agency. It is also a focus of high-level Chinese politicians such as Wen Jiabao and his successor as prime minister, Li Keqiang. China will undergo a quantitative and qualitative transformation in the next 10 to 20 years, which will affect the general chemical industry in China. The economic transformation will have different consequences for specific segments of the chemical industry.

Dr. Kai Pflug
CEO, Management Consulting

Analysis of this may provide industry participants with insight regarding the relative attractiveness of different chemical products and segments, and thus may be useful for strategic and investment decisions.

Quantitative Transformation of the Chinese Economy

Clearly there is a shift away from the high annual growth rates of gross domestic product in the recent past. While annual growth was between 9% and 12% from 2004 to 2011, growth in 2012 slowed to 7.8%, and the official growth target for 2013 is 7.5%. For the next decade or so, an annual growth of between 5% and 7% seems a much more realistic assumption than a continuation of the earlier growth. This in itself is not a reason to worry but rather a common global phenomenon: Economic growth slows down once a certain economic level has been achieved as the most promising improvements in production and other economic activities have already been implemented.

… And Effect on Chemical Industry

By now, the chemical industry as a whole is maturing. As a consequence, the difference between GDP growth and the higher growth of the chemical industry (approximately a difference of 4% in the past few years) is likely to shrink to possibly 2%. Combined with the reduced GDP growth, this will result in a chemical industry growth of about 7% to 9% for the years until 2020. This is still respectable growth, but obviously a lot lower than in the recent past.

Qualitative Transformation of the Chinese Economy

The lower growth rate of the Chinese economy is widely regarded not only to be a threat but also an opportunity to increase the quality of growth.

Five main areas can be identified in which a qualitative transformation of the Chinese economy is both a target of the government and to be expected:

- **From investment to consumption:** While the Chinese economy has long been driven primarily by fixed investment, private consumption will now grow in importance. As the disposable income of the Chinese rises, they will be able to spend more. Recent government initiatives in this area include boosts in the minimum wage and support for the expansion of consumer credit. Further potential lies in strengthening the Chinese pension and health-care system, encouraging the Chinese population to spend money rather than to save it for the future. Correspondingly, those industries that primarily serve investment purposes (e.g., producers of construction machinery) will experience slowdowns.
- **From export focus to increased imports:** Along with investment, exports were the other main driver of the Chinese economy in the past. However, as export markets in Europe, the U.S. and Japan have slowed down while the Chinese economy is still expanding, imports will likely increase at a faster pace than exports.
- **From labor-intensive to technology-intensive production:** China is now a middle-income country and no longer has the advantage of cheap labor. This trend will continue as the number of workers in China's workforce will start to decline in the next few years, putting additional pressure on employers to lift wages. In fact, some industries with a focus on low salaries, such as textiles, are already moving away from China. At the same time, Chinese policymakers state their intention toward a more innovation-driven economy. In 2013, China will spend an estimated 2% of GDP in research and development, a level achieved only by the most R&D-intensive countries in the world.
- **From production to services:** Currently, the service sector accounts for only about 45% of Chinese GDP compared with 80% in the U.S., indicating a great improvement potential. Rising consumer spending is likely to benefit services such as software, entertainment and tourism more than the production of physical goods.
- **From polluting to more environmentally friendly processes:** Rising incomes make the Chinese population less tolerant of environmental pollution and more willing to accept a somewhat slower growth if the quality of growth is higher. The 12th Five-Year Plan strongly supports the idea of sustainability, and individual provinces such as the Guangdong government have already enacted fairly ambitious targets for reducing energy consumption and carbon dioxide emission per unit of GDP. There, the government has stated its willingness to slow the growth of industries with high energy consumption in order to reduce the release of pollutants.

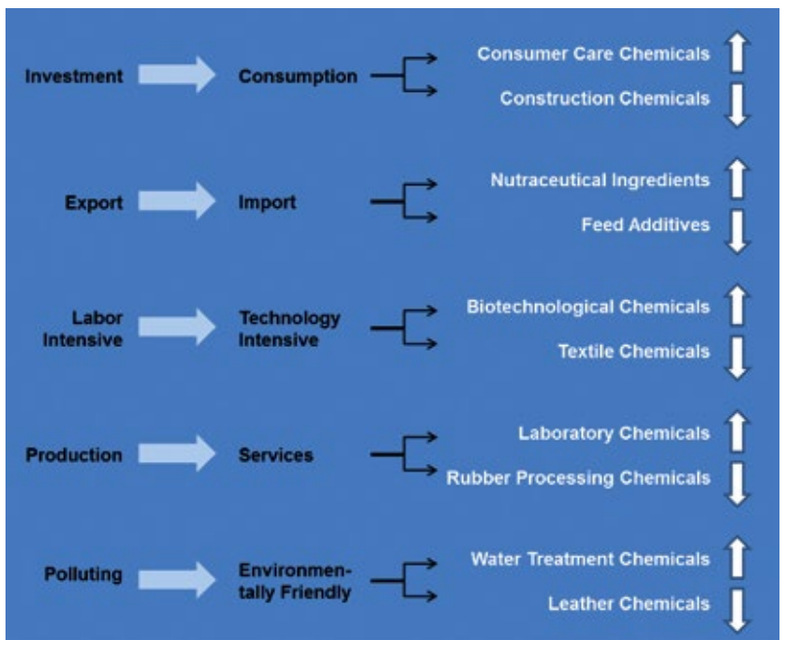
… And Effect on Chemical Industry

These five transformations do not affect all chemical segments in the same way. Before carrying out a more detailed segment analysis, there are some general observations on this.

The shift from investment to consumption will benefit those chemical segments supplying mainly consumer products, for example consumer care chemicals. In contrast, chemical segments such as construction chemicals — which naturally depend on investment in infrastructure and buildings — may suffer.

Continues Page 7 ▶

Effect of Chinese Economic Transformation	Chemical Segment
Strongly positive	Consumer care chemicals
	Nutraceutical ingredients
	Electronic chemicals
	Laboratory chemicals
	Printing ink
	Biotech chemicals
	Imaging chemicals
	Water treatment chemicals
Slightly positive	Adhesives&Sealants
	API
	Food additive
	Paints&Coatings
	Cleaners (industrial and institutional)
	Membrane material
	Wood treatment chemicals
Neutral or slightly negative	Lubricant additive
	Oil field chemicals
	Pesticide
	Pharma intermediate
	Thermoplastics
	Agrochemical
	Lubricant
	Paper chemicals
	Plastics additive
Strongly negative	Construction chemicals
	Explosives
	Feed additive
	Leather chemicals
	Rubber
	Textile chemicals
	Textile dye
	Mining chemicals
	Nonwoven fabrics
	Rubber processing



Keeping Your Formulas Secret

Prevention Can Help Protect Intellectual Property in China

Ideas In Jeopardy – For chemical companies doing business in China, few concerns are as ubiquitous as the risk of the theft or loss of intellectual property. Of all the forms of IP that are most difficult to protect in that country, trade secrets may be at the top of the list.

Daniel Roules
Partner, Squire Sanders

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According to both China's Anti-Unfair Competition Law and its criminal law, a trade secret is a specific type of confidential information that gives an economic advantage to a given company, at least for so long as that information is kept confidential. It is necessary when seeking to enforce rights to trade secrets to show the steps that have been taken to preserve the confidentiality of the material. There is no statutory limit on the duration of a trade secret — as long as it is kept secret and can be shown to have value, it can be claimed as a trade secret.

General Strategies for Trade Secret Protection

Prevention is better than cure, and in the first instance there are several simple ways in which chemical companies can prepare themselves to minimize the risk of loss of trade secrets. Regardless of what you may think to be the most likely source for a leak, it is worth establishing certain practical guidelines for your operations in the Chinese market. Such guidelines would include the following:

- Where possible, keep trade secrets offshore. Over the years, many companies have taken advantage of China's manufacturing capabilities and infrastructure but have retained offshore a final component or ingredient or process that gives their product its unique edge.
- If a trade secret must be brought to China, consider breaking it down and allocating it in discrete steps at separate locations so people at any one site will not have full knowledge of the trade secret.
- Where the trade secret is in writing, consider copyrighting the information to afford greater opportunity for protection, and where not in writing, consider reducing portions of it to writing for the purpose of copyrighting.
- Conspicuously mark any written materials that contain trade secrets as "Confidential."
- Limit access to all classified information on a need-to-know basis, and maintain lists of those individuals with access. Using software or swipe cards, monitor who accesses such classified material.
- Use locks (mechanical or electronic) to deny access to any person who lacks authorized access to trade secrets, and update passwords and codes at least every three months and to track data flows and file transfers.
- Educate/train employees about their responsibilities regarding trade secrets and the sanctions (both internally and under Chinese law) for breach.
- During exit interviews with departing employees, remind them of their continuing contractual duties not to use or disclose any trade secrets.
- Establish a hotline for employees to report risks of theft of trade secrets by colleagues or outside contacts.
- Take prompt action to stop trade secret theft immediately after identifying a problem: for example, you may take control of the employee's laptop, perhaps file the case with the public security bureau, and apply for preliminary injunctive relief if applicable.
- Consider participating in organizations focused on such IP protection in China (e.g., Quality Brands Protection Committee, European or American Chamber of Commerce).

Considering potential sources of leaks can help develop more specific trade secret protection. In China, these typically consist of partners, suppliers and customers, and own employees. The global financial crisis triggered a resurgence of interest in joint ventures; as China becomes not merely the place to manufacture for sale elsewhere, but the target market, where having a local partner may offer the allure of a broader national footprint and existing distribution network. But partners and their employees often present risks. Similarly, companies that supply or purchase from your company may have the opportunity to misappropriate your trade secrets if they have access to technical specifications and tolerances. Lastly, given the high turnover of employees in China, you should anticipate that at some point one or more of your employees will take trade secrets when leaving your employment.

This was alleged in the case of U.S. phenolic resins producer SI Group, which first sued Chinese company Sino Legend in 2007. SI Group claimed that Sino Legend had hired its Shanghai plant production manager and taken trade secrets to use in its production of "virtually identical" tackifier resins for tires. The lack of effective redress in China led SI Group to file a complaint with the U.S. International Trade Commission in 2012.

Protecting Trade Secrets from Partners

The risks presented by disclosures to your company's partners in China (whether Chinese or foreign) can be managed first by conducting some due diligence regarding your potential partner's IP compliance history. The sources of such information in China are quite limited, but we find that many companies fail even to run the Chinese equivalent of a Google search to determine if the company has ever been noted for theft of IP or similar problems.

As a next step, most companies know the importance of entering into a nondisclosure agreement (NDA) before sharing confidential information; however, typically such obligations are binding only on the company, not its employees. Given the high rate of employee turnover in China, we recommend including in such NDA an obligation on your potential partner to impose consistent nondisclosure obligations on specified or key personnel that will continue for a reasonable period even after any expiration/termination of the employment relationship, to maintain a list showing the names and national ID card numbers of all such personnel, and to indemnify you for any breach of the foregoing.

It is worth including one or more of the following in the contracts with your partner:

- Delineating the parties' respective rights and obligations with regard to any IP, including trade secrets.
- Including an acknowledgement by your partner of your ownership of the trade secrets and a warranty that such trade secrets will be used by the partner only for specified purposes, and consider including an acknowledgement by your partner of what it does not know as of the date of the contract, to establish a baseline — then if the partner has such knowledge in the future, it will need to explain how it obtained such information if not from you.
- Inserting a covenant that the partner will not claim ownership or attempt to register in any jurisdiction any trade secret.
- Creating the right to conduct technology audits and imposing on the partner the duty to cooperate.
- Impose a duty to comply with your own trade secret protection policies, as amended from time to time.
- State your company's right to terminate the contract for trade secret theft, with the explicit right in addition to claim damages.
- Specify the rights of the parties, if any, to the other's trade secrets upon termination and prohibitions/restrictions on use of trade secrets thereafter.

Protecting Trade Secrets from Suppliers and Customers

As with partners, the first step in protecting your trade secrets from your suppliers is to conduct whatever background check you can to assess the risk of theft. Where possible, apportion production of components among multiple suppliers so that none has full knowledge of your secrets. Consider including in your nondisclosure agreements an obligation to impose confidentiality obligations on the supplier's key personnel also.

In your contracts with suppliers, you might wish to include one or more of the following:

- An acknowledgement of your ownership of the trade secrets and a warranty that such trade secrets will be used by the supplier only to produce goods pursuant to your instruction. As suggested above for partners, you might want to include an acknowledgement of what the supplier does not have knowledge of as of the date of the contract.
- A covenant that the supplier will not claim ownership or attempt to register in any jurisdiction any trade secret.
- The right to conduct technology audits and the duty of the supplier to cooperate.
- A duty by the supplier to comply with your own trade secret protection policies, as amended from time to time.
- Your right to terminate for trade secret theft.
- Prohibitions on any use of your company's trade secrets after expiration/termination of the contract with the supplier.

Recognize also that your own customers may gain access to and then misuse your proprietary information. It is not uncommon in any market to purchase the products of a competitor for the purpose of learning trade secrets, but such a problem is pervasive in China. Accordingly, you may want to modify some of the above for use in contracts even with your own customers.

Protecting Trade Secrets from Employees

Perhaps the greatest sources of trade secret theft in China are one's own employees. To minimize this risk, we suggest you consider the following:

- Impose confidentiality and noncompetition obligations on all "ordinary employees" in their standard employment contracts, which are mandatory under Chinese law.
- Require senior or middle-level management personnel and other employees who have access to trade secrets to sign a separate and stricter confidentiality and noncompetition contract. This separate contract may permit enforcement without going through the labor arbitration that will be required for most employment disputes.
- Specify in employment contracts and the company manual that theft of trade secrets constitutes grounds for termination.
- In exit interviews at the end of any employment relationships, remind the employees of their obligations regarding trade secrets.

Conclusion

Any company doing business in China should anticipate that at some point its trade secrets will be misused or misappropriated. The chemical industry is by its very nature highly complex, with its IP most often a combination of various intertwined manufacturing processes and products. While the situation in China is changing for the better, with increased awareness of and sensitivity to IP issues in Chinese courts, the best course of action for companies in the chemicals sector must remain that of prevention of breaches as far as possible.

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Change In China

Continued Page 6

Reduced exports are likely to negatively affect segments with export-oriented end customers such as textile chemicals, textile dyes and leather chemicals. On the other hand, chemical multinational companies with a strong China presence may benefit by increasing their imports of high-end specialty chemicals and materials.

The transformation toward technology and innovation is already quite visible in the many R&D centers that have been established particularly in the Shanghai area in the past 10 years. It is likely to continue, with smaller and second-tier foreign companies as well as bigger domestic companies also increasing their R&D work in China.

The shift from production of physical products to services is one that will have a marginally negative effect on most chemical segments, as the chemical industry by definition focuses on physical products.

Finally, growing awareness of environmental issues will benefit a few chemical segments such as water treatment chemicals while at the same time negatively affecting others (such as leather chemicals, pigments and dyes), similarly to the segment shift experienced in Europe and the U.S. a few decades ago.

Effect on Key Chemical Segments

For this categorization, each segment was examined for each of the five transformation factors. For each segment/factor combination, the effect was either judged to be positive (i.e., the transformation factor will favor the growth of the chemical segment), neutral (the transformation factor will not have a major influence on the growth of the chemical segment) or negative (the transformation factor will negatively affect the growth of the segment). All evaluations were then weighted and aggregated, resulting in four groups of chemical segments:

- Some chemical segments experience strong additional growth as a result of the transformation of the Chinese economy.
- Some chemical segments experience minor additional growth.
- Some chemical segments experience a minor reduction of growth.
- Some chemical segments experience a major reduction of growth.

In summary, the transformation of the Chinese economy will have a substantial effect on the chemical industry. However, the effect depends much more on the specific chemical segment than on the general properties of the chemical industry.

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The Key to World Peace? Agrochemicals

Innovation in AgChem Vital to Food Supply Chain

Finding The Balance – The global food supply and global peace are interlinked. Agrochemicals play only a small part in the cost of food production and other factors such as food wastage, other inputs such as fertilizers and machinery and delivery infrastructure are all contributors. Nevertheless, agrochemicals have over the last 60 years made significant contributions to improving yields. Dr. Nigel Uttley of Enigma Marketing Research analyzes the balance between innovator and generic companies and looks at how the regulatory system can be used to encourage generics rather than a deterrent as exists at present.

Dr. Nigel Uttley
Enigma Marketing Research

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Since 2007 the global crop protection market (excluding GM seed, conventional seed or non-crop market sectors) has grown from $33 billion to $47 billion in 2012, an average rate increase of 7% per year. Future growth predictions will depend on issues such as: population growth and the resulting decrease in available land for agriculture (fig. 1); increasing sophistication of eating habits – a meat based diet requires greater use of pesticides than a vegetarian diet; consumption of major commodities is rising faster than population growth; and rising crop prices.

There will inevitably be a greater use of agrochemicals and the need to deliver safe innovative products, increase yields and to counter resistance problems in a cost effective way will be just as, if not more, important than ever. There needs to be a balance between the innovator companies reaping the rewards of providing such new products and a healthy generic sector which contributes to driving the cost of pesticides down.

Intellectual Property Rights (IPR)

The basic goal of the innovator companies over the last 60 years has been to introduce more effective active ingredients to replace older products especially as patent protection expires and thus maintain market share. Over the last 10-15 years, there has been a decline in the rate of new active ingredients and new chemical classes reaching the market (fig. 2), however, this does not mean that there is a decline in innovation; in fact, there has been a substantial increase in the introduction of new products primarily achieved by: mixtures of two or more active ingredients; improvements in delivery systems; and new improved formulation additives.

Such innovations can also result in products with IPR beyond that of the basic active ingredient and hence extend market exclusivity. The pharmaceutical industry has limited opportunity to develop mixture products although changes to formulation can lead to significant IPR opportunities and delay the patent cliff.

Based on IPR of the active ingredient the market is split into three product types (fig. 3).

- A patented product, where the active ingredient(s) is protected by a granted patent
- A proprietary off-patent product
- A generic product, where there is true competition in the market place and generic companies have registered products based on their own data and are not beholden to the main or original data holder

The proprietary off-patent products category arises when the active ingredient is off-patent but the final formulated product has some proprietary technology such as a new delivery system; is linked to GMO crops; is a mixture product which may contain a patented active ingredient or which can be patented; or has data protection issues that will restrict generic manufacturers entering the market.

The proprietary off-patent sector is the largest, and it is this sector which is the real battle ground between the innovator companies and generic manufacturer — a battle which the innovator companies are winning by introducing many mixture products, this segments the market and reduces the available market for generics to target. About 60-70% of the market is controlled by the top six companies, yet only about 20% of all active ingredients have patent protection.

In the generic sector, there is a small number of large companies with sales in excess of $500 million and sales in all the major global markets. When it comes to new products, these generic companies can also be innovative through the development of new formulations and mixtures. There are many hundreds of small generic manufacturing companies (mainly in India and China) with sales of less than $50 million per year. Many of the small companies have relied on the local market to provide the majority of sales and have sought export markets where registrations are relatively quickly obtained and inexpensive. However, as registration requirements in all countries become harder and more expensive, it will be necessary for serious, long-term generic players to enter the large well-protected markets of Europe and the U.S. in order to spread the cost of registrations over as many markets as possible.

In order for these companies to grow and take advantage of the increasing market share taken by off-patent products, it is necessary to invest larger sums of money in product registrations and/or find partners with which to share the costs. To date, only a relatively small percentage of Indian and Chinese companies have managed to develop European and/or U.S. registrations.

The introduction of new active ingredients has declined from 20 per year to 5-7 per year; however, if we look at the 196 agrochemical patent applications filed in 2012 in the EU and U.S., 85% of filings were from the major innovator companies: Syngenta: 59; Bayer CropScience: 52; BASF: 29; Dow AgroScience: 15; DuPont: 11. The majority of these patents are not for new active ingredients per se but are mainly for mixture products.

In addition to the technical benefits of mixture products, commercial benefits also result. For example, mixtures segment the market creating a greater number of branded products, thus making it harder for generics to take market share. The use of patent-protected active ingredients restricts market entry by generics – if one of the mixture's active ingredients is patent protected, generic companies will not have access to this active ingredient, and therefore cannot enter this segment of the market until all intellectual property rights have lapsed. Also, many mixture products have received patent protection in their own right.

As a pharmaceutical loses patent protection and generics enter the market, prices will fall rapidly, which can seriously affect the share price. However, for agrochemicals, the ability to create new mixture products and/or new formulations means that the patent cliff isn't as steep and significantly delayed in many cases.

Registration Of Agrochemicals

The registration of agrochemicals is mandatory prior to sales; different countries/regions have different systems and some are stricter than others. All systems are becoming more regulated to ensure food quality is high and agrochemicals are delivered safely to the crop. In the pharmaceutical industry (fig. 4), a generic company only needs to prove bioequivalence of its product with that of the innovator's product and can then cite the innovator's registration data file to gain registrations. Thus, the cost of market entry is significantly reduced and results in an erosion of prices. In the U.S., the first generic to market is further rewarded by a six-month period of exclusivity prior to market entry of other generics. Encouraging the generic pharmaceutical sector is a result of lobbying by large private and public health-care providers.

In agrochemicals, no such lobbying or political initiatives exist, and generic companies have to generate their own registration data or agree to data compensation with the data holder. This puts the generic agrochemical company at a massive disadvantage compared to its pharmaceutical counterpart, as the ratio of cost to market entry compared to potential market gain is considerably higher for generic agrochemical companies.

If it is recognized that global food security is a key element for global peace, then this is the one key area where politicians can contribute to driving down agrochemical input costs by making access to registrations cheaper for generic companies. Global harmonization of registration systems will also help drive down the cost for all companies.

Global food security is a key element for global peace and the growing population; increased sophistication of eating habits will put severe pressure on food supplies and will fuel demand for larger volumes of agrochemicals resulting in increased sales. The agrochemical industry will continue to play a key role to increase yields and if this is to be at affordable prices then the generic sector needs to be encouraged by making market entry easier.

Dr. Nigel Uttley, Enigma Marketing Research

Year	1965	2005	2030
Population (billions)	3.2	6.5	8.3
Arable land per person (m^2)	4,300	2,200	1,800

Fig. 1: Relationship between rising population and available arable land

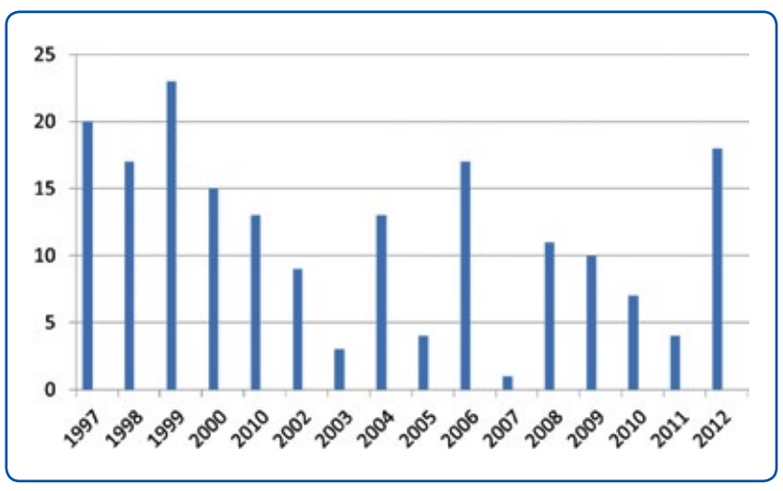

Fig. 2: Rate of new active ingredients reaching the market.

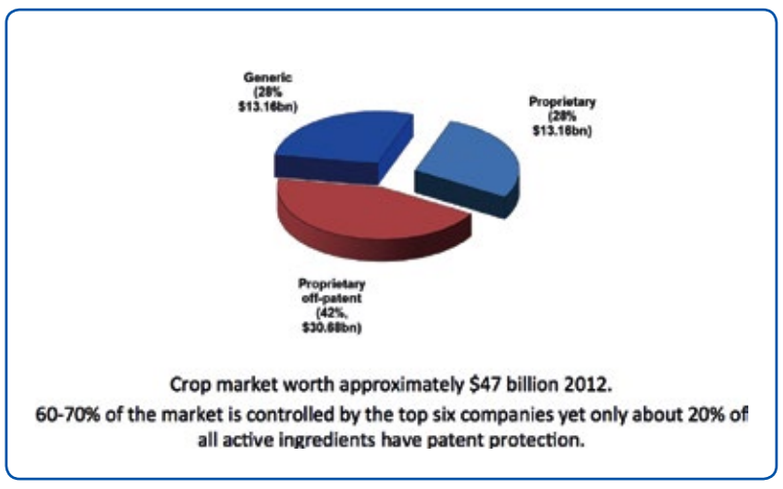

Fig. 3: Sales of the crop protection market by sector based on IPR.

Similarities	Differences
Both are knowledge based industries – new molecules discovered primarily by organic chemists	The value in sales revenue of the Pharmaceutical industry is approximately 10 times larger than agrochemicals
Both have similar global patent laws and both have patent term extensions to compensate for the long period from discovery to market launch	Pharmaceuticals are much higher profile as politicians and payers of health-care for example the UK National Health Service and medical aid schemes seek to minimize costs
Strict registration requirements for both but agrochemicals have greater protection for the originator's registration data	Generic pharmaceuticals companies only need to prove bioequivalence to gain registrations whereas agrochemical companies have to generate own data or agree to data compensation
Opportunities to extend IPR through improved delivery systems and new indications	The top 6 pharmaceutical companies have about 30% global market share whereas the top 6 agrochemical companies have about 70% global market share
Both account for only a small % of the total cost of delivering health care or food production	Limited opportunities in pharmaceuticals to create mixture products and extended IPR
	Lack of political will to increase share of generics compared with same situation in pharmaceuticals
-	Steep patent cliff for pharmaceuticals but gentle one for agrochemicals

Fig. 4: Comparisons of agrochemicals with pharmaceuticals (major differences highlighted in blue)

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Chemicals

Industry collaboration is at the heart of new innovation.

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Pharma

How will GDUFA change the API industry?

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Pharma Production

The next generation of operational excellence is on its way.

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Solvay Specialty Polymers Starts €21 Million PEEK and PAEK Plant in China Solvay Specialty Polymers, the high-performance plastics subsidiary of Belgian chemical producer Solvay, has brought on stream a new €21 million production facility for its KetaSpire and AvaSpire polyetheretherketone (PEEK) and polyarylethylene (PAEK) compounds at Changshu in China's Jiangsu province. The expanded availability of the two high-temperature products also benefits its Torlon polyamide-imide resin, the Alpharetta, Georgia-based company said. (dw)

Sinopec Proposes $3.1 Billion Natural Gas, LPG-Based Ethylene Project Sinopec has proposed a $3.1 billion ethylene plant in east China that would be the top Asian refiner's first to use natural gas and liquefied petroleum gas (LPG) as a petrochemical feedstock. Sinopec's plans call for a 1 million t/y ethylene complex in Qingdao, Shandong province, at a cost of 18.79 billion yuan ($3.1 billion), according to a circular posted on the Ministry of Environmental Protection's (MEP) website. The Qingdao complex would take three years to build, said the MEP circular, without giving a time frame for the start of operations.

Ineos Oligomers Building New LAO Plant on U.S. Gulf Coast Ineos Oligomers has announced plans to build a new plant for linear alpha olefins (LAO) on the U.S. Gulf coast. Set to start up in 2016, the facility will have initial capacity of 350,000 t/y but, like similar Ineos units, it is designed to be expanded by an additional 50%. According to CEO Bob Learman, output eventually could exceed 500,000 t/y. The U.S. subsidiary of the Swiss-based group also is "evaluating opportunities" for expanding its LAO plant in Joffre, Alberta, Canada, another facility designed for a 50% capacity increase, In a first expansion stage, due on stream at the end of the 2014 first quarter, capacity will be lifted by 10%. (dw)

Start-up Date of H1 2014 Confirmed for New Russian PET Complex Russian petrochemicals giant Sibur has announced a start-up date of first-half 2014 for the PET production complex of its majority-owned subsidiary Polief at Ufa in the Republic of Bashkortostan.At full run, the complex will have capacity to produce 210,000 t/y of PET – up from 140,000 t/y currently. It will be back-integrated into an existing facility for the polymer's main feedstock PTA. Output is earmarked for the bottled beverage market. (dw)

BASF Lifts Global Output of 1.4 Butanediol and PolyTHF BASF continues to expand its position as leading global supplier of the chemical intermediate 1.4 butanediol (BDO) and its derivative polytetramethylene ether glycol (PTMEG), also known as PolyTHF. Over the next two years, output capability for BDO will be expanded to 650,000 t/y (from 535,000 t/y currently) and for PolyTHF to 350,000 t/y (from 250,000 t/y). Investment will be in the "double-digit euro range." By 2015, new production facilities for 100,000 t/y of BDO and 50,000 t/y of PolyTHF are due to go on stream at Korla in China's Xinjiang province in cooperation with local producer Xinjiang Markor Chemical Industry Co. The product will be marketed to regional customers. (dw)

Qapco Chooses Unipol PE and PP Processes for Ras Laffan Complex Qatar Petrochemical Company (Qapco) is lining up technology for the Al Sejeel petrochemical and commodity plastics production complex it is building at Ras Laffan, Qatar, and set to go on stream in 2018. The 80:20 joint venture of Qatar Industries and France's Total Petrochemicals has acquired a license to use the Unipol PE process of Houston, Texas-based Univation Technologies in producing nearly 1.6m t/y of polyethylene. It has licensed the Unipol PP process from Dow Chemical's Union Carbide division for a 540,000 t/y polypropylene unit, the first PP unit in Qatar.The Al Sejeel complex, which will be back-integrated into a mixed feed cracker, will have a 550,000 t/y LLDPE plant and two plants capable of producing 520,000 t/y of HDPE each, all using All Univation's XCAT metallocene and Prodigy bimodal catalysts. The PP unit will produce random copolymers and impact copolymers. (dw)

Total to Invest €1 Billion to Modernize Antwerp Complex Total said it will invest €1 billion in modernizing its Antwerp production complex. The company will install a new refinery complex where heavy fuel oil will be converted to desulfurized diesel and domestic heating oil with ultra-low sulfur content. Production begin is slated for early 2016. The company will also work on a new installation for converting waste refinery gases with lower added value into cheap petrochemical feedstock to replace more expensive naphtha derived from oil. The installation is projected to go on stream in 2017. (bhs)

Fully Charged

Full Commercialization Of Advanced Battery Materials Likely To Be Long Haul

Technology – Companies developing and producing chemicals for the large battery market are remaining bullish about its prospects despite its spectacular failure so far to live up to expectations. Full commercialization of technologies such as lithium-ion batteries for key sectors like transportation, particularly for automobiles, is taking longer to be achieved than previously predicted.

Forecasters had been saying 4-5 years ago that there would be strong demand for lithium-ion batteries in vehicles and for stationary use due to the need to cut CO_2 emissions and reduce dependence on increasingly costly fossil fuels.

Instead, throughout most of the world large battery sales have been weak. This has resulted in a huge excess in production capacity throughout the battery supply chain from materials through to the manufacture of cells and modules.

Capacity Over Demand

By late last year, global production capacity for automotive lithium-ion batteries was five times higher than demand, according to Menahem Anderman, president of the U.S.-based consultancy Advanced Automotive Battery (AAB).

The most serious flop in sales has been in the U.S., where the federal government had by mid-2012 allocated over $2 billion in subsidies for the production of electric vehicles, the U.S. Congressional Budget Office (CBO) has estimated.

Since automobile manufacturers introduced in 2010 a new generation of electric vehicles powered by lithium-ion batteries, their sales had reached only 40,000 by last year while the government's target was 200,000. "Such vehicles will probably continue to make up only a small share of total vehicle sales for many years to come," concluded the CBO in a recent study on electric vehicle incentives.

Chemical Industry Outlook Positive

BASF's Chief Financial Officer Hans-Ulrich Engel, said that the company had anticipated difficult financial conditions initially when it set up a global battery materials business in 2011.

"It is a business in which we are willing to take losses at the beginning," he added. "It is driven by R&D expenses and investment in production plants. We have to be patient."

BASF has said it intends to invest a three-digit million euro sum in the research, development and production of advanced battery materials through to 2016.

"We are going in the right direction (with our battery materials business)," Andreas Kreimeyer, BASF's research executive director, told at the company's research press conference in May. "We are being ambitious and we're optimistic we will achieve our targets, although perhaps a bit later rather than earlier."

Among other European companies which are still focusing on expansion in the battery materials market in the longer term are Clariant, Solvay, Arkema, Evonik, Lanxess and Bayer MaterialScience (BMS).

Clariant claims that for its battery materials business the medium to long-term growth prospects remained unchanged.

"Promising future markets such as energy storage … are still in their early days," said Rudolf Wehrli, Clariant's chief executive.

Electric Vehicle Slump

Demand for electric vehicles – comprising plug-in hybrid electric vehicles (PHEVs) with both an electric motor and internal combustion engine (ICE) and all-electric vehicles (BEVs) which rely entirely on battery power–has so far failed to take off because of the cost of batteries, their weight, limited driving distances and lack of filling stations with recharging facilities. There are also safety worries centered on concerns about lithium-ion batteries catching fire

On the other hand, sales of traditional hybrid vehicles, like Toyota's Prius model, have kept up to market expectations. They rely mainly on their ICEs with their electric motors being used at low speeds and sometimes during acceleration. Their batteries are recharged by regenerative braking which releases energy when the brakes are applied.

The cathodes, anodes and electrolytes–the key components of any battery–in HEVs require substantial less materials than those needed for PHEVs or BEVs. Sometimes the amounts can be only a tenth of those necessary for the bigger and much heavier batteries.

Nonetheless analysts are expecting that after a slow start demand for PHEVs and BEVs will begin to speed up significantly. In his latest study of the global EV sector, Mr Anderman predicts that sales of BEVs will rise seven fold to 450,000 units between 2012 and 2020 and those for PHEVs 13 fold to 750,000. But by 2016 their share of new vehicle sales will still only be around 0.6%.

By 2020 the HEV market will expand 2.6 times to 4.1 million. So by the end of the decade the total value of the lithium-ion automotive battery market will have gone up from $1.4 billion in 2012 to $8.5 billion.

Furthermore other outlets for large batteries, such as energy storage for smart electricity distribution, are expected to grow rapidly.

Casualties Of Sluggish Expansion

So far the biggest casualties of the sluggish expansion of the large lithium battery market have tended to be in the businesses of companies which are vertically integrated in the production of materials, cells, modules and battery systems.

Massachusetts-based A123 Systems, a 12-year-old company using nanophosphate technology developed at the Massachusetts Institute of Technology (MIT) to make electrodes, cells and modules for high-performing lithium iron phosphate (LFP) batteries, filed for bankruptcy last year. It was then taken over by Wanxiang Group Corp, a Chinese supplier of auto batteries, which bid the highest price of $257 million in an auction organized by a U.S. Bankruptcy Court judge.

Dow Chemical included a write-down of the value of Dow Kokam, a four-year-old lithium-ion battery joint venture, in total restructuring charges of up to $1.1 billion in the company in the fourth quarter of last year. Dow Kokam has built a production plant in Midland, Michigan, with the help of a U.S. federal grant of $161 million and $180 million in tax incentives from Michigan state.

The battery materials portfolio of Dow has recently been extended with the development of a new phosphate-based battery material–lithium manganese iron phosphate (LMFP). The company already makes coated graphite anode materials.

Evonik recorded losses last year of €14 million at its 100-percent owned subsidiary Evonik Litarion for battery components and of €50 million at Li-Tec Battery, a joint venture with Daimler for producing high-tech battery cells in which it has a 50.1% stake. The total sales of both ventures, based at Kamenz, Germany, were not revealed.

Strategies Focused on Advanced Battery Technologies

The current strategy of leading battery material suppliers is to focus on the development of advanced battery technologies, which will provide a foundation for their businesses in the 2020s when electric vehicles are now expected to become firmly established in the global transportation market.

Clariant, for example, which in a recent restructuring has set up a Catalysis & Energy business to cover battery materials, is concentrating a lot of R&D resources on improvements to LFP technologies. Last year Clariant opened a new LFP plant in Quebec, Canada.

"Based on inexpensive iron phosphate, (LFP) is considerably more thermal resistant and therefore safer," said Klaus Brandt, Clariant's vice-president of battery materials. "The material is powerful, fast to charge and also much more resistant to heat and cold."

BASF has made a number of acquisitions and development collaborations to establish itself in the market for existing lithium-ion battery materials, such as nickel-metal hydride (NiMH).

Its long-term plans are centered on materials beyond lithium-ion technologies like lithium-sulfur. Last year it invested $50 million in an equity share in Sion Power, Tucson, Arizona, a leader in the development of lithium-sulphur batteries.

"Lithium-sulphur batteries not only have high performance potential but will be less expensive than other lithium batteries so they will help to resolve the key issue of cost," said Friedrich Seitz, President Process Research & Chemical Engineering at BASF. "But it will take 10 years to fully commercialize them."

UK-based OXIS Energy, another start-up considered to be a technology leader in lithium sulphur batteries, has recently attracted investment of $24 million from Sasol New Energy, the technology development arm of Sasol, the South African chemicals and energy company.

Earlier this year, OXIS reached a joint development agreement with Arkema, which over the last 10 years has been building up a knowledge base in lithium-ion battery technology. In January OXIS also clinched a development deal with Bayer MaterialScience (BMS), which is developing large zinc-air batteries.

While BMS has been investigating zinc-air technology as a possible basis for cheap and efficient energy storage systems, companies like BASF are looking at the long-term potential of lithium-air technology. "It is something which may possible come after the commercialization of lithium-sulphur batteries," Seitz said. "At the moment it is the subject of exploratory research work."

The development of energy efficient but inexpensive large battery technologies is going to be a long haul, which perhaps only the big players in battery materials will be able to afford.

Sean Milmo, freelance science and business journalist, Essex, UK

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DuPont Gains Hard-Fought Majority Stake In Pannar Seed

DuPont has completed its three-year effort to buy a majority stake in South Africa's largest seed company, overcoming that country's stiff opposition to the foreign ownership with pledges to keep a rein on pricing and to aid small South African farmers. The deal with privately held Pannar Seed should provide immediate financial gain to DuPont, with new products expected to be on the market in August and September, according to Paul Schickler, president of DuPont Pioneer, DuPont's agricultural seed unit.

German Chemicals Economy Flat in H1 but European Sales Improve

In the first six months of 2013, a clear business trend for Germany's chemical producers did not materialize, the industry association Verband der chemischen Industrie (VCI) said in July. But while the sector lacked dynamic, compared with counterparts in other European countries German companies performed relatively well, the association said.

Production and sales of German chemical companies in H1 2013 were flat at the 2012 level and thus below producers' expectations. Business with foreign customers was slightly better than at home. Along with pharmaceuticals, polymers, consumer chemicals were the only segments to see any growth.

For the full year 2013, VCI is sticking to its earlier forecast of a 1.5% rise in chemical output and a sales increase of the same dimension to €190 billion. The association predicts slight gains in Germany and the rest of Europe in the second half, with export growth slightly less dynamic than expected earlier. (dw)

Lanxess Reports Successful PBT Trials with Bio-based BDO Feedstock

Trial production of polybutylene terephthalate (PBT) at the Hamm-Uentrop, Germany, plant of specialty chemicals producer Lanxess, using bio-based 1.4 butanediol (BDO) made according to the process developed by U.S.-based Genomatica, have proven that the renewable route to the polymer is commercially feasible, the two companies said.

In the test, Lanxess fed 20 t of the 100% bio-based BDO into the continuous production process at the 80,000 t/y polymerization facility it operates in a joint venture with DuPont. The company said it found that the properties and the quality of the resulting product were "fully equivalent" to conventional petroleum-based PBT.

Also using the Genomatica process, Japanese chemicals and plastics producer Toray in May said it had developed a partially bio-based PBT at bench scale with physical properties and formability equivalent to polymer made from conventional BDO. Toray also has made prototypes of molded components, and before scaling up to commercial production it plans to share samples of its bio-based PBT with customers to help develop market demand. (dw)

EU Chemicals Output Shrinking in 2013

European chemicals output will contract by 1% this year before returning to modest growth of 1.5% in 2014, Cefic, the European Chemical Industry Council, said. The 2013 figure is lower than the 0.5% slight expansion announced in December 2012, as the economic development to date has been weaker than expected.

The gradual recovery will be founded upon stabilization of industrial production in Europe after two years of weakness and a modest rise in exports. But the European chemicals sector, which generates 1% of the continent's gross domestic product and employs 1.2 million, will face tough competition from U.S. producers benefiting from cheap energy and feedstock.

"The EU chemical industry is still facing headwinds from the weak European economy," Cefic President Kurt Bock said. "The chemical industry continues to be exposed to strong international competition, mainly due to low-cost energy and feedstock in the US. European policymakers need to address the energy and feedstock issue if we are to preserve Europe's industrial core."

The 1% fall in European chemical output during 2013, compared with 2012, will be the second consecutive year of modest output decline. Important industrial markets for Although demand is stronger in some individual countries, both automotive and construction remain generally weak. The European construction output also remains at historically low levels. Cefic forecasts a return to moderate positive growth for chemicals output in 2014 of 1.5%. Petrochemicals and fine and specialty chemicals sub sectors both are predicted to grow by 2%. Consumer chemicals, a subsector that will remain in positive growth territory in 2013, will further expand by 1.5% next year followed by a 1% uptick for inorganic basic chemicals. Employment in the sector is forecast to remain stagnant.

Bayer Confirms 2015 Start for Commercial-Scale CO_2 to Polyols Unit

Bayer MaterialScience has confirmed 2015 as the start-up date for commercial scale production facility of polyether of polycarbonate polyols made from CO_2 feedstock. The new plant at Dormagen, Germany, will have capacity for "several thousand tons" of polyols.

Output will not be sufficient to accommodate market demand, but CEO Patrick Thomas said the Bayer group may opt to license its patented technology rather than to become an exclusive producer. Along with bedding, the CO_2-derived polyols could be used to produce thermoplastic polyurethanes and later coatings or fibers, he added.

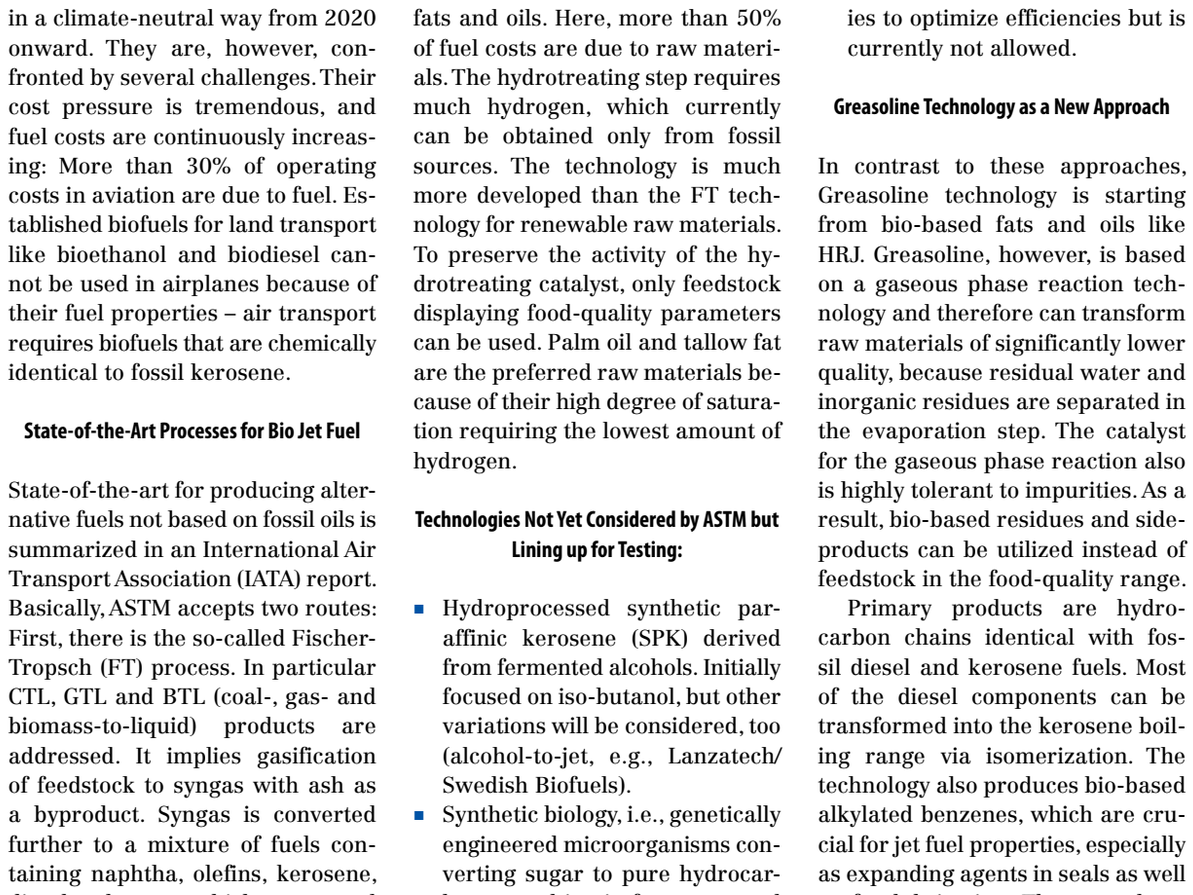
In early 2011, BMS began producing test quantities of the PU foam precursors at Leverkusen, Germany, with an eye to developing foam with properties equivalent to those of conventional grades. The test project known as Dream Reaction and later Dream Production was supported financially by the German federal ministry for research and development, BMBF, and included input from research partners such as RWTH Aachen University, which developed the catalyst. CO_2 was sourced from a nearby power plant owned by German energy utility RWE.

The use of carbon dioxide as a feedstock not only benefits the environment, said the BMS chief. CO_2 also will replace some of the fossil raw material traditionally used exclusively. The company also expects the new process to have economic advantages, as the waste streams can be obtained for free. (dw)

Bio Jet Fuel

– Alternative Bio-Based Fuel from Non-Food Resources and Residues Meets Kerosene Standards –

Green Air Travel – Continuous growth of air traffic and its corresponding increase in CO_2 emissions can be offset by high-quality bio jet fuels that meet all kerosene-related parameters. Some technologies are already certified and on the market. An innovative new technology uses bio-based nonfood resources and residues and, therefore, broadens the raw material basis for bio jet fuels and has the potential to supplement existing technologies.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Aviation Industry Growth and Related CO_2 footprint

Aviation is, among all transport sectors, growing strongly: Annual growth rates are projected at approximately 4.5% per year throughout the next decades. The majority of this growth is expected to be linked to Southeast Asia. Technological progress in the aviation industry – mainly more energy-efficient planes – might reduce the fuel consumption a bit. Yet without further changes in the fuel sector, aviation-related CO_2 emissions would increase by 3% per year. The aviation industry expects to be reliant on liquid fuels for the next 30 to 50 years, since no alternatives for biofuels – like batteries for cars – exist for airplanes.

This would put even more pressure on the CO_2 footprint of aviation: Already today, 12% of transport CO_2 emissions and 3% of all synthetic CO_2 emissions are due to aviation. European airlines consumed 53 million tons of kerosene in 2010; the whole world used 200 million tons.

Challenges For Aviation Companies

Governmental bodies are discussing joint targets and implementing several regulative actions in this context. The European Union decided in its Renewables Energy Directive (RED) to use 10% renewable energy in the transport sector by 2020 and is shooting for 2 million tons of "sustainable" kerosene by 2020. Details can be found in the technical paper "A Performing Biofuels Supply Chain for EU Aviation" of DG ENER 2011.

Aviation companies agreed on a voluntary commitment to grow only in a climate-neutral way from 2020 onward. They are, however, confronted by several challenges. Their cost pressure is tremendous, and fuel costs are continuously increasing: More than 30% of operating costs in aviation are due to fuel. Established biofuels for land transport like bioethanol and biodiesel cannot be used in airplanes because of their fuel properties – air transport requires biofuels that are chemically identical to fossil kerosene.

State-of-the-Art Processes for Bio Jet Fuel

State-of-the-art for producing alternative fuels not based on fossil oils is summarized in an International Air Transport Association (IATA) report. Basically, ASTM accepts two routes: First, there is the so-called Fischer-Tropsch (FT) process. In particular CTL, GTL and BTL (coal-, gas- and biomass-to-liquid) products are addressed. It implies gasification of feedstock to syngas with ash as a byproduct. Syngas is converted further to a mixture of fuels containing naphtha, olefins, kerosene, diesel and waxes, which are treated in several steps by so-called hydroprocessing and isomerization to yield fuels including jet fuel. Since those processing steps require very large units, typically more than 50% of fuel costs are due to investment costs.

Second, there are so-called hydrogenated vegetable oils, sometimes also called hydroprocessed renewable jet (HRJ). Processing steps comprise, besides distillation, the steps hydrotreating, hydrocracking and isomerization. Raw materials include nonfood and recycled fats and oils. Here, more than 50% of fuel costs are due to raw materials. The hydrotreating step requires much hydrogen, which currently can be obtained only from fossil sources. The technology is much more developed than the FT technology for renewable raw materials. To preserve the activity of the hydrotreating catalyst, only feedstock displaying food-quality parameters can be used. Palm oil and tallow fat are the preferred raw materials because of their high degree of saturation requiring the lowest amount of hydrogen.

Technologies Not Yet Considered by ASTM but Lining up for Testing:

- Hydroprocessed synthetic paraffinic kerosene (SPK) derived from fermented alcohols. Initially focused on iso-butanol, but other variations will be considered, too (alcohol-to-jet, e.g., Lanzatech/Swedish Biofuels).
- Synthetic biology, i.e., genetically engineered microorganisms converting sugar to pure hydrocarbons, resulting in farnesene and other similar terpenes (sugar-to-jet, e.g., Amyris Biotechnologies, Gevo and Cobalt).
- Synthesized kerosene aromatics (SKA), implying alkylated benzenes, a fuel component important for elastomeric seals and fuel lubricity (e.g., UOP and KIOR).
- Pyrolysis of cellulosic biomass to synthetic crude products (plus hydroprocessing).
- Comingling petroleum and biomass in refinery hydroprocessing. This is supported by refineries to optimize efficiencies but is currently not allowed.

Greasoline Technology as a New Approach

In contrast to these approaches, Greasoline technology is starting from bio-based fats and oils like HRJ. Greasoline, however, is based on a gaseous phase reaction technology and therefore can transform raw materials of significantly lower quality, because residual water and inorganic residues are separated in the evaporation step. The catalyst for the gaseous phase reaction also is highly tolerant to impurities. As a result, bio-based residues and side-products can be utilized instead of feedstock in the food-quality range.

Primary products are hydrocarbon chains identical with fossil diesel and kerosene fuels. Most of the diesel components can be transformed into the kerosene boiling range via isomerization. The technology also produces bio-based alkylated benzenes, which are crucial for jet fuel properties, especially as expanding agents in seals as well as for lubrication. These products cannot be obtained by hydro-treating processes and therefore HRJ fuel has to be blended with fossil jet fuel.

The basic technology does not need external hydrogen, because the formation of coke as a byproduct on the catalyst automatically closes the carbon-hydrogen balance within the system. A subsequent hydrogenation step with little hydrogen consumption is optional to guarantee all product quality parameters. The catalyst itself is regenerated after the biofuel reaction in an industrially established process. The process is currently performed in a pilot plant at Oberhausen; partners, mainly in the oil industry, are elaborating on plans for a demonstration plant.

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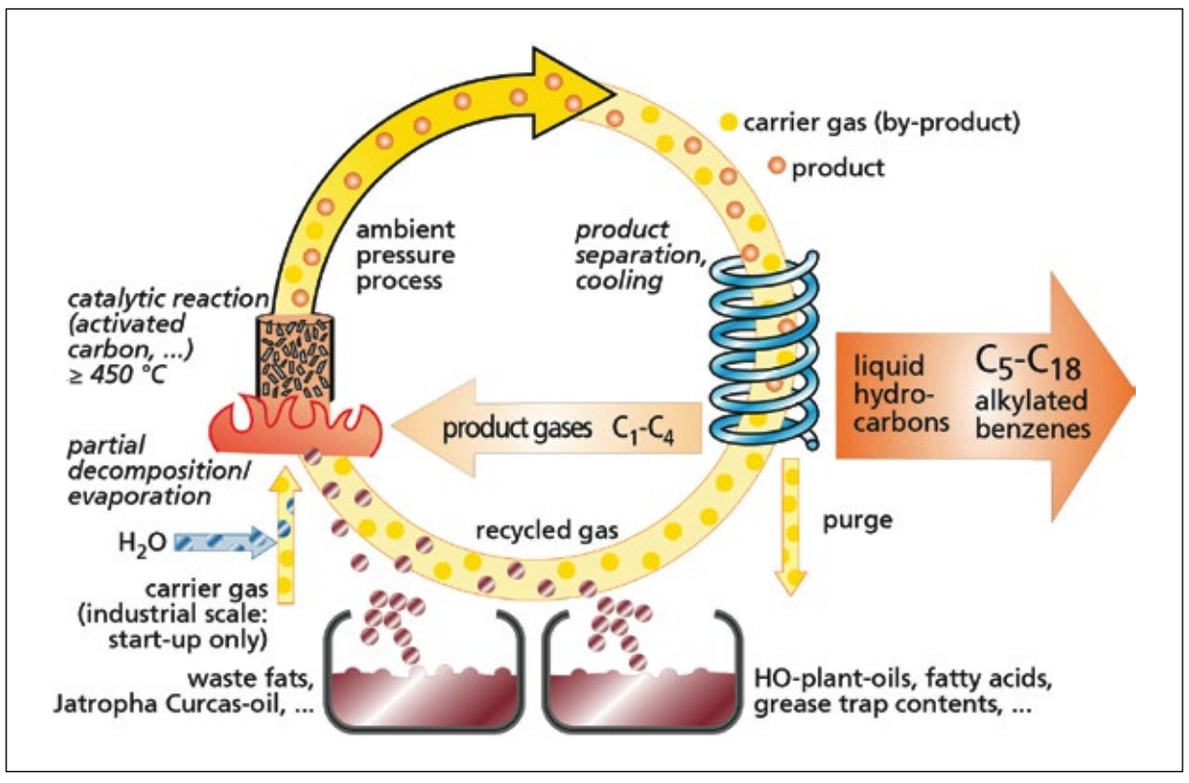

Fig.: Greasoline process scheme – main fuel products: bio jet fuel, bio-based alkylated benzenes and bio-based diesel.

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Sustainable Revolution

Industry Collaboration is at the Heart of New Innovation

Growing World – During the last centuries the chemical industry has enabled the first and second industrial revolution, and also the longest period of wealth creation in human history. During the last four decades, the world GDP grew from almost $15 trillion in 1970 to almost $63 trillion in 2010, while the world population doubled from 3.6 billion people to seven billion people and the world average life expectancy grew from 45 to 67 years old, pulling hundreds of millions of people out of poverty. Meanwhile, the world energy demand also doubled from 4.9 million tons of oil equivalent (MTOE) to 12 million (MTOE), the crude oil demand also doubled from 45 million barrels of oil to 88 million barrels of oil and natural gas demand tripled from 35 trillion ft^3 to an impressive 111 trillion in 2010.

In the second article in a three-part series, Rafael Cayuela Valencia, author of the book The Future of the Chemical Industry by 2050, examines how the innovation landscape must change in order to accommodate a much-needed cut in resources, energy demand and CO_2 emissions.

The following next decades will be equally demanding, stretching the chemical industry to levels never seen before; by 2050, the chemical industry is expected to quadruple from 2010 levels. However all these positive aspects will not come alone. Energy and resource scarcity (including food, water and others), greenhouse emissions and climate change will present formidable challenges and business opportunities for the industry. That challenges in combination with massive economic and industry growth, changing feedstock (to shale gas and bio), products (more sustainable), markets and players (towards BRIC and REST) will entail a massive transformation in the industry.

Rafael Cayuela Valencia
Commercial Director Feedstock (Ethylene, Benzene & Styrene), Styron

CO_2 Emissions Diet

In light of climate change, the world must learn to leave with an average of 4,000 grams of CO_2 per capita and day, as opposed to the current 13,283 grams and the projected 28,215 grams by 2050. This represents a significant technological challenge as well as a massive business opportunity. To put this target figure in perspective, 4,000 grams of CO_2 per capita and day is equivalent to a 20-40 km car ride, with 100-200 grams of CO_2 being used per kilometer – or the current level of per capita and day emissions in India in 2010.

Can we imagine the amount of technologies and challenges our industries will need to overcome and the chemical industry will need to enable in order to comply with these severe requirements? Can we imagine how our industries will need to change when we are confronted with this super diet of CO_2 emissions?

In 2010, the cost for one ton of CO_2 in Europe and under the European Trading Scheme (ETS) fluctuated between €10-20 per month. As an individual perhaps some people could still afford to pay for these extra emissions, but others might not – and certainly the world as a total can't. Such a severe CO_2 emissions limitation would present a huge challenge to all industries. Surely the world's perspective on emissions will radically change when our society, companies, industries and countries will start valuing and pricing CO_2 and its alternatives with the 4,000 grams in mind.

The global perspective on all these issues – energy, resources and emissions – is about to change very soon. As soon as the world economy starts improving, governments around the world will start enacting more and more stringent legislation to address these topics. The world is just at the beginning of that very long journey of ever-increasingly stringent and global legislation and regulations.

The next industrial revolution must be sustainable. © Pixel Embargo - Fotolia.com

Necessity And Innovation

The history of the chemical industry has been built around two fundamentals pillars: necessity and innovation. During the last centuries, the chemical industry has solved some of the major challenges presented to humans, enabling the first and second industrial revolutions, the highest period of growth and the current levels of wealth. The industry has sometimes been driven by markets, sometimes by innovation and sometimes by governments and society eager to find solutions urgent issues.

Due to the massive economic and population growth over the last four decades, the chemical industry focused on operational efficiencies rather than traditional innovation. In fact, most of the significant industry innovations happened in the first half of the last century. Now that the need to address resource and energy scarcity, emissions reductions and climate change is upon us, the industry will be forced to go beyond operational efficiencies and to move back to its roots: fostering innovation and technology (fig. 1).

Moving Toward Convergence and Collaboration

Under the imperative need of our world to pursue all the positive aspects of the upcoming economic growth and prosperity while handling resource and energy scarcity and a carbon productivity of 60% versus 2010 and 80% versus 2050, the chemical industry will require true innovation and a transformational change. The industry will change its feedstock, products, technology and markets – however it is the way it works and innovates that will enable the next technological revolution.

The fact that one single technology, company or industry might not be able to solve or even tackle some of the upcoming challenges highlights the necessity of vertical and horizontal collaboration as well as technological convergence. Industry collaboration and technology convergence will represent the ultimate parading of innovation and the bases of the third industrial revolution: the sustainable revolution.

It is fascinating to consider what kinds of products, solutions and innovations could be created when a stream of companies across the whole value chain work together on tackling energy and emissions reductions. The aggregated value, brain power and solutions these companies could bring together are simply amazing (fig. 2).Collaboration and technological convergence will be at the center piece of the chemical industry, innovation and the next technological and industrial revolution. However collaboration and technological convergence would not be easy as multiple and serious hurdles will need to be overcome.

Technological and business collaboration and convergence require different mindsets, different kind of employees and even different business and political leaders. Collaboration requires that individuals must be able and willing to go beyond their own boundaries, companies, industries and countries on the search of value and solutions. Collaboration will also require much more broad technological profile with much more flexible employees and leaders.

Companies will need to be more open and able to share knowledge without losing value. Proper innovation will require new ways to share and protect intellectual property and knowledge. At the same time, governments and authorities will need to find ways to stimulate innovation and collaboration, providing the right scheme of targets and incentives while setting the framework for collaboration within the proper legal boundaries.

Companies will also need to spend broad amount of time on selecting their partners and stream chain, as their intrinsic value will not only be linked to its own value anymore, but to the value of their technology partners. At the same time, banks and institutions will start valuing companies not only for their intrinsic value but also for their future technological value.

These are some of the most obvious challenges for technical collaboration and convergence, and these already imply massive changes in the way the chemical industry currently innovates. These changes will be gradual, but the implications will be pervasive.

However some things remain absolutely clear: The world will be able to solve the upcoming challenges if we act together immediately. Innovation, collaboration and convergence will be the catalyst for the third industrial revolution. The chemical industry, as always, will be at the forefront of the solution.

Conclusion

The chemical industry and our society are on the verge of a massive economic and technological revolution. During this transformation, companies, whole industries and perhaps countries could become bankrupt or even disappear while others will reach new levels of success and prosperity. Companies and industries able to lead in this transformation will be the leaders of the future, and those embracing technological collaboration and convergence will be at the forefront.

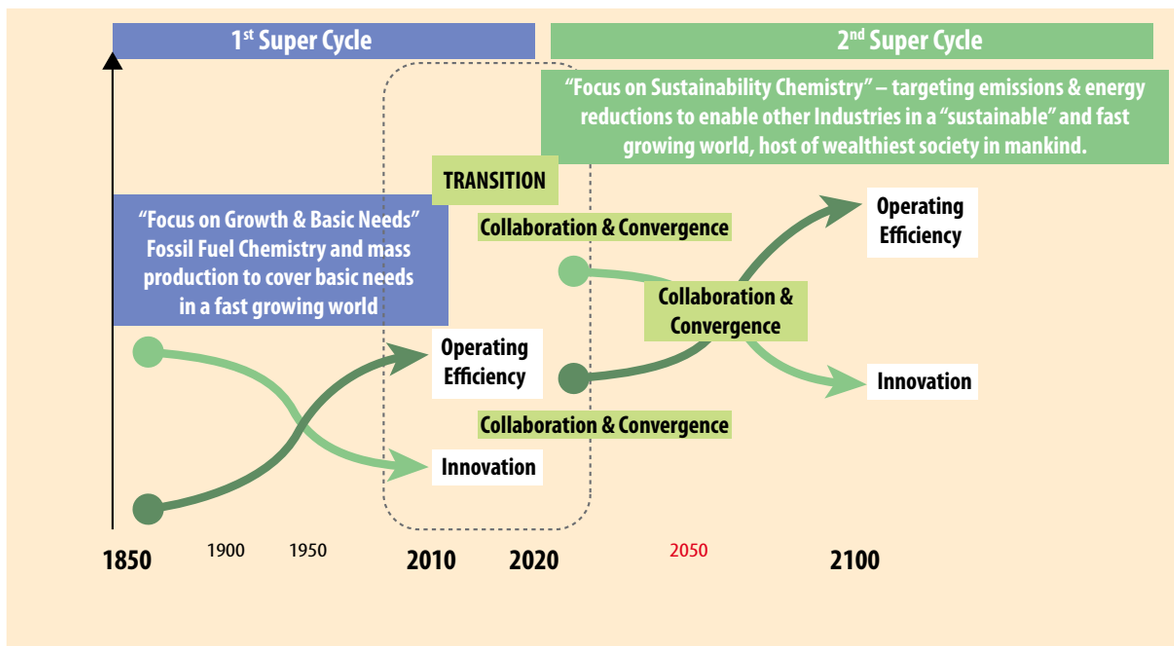

Fig. 1: The Chemical Industry Long Term Innovation Cycles: "from Operational Efficiencies towards Collaboration and Convergence".

Want more? Check out the book.

The Future of the Chemical Industry by 2050

Discussing the technological supremacy of the chemical industry and how it will adopt a leading position to solve some of the largest global challenges humans have even seen, this book details how the industry will address climate change, aging populations, resource scarcity, globality, networks speed, pandemics, and massive growth and demand. Author Rafael Cayuela currently works as the global product and marketing director for Styron.

The Future of the Chemical Industry by 2050
Rafael Cayuela
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BASF's Plastics Portfolio Focuses on Growth Markets

Germany — In an overview of its recently realigned plastics activities, BASF said that by bundling all specialty polymers in the new Performance Materials division, it has strengthened its focus on the customer. After splitting the former Plastics segment's portfolio into upstream (monomers) and downstream (performance materials) businesses, at the beginning of this year, managing board member Martin Brudermüller said the German chemical giant is strengthening both sides of the portfolio through investment in new products, plant and equipment as well as technology.

Projects in progress include expanding production of engineering plastics in Ludwigshafen and lifting the group's profile in Latin America through the Brazilian Mazzaferro polyamide 6 business acquired in mid-2012. In what it bills as the largest single investment in the history of the site, BASF is also widening capacity for thermoplastic polyurethanes at Lemförde, Germany, up to late 2014. At Ludwigshafen, it is increasing output of the expandable polystyrene insulation material Neopor at by 60,000 t/y up to October 2013.

Martin Brudermüller
BASF managing board member

Production of polyurethane feedstocks is being upgraded at two locations with the construction of new world-scale MDI and TDI facilities. Reflecting strong Asian demand, a plant for 400,000 t/y of MDI is under construction at Chongqing, China, and will start up in 2014. At Ludwigshafen, a 300,000 t/y TDI plant is also due on stream next year.

Relatively new fields for the group are the high-end markets of wind energy and biopolymers. In addition to epoxy systems that speed up rotor blade manufacturing by as much as 30% and a PET-based structural foam designed to lend stability to the blade interior, BASF today produces coating systems for blades and towers, special grouting mortars and concrete additives for foundations and towers, along with lubricants for wind turbine gearboxes. In the biopolymers spectrum, within its record group R&D budget of close to €2 billion, the Ludwigshafen group is looking toward development of a biodegradable, primarily bio-based foam with properties similar to those of polystyrene to be used in packaging of food and E&E components. (dw) ■

EPA Gets Tough on Shell, ExxonMobil for Pollution

U.S. — The U.S. Environmental Protection Agency (EPA) is cracking down on companies suspecting of violating anti-pollution laws. In an agreement described as the first of its kind involving chemical production, the Shell group has been ordered to invest at least $115m in cleaning up emissions at its Deer Park, Texas, refinery and chemical complex. Shell also will pay a fine of $2.6 million for alleged violations of the Clean Air at the complex bordering a residential neighborhood and a school.The EPA said Shell will spend $100 million to minimize flaring by recovering and recycling waste gases – some of which it may use as chemical feedstock or products. The producer also has agreed to install flare caps and instruments as well as monitoring systems to ensure that gases sent to flares are burned with 98% efficiency. A $1 million on a state-of-the-art system will monitor benzene levels at the fenceline of the complex.

Along with upgrading its wastewater treatment facilities, the company will be required to reduce emissions of sulfur dioxide and volatile organic compounds by 4,550 t/y. When the upgrades are fully implemented, emissions of greenhouse gases should be reduced by around 260,000 t/y. At Deer Park, Shell processes some 330,000 barrels per day of crude oil as well as producing 8,000 t/d of chemicals.

EPA has fined ExxonMobil subsidiary XTO Energy $100,000 for violating the Clean Water Act for discharging polluted wastewater from a facility in Pennsylvania's Lycoming County used to store water from hydraulic fracturing. The settlement also calls for the company to invest some $20 million in improving wastewater management. This should include recycling, proper disposal and prevention of spills from gas exploration and production activities in the states of Pennsylvania and West Virginia.

Among other things, XTO will be required to install a continuous remote monitoring system for all of its permanent production in the two states with alarms designed to immediately alert operators when spills occur as well as implementing a program to actively monitor interconnected wastewater storage tanks. The XTO discharge was discovered by the Pennsylvania Department of Environmental Protection when it found pollutants in a tributary of the Susquehanna River basin during a routine inspection. Authorities said the release contained a variety of pollutants, including chlorides, barium, strontium and total dissolved solids. (dw) ■

Barriers To Innovation

Challenges in the Implementation of Green Chemistry and Engineering

Proving the Value of Sustainability – Green chemistry and engineering, a promising and innovative approach toward sustainable chemistry, is not yet established. As every adoption process is obstructed by barriers, 70% of planned organizational change initiatives fail. Thus, the minimization of disruptions is decisive. We present major barriers to green chemistry and engineering derived both from expert interviews and a survey. Barrier analysis is a powerful tool for the assessment of every company. Based on its results, companies can derive strategies for overcoming barriers.

The transition to a sustainable chemical industry requires radical technological innovation for new processes and products. This new paradigm implies added value from the use of chemicals without adding new risks to our society or transferring risk to future generations. Environmentally benign chemical synthesis – better known as green chemistry – is the most basic concept among a list of promising concepts to transform sustainable chemicals into action.

But green chemistry is not yet established in the chemical industry. The implementation of green chemistry can increase corporate value, mitigate a company's risk and strengthen long-term competitiveness. So why does the implementation of green chemistry lag behind expectations?

The focus of this article is to identify factors – known as barriers – related to the implementation of green chemistry in industrial chemistry that may hamper, decelerate or even block its adoption. As every adoption process is obstructed by barriers, especially such essential innovations are affected. We have analyzed major barriers to the implementation of green chemistry. If barriers are not surmounted, green chemistry might fail and it might become a threat for the company. The discovery and consideration of as many barriers as possible is supposed to decrease vulnerability and increase resilience and, therefore, ensure the survival of the company.

Six Barriers to Green Chemistry and Engineering

In order to identify and evaluate these barriers, we analyzed literature and conducted an explorative survey. Primarily we focus on the six barrier categories identified at the Harvard workshop Overcoming the Challenges to the Implementation of Green Chemistry

- **Economic and financial:** The chemical industry is a well-established, mostly capital-intensive industry. There is a high investment barrier.
- **Regulatory:** Current regulation focuses on reducing risk through reductions in exposure while green chemistry promotes the reduction of inherent risk by reduction of hazard. Changes to more benign processes are inhibited by cost-intensive, control-oriented regulation.
- **Technological:** The number of disciplines involved in green chemistry is high and, accordingly, so is the number of "scientific" languages. The lack of appropriate training of chemists, including the ability to think on a more global or system level, has emerged as an important barrier.
- **Organizational:** The "promoters by know-how" – e.g., the chemist in research and development – are mostly not in a position of power. The "promoters by power" – e.g., the management executives – need an attitude toward the implementation of green chemistry to support it strongly enough.
- **Sociocultural:** Missing awareness within the different stakeholder groups can be a barrier to the implementation of green chemistry.
- **Definitions and metrics:** There is a lack of a consistent measurement for "green" chemical products or processes.

Barriers related to these identified classes might occur at different stages of the implementation process.

Methodology Of Barrier Analysis

Based on the barriers identified in this workshop, a questionnaire was developed to identify and assess those factors that may hamper, decelerate or even block green chemistry. The observation items were the perceived, i.e., subjective, barriers, as they embody risks, whereas an objectified measurement of barriers does not accomplish the same aim; it is perception that influences human behavior and not objective measures. The study was designed as a written web-based survey.

For the visualization of the results of the questionnaire, a barriers profile was chosen. It shall assist the organization in designating a starting point for a deeper analysis of the identified barriers and to generate strategies to overcome them. This assessment method uses the averages and spreads to identify tendencies for possible barriers and to evaluate their relevance. Through this method it can be assessed whether potential barriers are perceived as barriers (the higher the average, the bigger the perceived barrier) as well as whether different views exist about barriers (the bigger the spread, the more different the perception of a barrier). This analysis aims to determine first trends (e.g., all interviewees perceive one barrier almost identically) and to identify starting points for the assessment of causes for barriers (e.g., strongly differing views on barriers suggest a need to ascertain the reasons behind those differences).

Results And Discussion

We matched our results with the six major barrier groups obtained as a result of the Harvard workshop. The barrier statements were sorted according to the Harvard groups by investigator triangulation, i.e., three persons classified the barriers independently and then discussed the results. Matching the barriers with the classification developed at the Harvard workshop, it can be seen that within each barrier group some prerequisites are already given, whereas others still have to be strived for. The results reveal that within each group (except the metrics and definition group) some barriers seem to be overcome, whereas others still have to be strived for.

To further analyze the causes of barriers to the implementation of green chemistry, the barriers were sorted along the innovation cycle. The innovation process was used because innovation is one of the main drivers for value in chemistry, and green chemistry solutions are innovations. That analysis shows a more differentiated picture than the analysis of the Harvard barrier groups in order to develop strategies for overcoming the barriers. Barriers seem to be perceived higher the later the stage of the innovation process. Activities to overcome barriers as sources for intangible risk should focus on the adoption and diffusion stage.

Value Of Green

Green chemistry as the most fundamental concept in sustainable chemistry has achieved a good awareness level. Yet implementation needs to be pushed forward. Activities to overcome barriers regarding the implementation of green chemistry should focus on the adoption and diffusion stage. While different strategies such as the stronger involvement of policies or the expansion of networks are advantageous, we plead for the necessity of involving green chemistry aspects into corporate decision calculus. We argue that one aspect is the missing connection between green chemistry and the value of the company. Even though companies are persuaded by the concept of green chemistry and take an active role in the transition to a sustainable chemical industry, they will first ask for its contribution to the company's value. The primary issue from the company's perspective is that of economics.

"The chemical industry exists to make profits and products, in that order," according to Green Chemistry in Practice by Joseph J. Bozell. In other words, unless there can be shown a value, they will not choose the green path.

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U.S. Drugmaker Perrigo to buy Ireland's Elan for $8.6 Billion U.S. drug maker Perrigo agreed to buy Elan for $8.6 billion in a deal that will hand its tax savings from being domiciled in Ireland and royalties from a blockbuster multiple sclerosis treatment. The deal ends a bitter takeover battle in which Elan rejected three lower bids from U.S. investment firm Royalty Pharma amid injunctions, court hearings and a war of words before putting itself up for sale in June. Michigan-based Perrigo, which makes OTC pharmaceuticals for the in-store brand market and has a market value of some $12 billion, will pay $6.25 per share in cash plus $10.25 per share in stock. According to Deutsche Bank analysts, the offer is a significant premium to their $12 per share valuation of Elan, reflecting the tax advantage, and worth about a fifth more than their calculation of the Royalty bid.

Pfizer to Split Generic, Branded Drugs Units Pfizer, in what could be the prelude to spinning off its generics drug business, said it plans to separate its commercial operations into two units, mainly for patent-protected brands and a third for generics.Pfizer said the changes will take effect by January in countries that do not require a consultation with labor unions. Earlier this year, Pfizer said it would begin examining the finances of its patent-protected unit, which it calls its "innovative" business, and its generic operation, called its "value" business, to decide whether to spin off the generics operation. It said the review would take three years. Pfizer generics, which have far lower profit margins than patent-protected drugs, had global sales last year of $10.2 billion. The business represents 17% of total sales and overwhelmingly comes from overseas.

Novartis Lifts Full-Year Outlook After Competition Delay Novartis raised its full-year outlook after generic competition to its best-selling blood pressure pill was delayed, granting the Swiss drug maker a temporary reprieve from patent losses. The Basel-based firm lost its patent rights on Diovan in the U.S. last year and faced competition from a copycat version of its monotherapy from Ranbaxy Laboratories. But the lab has so far failed to get a green light for production from U.S. regulators. Novartis said it expected full-year sales to grow at a low-single digit rate in constant currencies and core earnings to decline in the low single digits. It had previously guided for a mid-single digit drop in core earnings and flat net sales.

Turkish Drug Maker Sanovel Up For Sale Turkish generic drug maker Sanovel has been put up for sale by parent Toksoz Holding and could fetch between $500 million and $1 billion, three sources close to the matter told Reuters. Toksoz, which has interests in the food and pharmaceutical sectors, has hired J.P. Morgan Chase, Istanbul-based Alpacar Associates and U.S. boutique adviser Greenhill to find potential buyers for the business, the sources said. Sanovel, one of the top 10 pharmaceutical firms in Turkey, is likely to attract industry players rather than financial buyers, one of the sources said, without elaborating.

Russia's Pharmstandard To Spin Off OTC Business Pharmstandard, Russia's leading drug maker has started steps to spin off its over-the-counter medicines business. The Russian company, majority owned by businessmen Viktor Kharitonin and Egor Kulkov, said in a separate statement that it is planning to buy a Singapore-based company called Bever Pharmaceutical in a deal valued at $630 million. The separation of its over-the-counter business will be into a separate legal entity, the company said, but gave no further details about the structure of the new company or whether it would be listed.

U.S. Supreme Court Win Boosts Fight against Drug Settlements A U.S. Supreme Court ruling giving regulators the right to sue drug makers for agreements that delay sale of cheaper generic pharmaceuticals should deter some of the most egregious deals and allow the agency to better fight others, Federal Trade Commission Chairwoman Edith Ramirez told lawmakers. At issue are pay-for-delay deals, where brand-name drug makers settle patent infringement lawsuits by paying generic companies to postpone marketing their cheaper versions of the products. The FTC says the deals cost consumers and the U.S. government an additional $3.5 billion on drug costs each year by keeping cheaper generic drugs off the market for longer.

Abbott to Buy OptiMedica, Strengthens Medical Device Focus Abbott said it would enter the laser cataract surgery business by buying privately held OptiMedica for up to $400 million and in a separate deal would pay $310 million for stent maker Idev Technologies. The deals follow Abbott's spinout earlier this year of its branded prescription business into a separate company, AbbVie.The suburban Chicago company said it would pay $250 million for OptiMedica, net of cash, and make additional payments of up to $150 million upon completion of certain development, regulatory or sales milestones.

Alexion Valuation Could Choke Any Roche Bid Buying Alexion Pharmaceuticals would help Roche enter the area of rare or orphan diseases, but it could command a price too high.Two people familiar with the matter have told Reuters that the Basel-based firm is seeking financing for a potential bid for Alexion, which specializes in the treatment of rare diseases. A bid for Alexion would mark an attempt by Roche to diversify beyond its core cancer competencies through acquisitions, following a string of failures from its own research operations for drugs to treat cardio metabolic diseases.

The Price of Doing Business

How Will GDUFA Change the API Industry?

Michael Glessner
Pharmaceutical Research Analyst, Thomson Reuters

The FDA has announced that, while it will continue to target annual revenue of $299 million from the GDUFA program, DMF filing fees and annual facility fees will increase during FY 2014-2017. Time will tell if those fees prove prohibitive to API suppliers or if these payments are simply accepted as the price of doing business.

One-Time Fee – On Oct. 1, 2012, the U. S. Food and Drug Administration (FDA) implemented the long-discussed Generic Drug User Fee Act (GDUFA), authorizing the agency to collect fees from any manufacturers worldwide who wish for their active pharmaceutical ingredients (APIs) to be eligible for use in generic drugs sold in the U. S.

According to the legislation, a one-time fee is assessed the first time a Type II Drug Master File (DMF) is referenced in an Abbreviated New Drug Application (ANDA). In addition, manufacturers must pay annual facility fees for each location producing at least one generic API for use in the U.S. market (fig. 1).

With the additional revenue, targeted to be $299 million annually, the FDA plans to add resources in the hopes of accomplishing two important goals. First, they aim to cut into the large backlog of ANDAs awaiting review and to reduce average review time moving forward. Second, the FDA wants to increase the breadth and frequency of API manufacturer facility inspections, particularly in less regulated markets where previous inspections by any governing agency may have been non-existent.Despite the additional fees that will be incurred, many API manufacturers are supportive of the GDUFA legislation. Reduced ANDA review time will help some generics reach the market (and start generating revenue) more quickly. Manufacturers in regulated markets who were already subject to regular inspections by the FDA or the European Medicines Agency (EMA) are eager for their low-cost competitors in less regulated markets to be exposed to a similar level of scrutiny. Some in the industry believe that the FDA's Available for Reference List of DMFs with paid fees (available for download on the FDA website) will help to distinguish legitimate API producers from companies who use regulatory filings to market products they may or may not have the capability to produce.

Fig. 1: GDUFA Fee structure.

GDUFA Fee structure (all values in US$)			
Year	DMF Filing Fee	Annual Facility Fee	
	(one-time only)	Domestic	Foreign
2013	21,340	26,458	41,458
2014-2017*	51,258	34,368	49,368

*fees are estimated and subject to change

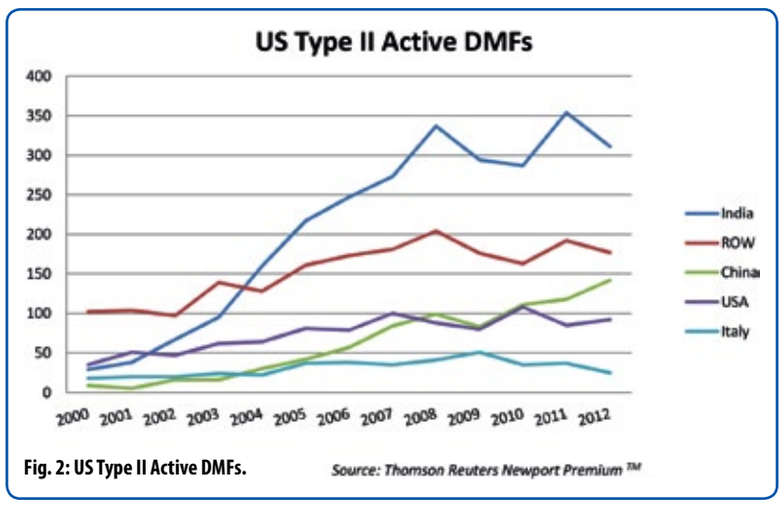

Fig. 2: US Type II Active DMFs. *Source: Thomson Reuters Newport Premium ™*

GDUFA Effects on the API Industry

One possible result of the GDUFA legislation could be a change in the growing trend of DMF filings originating from less-regulated markets. While a significant portion of APIs in the U.S. market continues to come from Italy and Spain, we have seen a sizable increase in the market share held by Indian companies. According to the Chemical Pharmaceutical Generic Association, the market share held by Indian companies quadrupled between 2005 and 2010.

Figure two, created with data from Thomson Reuters Newport Premium shows the total number of currently active U.S. DMFs filed each year since 2000 and breaks down those submissions by the country where DMF manufacturers' corporate headquarters are located. Total DMF count is not a direct measure of regional API production or presence in the U.S. market; many DMFs are filed but never referenced, and some companies can avoid filing DMFs altogether by placing pertinent information directly in their ANDA submission rather than submitting it as a separate document. DMF filings do, however, provide a strong indication of which API manufacturers have an interest in penetrating the U.S. drug market; it is clear from this chart that over the past decade more and more of that interest has come from companies based in India and China.

While we expect continued growth in the number of DMF filings from India and China, the rate at which this growth occurs compared to regulated markets may be curbed in response to the GDUFA legislation. Filing fees as well as the challenges of preparing for and responding to FDA inspections may serve to close the price gap between regulated and unregulated suppliers and slow the prolific rate of Indian and Chinese DMF filings.

Small companies who manufacture only a handful of APIs will find it more difficult to recoup the annual facility fee than large companies who can spread the cost across many products. Smaller players may choose to merge with other small companies, work with a purchaser willing to share costs or decide that the new fees are a prohibitive barrier to U.S. market participation.

Companies with multiple production facilities may decide to consolidate production of APIs bound for the U.S. in an attempt to avoid multiple facility fees. Potent, low-dose APIs that take up less production space could be a better return on investment than a large volume API that limits a company's ability to manufacture multiple products in one facility.

Supplier-Customer Relationship

One interesting sub-plot to the GDUFA story will be the effect of this legislation on the relationship between API suppliers and their customers. Suppliers who make an API exclusively for a customer may look for the customer to cover the cost of the DMF filing fee. Other suppliers may look to line up multiple customers before allowing their DMF to be referenced. API producers who make their living as a "secondary source," supplying generic drug companies with API only in times of shortage or primary supply chain breakdown, could find themselves paying DMF fees for APIs they never sell. These companies may seek some financial incentive from the purchasers who are referencing their DMFs

Customers, in turn, may take extra care to find a reputable API supplier because if an initial supply agreement falls apart, in addition to paying the new supplier for cost development, validation and stability there is currently a $25,760 fee associated with the submittal of the Prior Approval Supplement (PAS) necessary to change API suppliers. This may drive business back toward API suppliers in more regulated regions like the U.S. and Europe.

Moving Forward

With the GDUFA program still in its infancy, it is difficult to predict not only how the legislation will change the industry, but how long it will take before these changes unfold. Many skeptics believe that the FDA goal of reviewing 90% of ANDAs within 10 months of submission by the end of the program's fifth year is unrealistic. Even with the new revenue, the prospect of hiring and training new employees, addressing the ANDA backlog and cutting two years off the current average review time seems a daunting task. The FDA has announced that, while it will continue to target annual revenue of $299 million from the GDUFA program, DMF filing fees and annual facility fees will increase during FY 2014-2017 (fig. 1). Time will tell if those fees prove prohibitive to API suppliers or if these payments are simply accepted as the price of doing business.

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The Next Generation of Operational Excellence

Professionalizing – Embedding – Sharpening

Focus –The role and perception of operational excellence (OPEX) within the pharmaceutical industry has changed significantly over the last decade. Concepts that are applied in numerous companies have evolved from single, standalone approaches with a rather limited scope towards sophisticated programs aiming to deliver an organization's competitive edge. Since 2003, the University of St.Gallen has accompanied the industry's development with its ongoing benchmarking study supporting decision-making in pharmaceutical companies.

Prof. Dr. Thomas Friedli
University of St. Gallen

Daniel Bellm
University of St. Gallen

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The History and Definition of Pharmaceutical OPEX

The philosophy of operational excellence looks back on a long history. The underlying concepts that evolved over time have their origins predominantly in the Japanese automotive industry and disseminated thence into most other industries. However, with regard to the pharmaceutical industry, the history of OPEX is still short. The first serious initiatives were only launched at the beginning of this century. Since then, OPEX gained momentum and became a priority for top management and workforce alike at pharmaceutical manufacturers in every part of the world.

Around the same time, science of pharmaceutical manufacturing appeared on the U.S. Food and Drug Administration's (FDA) agenda. As a reaction to a continuously rising number of post-approval changes that hampered the agency's inspection obligations, the FDA started to push the industry towards developing a scientific understanding of pharmaceutical manufacturing processes and encouraged manufacturers to use innovative technologies like process analytical technology (PAT) for better process control leading to a new paradigm: Quality and productivity came on the agency's agenda, providing the industry with new opportunities and paving the way for OPEX. The incremental introduction of OPEX in the pharmaceutical industry up until now has happened in three major stages (fig. 1)

Looking back at the historical development of OPEX in the pharmaceutical industry and the numerous influences over time, it is no wonder that there is no clear-cut definition of the term "operational excellence" to date. In the past, the term OPEX was often used for newly launched improvement activities or as a proxy for cost-cutting programs, Six Sigma and lean initiatives.

With regard to the innumerable publications that contributed to the understanding of OPEX and from our experience, OPEX should be understood as the balanced management of cost, quality and time while at the same time focusing on the customer needs. To achieve this end, OPEX comprises structural and behavioral changes thought to optimally support necessary activities. In order to maintain sustainability also in changing or volatile environments, OPEX has to be pushed by top management and has to be designed to engage every single employee. Obviously, OPEX is not only about performance. It also encompasses the way leading to that superior performance, and practices that allow an organization to continuously improve itself.

Launching And Maintaining OPEX

The focus of managing an OPEX initiative has to change over time. Awareness of critical success factors and barriers in managing OPEX can provide guidelines as to how to design, review and adapt an excellence program. Obviously, launching an initiative and introducing a company to continuous improvement for the first time addresses another set of managerial capabilities than maintaining a system in a steady state. The comparison of successful practices with less favorable ones results in a summary of barriers and success factors that managers should have on their agenda when launching an OPEX initiative.

After the effective launch of an OPEX initiative, its management will need to change. However, this does not imply to disregard the factors that were once relevant for the initiative's successful take-off. They should be further stressed, but complemented by paying attention to new challenges and utilizing upcoming opportunities (fig. 2)

An OPEX initiative has to be aligned with a company's overall manufacturing and supply strategy. Consequently, in accordance with a constantly changing environment that an organization is exposed to as well as with changing maturity levels of manufacturing sites and the initiative itself, a time-based adaption of OPEX programs along with their focused priorities is required. Figure 2 summarizes essential focal areas OPEX managers should be aware of in order to lead an initiative successfully in the long run. Over time, new areas to focus on will arise, at the same time existing focal areas might require an adaption.

The necessity of an occasional adaption of an OPEX program or rather its time-based alignment and review of conformity with an organization's overall targets becomes obvious while reviewing the decade-long evolution of successful industry practices. Such programs usually have their origin in focused and single-point process improvements and later include the entire organization in the transformation process towards a full system approach.

Professionalizing And Embedding OPEX

The same way an organization changes over time, the embedded OPEX organizational structure will need to be developed. Since it is the organizational structure that provides the framework for the social-operational-control system and beyond influences behavior of individuals and groups, organizational sub-dimensions will require an adjustment at the right time in order to accelerate the sustainable implementation of OPEX (fig. 3).

Although Werani (2013) argues that there are several options to design a manufacturing organization, especially in a globally operating company, Friedli and Lembke (2013) conclude that literature lacks evidence of the right structure and the guideline for practitioners as to how to optimally staff an OPEX initiative neither on its launch nor in its maintaining phase. Every company, however, needs to develop its own and specific organizational model including the right structures in order to ensure a reasonable division of labor and to facilitate productivity and efficiency gains.

Despite the pharmaceutical industry is discussing product and process optimization for more than a decade, predominately these discussions are still following a single plant perspective.

The coordination of pharmaceutical manufacturing sites on a network level holds enormous potential. Therefore, the industry will have to follow the example of other more advanced manufacturing industries and systematically address production optimization from a true network perspective in the near future.

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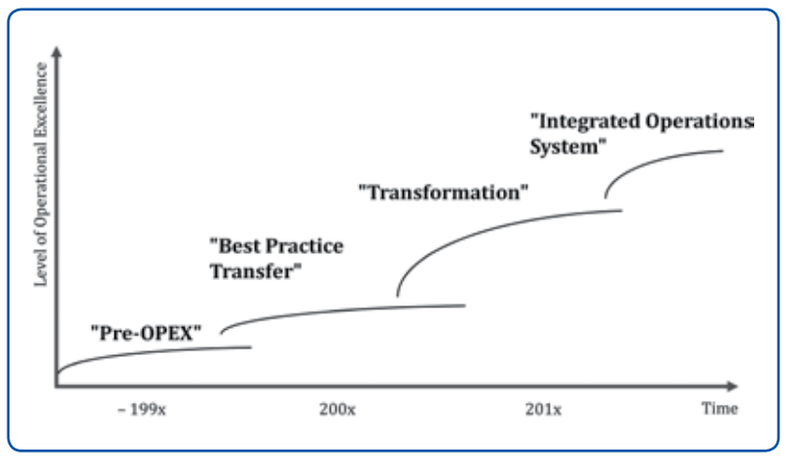


Fig. 1: The Pathway to Operational Excellence. © Friedli & Werani, 2013

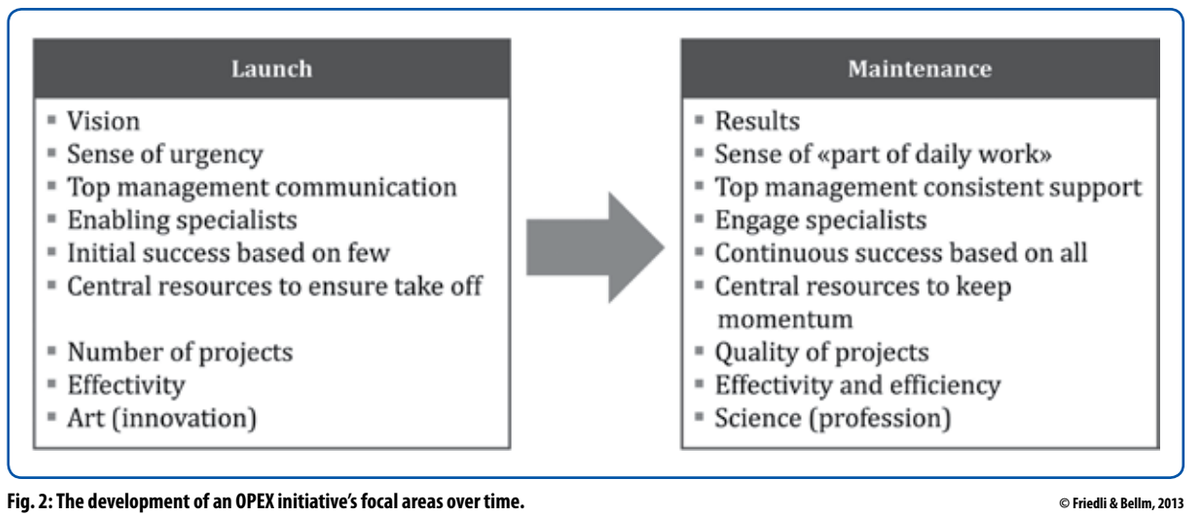


Fig. 2: The development of an OPEX initiative's focal areas over time. © Friedli & Bellm, 2013

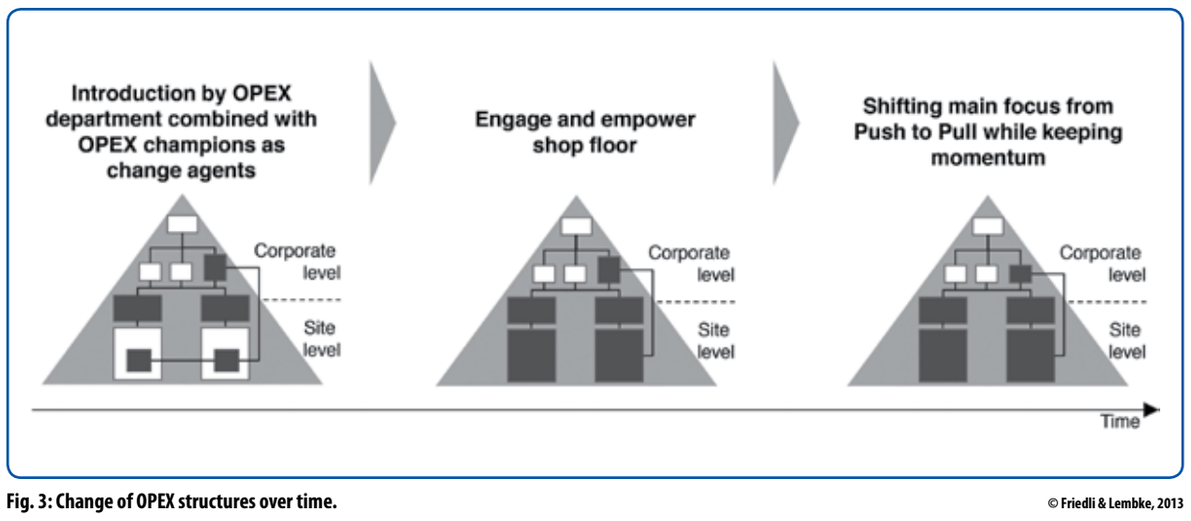


Fig. 3: Change of OPEX structures over time. © Friedli & Lembke, 2013


Neville Prior

Dr. Neville Prior, chairman of the Cornelius Group, has been elected as vice president of the European Association of Chemical Distributors (Fecc). He has been a member of the Fecc Board since 2009, actively contributing to the success of the association activities. Prior is also president of the Chemical Business Association (CBA) and brings 25 years of experience in the chemical distribution industry. Furthermore, the Fecc General Assembly appointed **Gordon Hay**, Brenntag's operations director Europe, and **Giorgio Bonetti**, member of the governing and executive council of the Italian Association, AssICC as board members.


Michel Spagnol

Michel Spagnol has taken over the role as president and CEO of Novasep. He succeeded **Patrick Glaser**, who held the position for three years. Spagnol joined Novasep from Shasun, where he was president and chief technology officer. He is a proven business leader with core expertise in contract manufacturing of active pharmaceutical ingredients and, more broadly, strong experience in using and developing innovative technologies to address needs of customers in fine chemicals and life sciences fields. Prior to Shasun, Spagnol spent his career at Rhodia.


Gilles Rochas

Gilles Rochas took over the role as vice president application segment Energy & Infrastructure at Borealis as of July 1. Rochas replaces **Marc Hubert**. With over 20 years experience in the polymer industry, Rochas returns to Vienna from Singapore, where he has been vice president for Sales in the Southeast Asia, Australia and New Zealand regions at Borouge since 2012. Prior to that, the French national had been vice president for Film & Moulding at Borouge since 2008 and had previously held numerous Vienna-based senior positions within Borealis.


Thomas Arnold

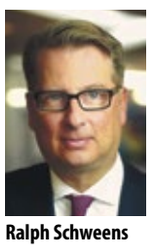
Thomas Arnold was appointed as managing director of Biesterfeld Spezialchemie effective May 1. He leads the company and its European organization together with **Dr. Nicole Hamelau**. Thomas Arnold is responsible for the operative business of Biesterfeld Spezialchemie and its subsidiaries and affiliates. As a graduate business economist he has worked for many years in leading positions in the international chemical industry, among others as executive director nutrition at Helm, at Lucas Meyer and BASF.


Peter Berka


Cord Manegold

Peter Berka has been appointed as manager Sales and Distribution in Europe at Songwon. Prior to joining Songwon, Berka held positions in technical support, marketing and sales at DuPont Performance Coatings Austria and Dic Performance Resins. Most recently he was European sales manager for Dyflex Polymers. Also at Songwon, **Cord Manegold** has started as global business manager Main Antioxidants and Blends. He reports to Olivier Keiser, EVP Business Management and member of the Songwon executive committee. Prior to joining Songwon, Manegold held key positions at Unichema, Chemtura and at Dow Chemical.

Chris Gowland has been appointed to the newly formed position of chief operating officer at Aesica, a global contract development and manufacturing organisation. As COO, Gowland has overall responsibility for all operating strategy and leads international operational delivery, continuing to guarantee best in class on time in full services across the Aesica Group. In addition, **Sven Thomas** and **David Ross** have been appointed as business development managers at Aesica. Ross will focus on the UK, Ireland and Scandinavia. Thomas will handle Central and Eastern Europe with a strong emphasis on expanding the level of business from Germany and the growing economies in Eastern Europe.


Ralph Schweens


Michael Stumpp


Alfred Hackenberger

Ralph Schweens, currently managing director of BASF Mexicana, will become president of the South America regional division based in São Paulo, Brazil, effective Oct. 1. The current head of the region **Dr. Alfred Hackenberger** is retiring following a more than 30 year career at BASF. **Dr. Michael Stumpp**, currently senior vice president, Global Home & Personal Care Business in the Care Chemicals division, will succeed Schweens as managing director of BASF Mexicana, based in Mexico City effective Sept.1.

Angela Merkel: A Chancellorship Forged in Crisis

Angela Merkel was already unique when she became German chancellor: the first female leader of Europe's biggest economy, the first from former communist East Germany and the first born after World War II.

Angela Merkel: A Chancellorship Forged in Crisis is the definitive new biography of the world's most powerful woman. Delving into Merkel's past, the authors explain the motives behind her drive to remake Europe for the age of globalization, her economic role models and the experiences under communism that color her decisions. For the first time in English, Merkel is fully placed in her European context

► "Angela Merkel: A Chancellorship Forged in Crisis"
Alan Crawford, Tony Czuczka
John Wiley & Sons, July 2013
Hardcover, Price: €25.90
ISBN: 978-1-118-64110-1

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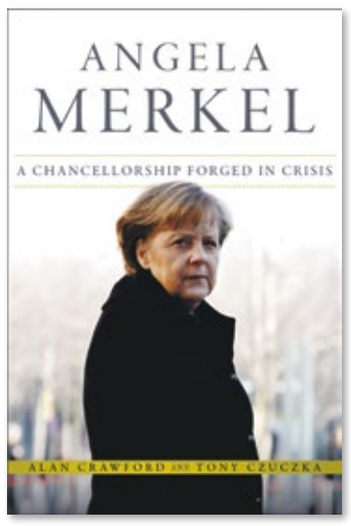


Ahead of the German Bundestag election in September, we are giving away two copies of the book. To take part in the giveaway, send us an email (subject: Merkel) with your full name and address to CHEManager-Europe@gitverlag.com. Winners will be drawn on Sept. 19.

Monsanto Exec Robert Fraley, Other Biotech Pioneers Win World Food Prize

An executive with Monsanto and two other pioneers in agricultural biotechnology said their selection as winners of the $250,000 World Food Prize should encourage the wider use of genetically engineered crops. The Iowa foundation that administers the prize, created by Nobel Peace Prize laureate Norman Borlaug, said genetically modified crops offer higher yields and more resistance to pests, plant disease and harsh weather.

It was the first time the award, often regarded as the equivalent of a Nobel Prize for agriculture, has gone to a creator of GM crops. While engineered varieties of crops like soybeans and corn are popular among U.S. farmers, they are not approved for cultivation in Europe. Some U.S. consumer groups also say genetically modified foods should be labeled, despite government assurances that the foods are safe.

Named as winners were: Robert Fraley, the chief technology officer at Monsanto; Mary-Dell Chilton, founder of Syngenta Biotechnology; and Marc Van Montagu, founder of the Institute of Plant Technology Outreach at Ghent University in Belgium.

"These three scientists are being recognized for their independent, individual breakthrough achievements in founding, developing and applying modern agricultural biotechnology," said Kenneth Quinn, president of the World Food Prize Foundation.

The Food Prize was announced as the U.S. Agriculture Department's search for the source of unapproved biotech wheat found on a farm in Oregon in April continued. The strain was developed years ago by Monsanto, but abandoned in 2005 due to worldwide opposition to engineered wheat. Van Montagu said


Robert Fraley
CTO, Monsanto


Mary-Dell Chilton
Founder, Syngenta Biotechnology


Marc Van Montagu
Founder, Plant Technology Outreach, Ghent University

he hoped "that this recognition will pave the way for Europe to embrace the benefits of this technology, an essential condition for global acceptance of transgenic plants."

Genetically engineered crops were grown on 430 million acres around the world in 2012, said the food prize committee. Despite the "gene revolution," though, the committee noted estimates that 870 million people - one in eight of the world's population - are hungry. "The World Food Prize provides us an important platform to engage a new global dialogue around enabling farmer access to advanced agricultural tools while ensuring a sustainable food supply for all," said Fraley.

Chilton, who helped produce the first genetically modified plants in the 1980s, said agricultural biotechnology "which started as curiosity-driven fundamental research, has now found worldwide application." ■

Wacker Wins Unilever Partner Award

Unilever presented Munich-based chemical company Wacker with this year's Partner to Win Award for its customer-oriented supply of silicone raw materials. According to the jury, Wacker helped to significantly reduce the cost for silicone emulsions for hair care products by expanding capacities and developing effective and affordable solutions at its site in India.

This year's Partner to Win Award categories included Innovation, Sustainability, Capacity and Capability Building and World Class Service. Every year, the British-Dutch consumer goods corporation celebrates and recognizes strategic raw material suppliers and service providers for their winning contributions.

Wacker has been supplying silicone emulsions, primarily from its production facility in Kolkata, India, to Unilever in Southeast Asia for around 10 years. "Unilever was expanding their business in India and in Southeast Asia and was looking for a supplier supporting this growth by providing high-quality products and sufficient capacities to meet their demand," said Jörg Krey, head of the Performance Silicones business unit. ■

EVENTS

World Chemicals & Unconventional Feedstocks Conference, Sept. 10–12, 2013, Singapore

The first World Chemical & Unconventional Feedstocks Conference will take place just before the long-running 31st Annual World Methanol Conference. The two conferences combine IHS and industry expertise and extensive analysis in energy and chemicals.

► http://ihsglobalevents.com/wmc-wfc2013/

Science Meets Tires – Perspectives for Tire Technology, Sept. 11-12, Aachen, Germany

The Institute of Plastics Processing (IKV) and the Institute of Automotive Engineering (IKA) at RWTH Aachen University jointly organize this international conference. The interdisciplinary exchange between experts from industry and research looks at the importance of the tire for the automotive industry. The presentations and discussions cover the entire process chain and provide an outlook on future trends and developments. The thematic focus of this year´s conference includes the design, dimensioning and testing of tires. The requirements of the automotive industry and innovations in processing will also be presented.

► www.science-meets-tires.de

FEICA European Adhesives & Sealants Conference and EXPO 2013, Sept. 11-13, Izmir, Turkey

The 2013 Adhesive & Sealant Conference organized by FEICA, the Association of the European Adhesive & Sealant Industry, starts off with the Business Forum "Adapt and change, the key to growth in Europe". As the keynote speaker, Dr. Ramón Bacardit, recently retired from Henkel and former FEICA President, will share over 30 years of experience in the adhesive industry. Furthermore, 27 speakers will be addressing topics such as "Sustainable Development", "Solutions for Small & Medium Sized Companies", "Smart Innovation in Adhesives & Sealants", "Business and Hot Melt", and "Advances in Dispersion Adhesive Technology".

► www.feica-conferences.com

Chemspec Asia 2013, Sept. 19-21, Bangkok

Quartz, the organizer of the Chemspec brand chemical industry events has chosen Bangkok as the venue for its inaugural Chemspec Asia Exhibition and Conference. This choice represents a clear indication of Thailand's strong reputation as a regional hub amongst the international fine chemicals community. It is expected that Chemspec Asia will attract more than 150 international exhibitors, 500 delegates and 4000 visitors. The event will provide a forum for companies to promote their commercial expertise and to form alliances with like-minded partners who wish to develop the potential of an exciting market.

► www.chemspecevents.com/asia

International SAP Conference for Chemicals, Sept. 30 – Oct.1, Frankfurt

The International SAP Conference for Chemicals provides attendees with information on how the latest innovation from SAP is allowing global chemical companies to maximize commercial success without compromising safety, compliance and quality. Packed with SAP expert insight and customer case studies, the conference will offer insight into how SAP's suite of solutions for the chemical industry are helping companies – large and small – to synchronize their processes, from supply chain management to product development, operations and risk management.

► http://uk.tacook.com/sapchemicals

India Chem Gujarat 2013, Oct. 24–26, Gandhinagar, Gujarat, India

The third edition of the three-day international exhibition and a two-day conference India Chem Gujarat is jointly organized by the Department of Chemicals and Petrochemicals of the Government of India along with the Government of Gujarat, the Industrial Extension Bureau (iNDEXTb), and the Federation of Indian Chambers of Commerce and Industry (FICCI). The event is focused on Specialty & Fine Chemicals, Agrochemicals, Dyes & Colorants and Chemical Technology. The organizers expect more than 200 focused exhibitors and over 8000 business attendees.

► www.indiachemgujarat.com

Biocides 2013, Nov. 18-20, Vienna

Now in its 16th year, this event offers delegates the chance to join an expert panel addressing legal issues and trade aspects of biocidal products, particularly the challenge of transforming the regime from the Directive (BPD) to the Regulation (BPR). This year's conference focuses on key aspects of the new Regulation (EU) No. 528/2012 relevant to active substances and biocidal products - including authorization of biocidal products and the core procedures for their application, together with administrative and scientific assessment of these products. The conference is organized by Chemical Watch and Feierl Herzele.

► www.europeanbiocides.net

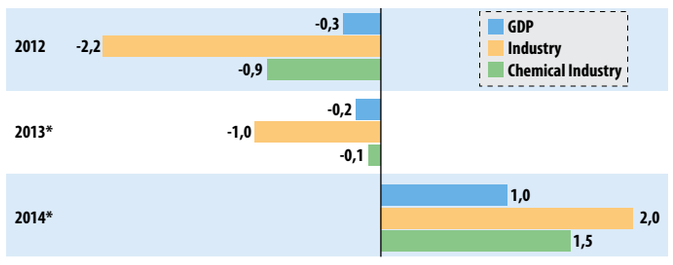
Hazards 24, May 7-9, 2014, Edinburgh

The UK's leading process safety conference will address major offshore and onshore themes including shale gas technologies, human factors, and safety culture. The event called Hazards 24 is organized by the Institution of Chemical Engineers (IChemE). With safety still a major concern in all the process industries Hazards 24 will provide an opportunity to share best practice, discuss past experiences and highlight the latest developments to minimize the risks. The organizers have announced a call for papers covering 18 themes including legislation, plant layout and environmental protection. Abstracts should be submitted by October 7, 2013.

► http://www.icheme.org/hazards24

Europe's economy recovers slowly

Economic Growth in the European Union
Year-on-year change (%)



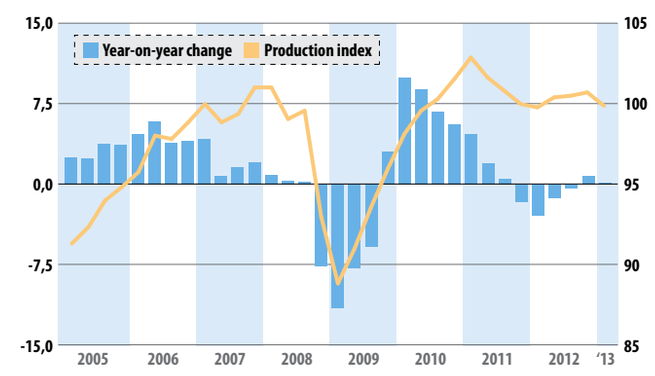
*Forecast

Source: VCI © CHEManager Europe

Economic uncertainty continues

Large parts of Europe continue to be in recession. The economic performance of the European Union (EU) has declined for six successive quarters. However, it seems that the bottom of the trough has been reached. The downward trend seems to have stopped; Germany is already experiencing an upward trend. However, the economic turnaround is delayed further. There is yet no evidence of recovery in the chemistry sector. So far order book entries do not show an increase in demand. But, the situation will stabilize in the second half of the year. Modest growth could then be expected in the following year (Fig. 1).

Chemical Production in the European Union (EU 27)
Year-on-year change (%)
Seasonally adjusted production index, 2010=100

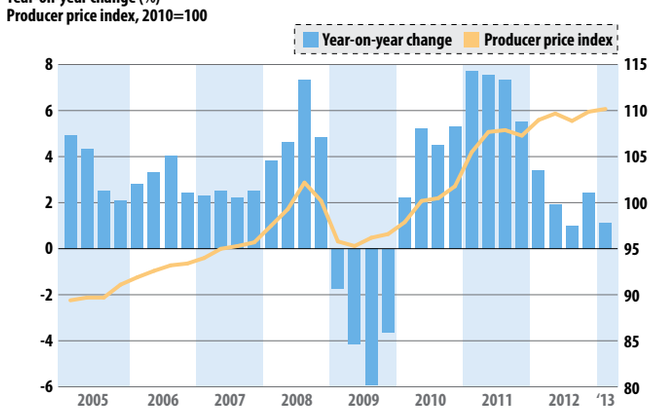


Source: Eurostat, VCI © CHEManager Europe

Chemical production remains sluggish

The recovery that followed the setbacks around the end of 2008/early2009 only lasted until the first quarter of 2010. Then the debt crisis and the related uncertainty in the markets hit the European chemical industry. Production went down quarter over quarter. At the beginning of 2012 the downtrend stopped but production did not recover, nor did the first quarter of 2013 bring about the hoped-for economic turnaround (fig. 2). In the first five months of 2013 EU chemicals production contracted 2.1% compared with the same period in 2012. Monthly production data for May showed a 1.1% drop compared with May 2012 data, however, compared to April 2013 monthly production grew 2.7%. in May.

Chemical Producer Prices in the European Union (EU 27)
Year-on-year change (%)
Producer price index, 2010=100

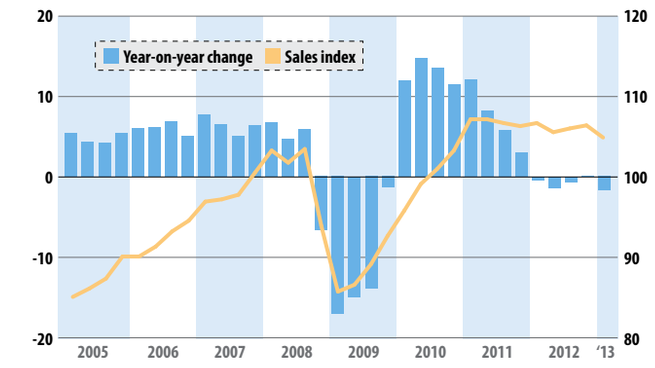


Source: Eurostat, VCI © CHEManager Europe

Moderate price increases

Up until the summer of 2011 chemical prices increased dynamically. Then orders declined and commodity prices remained almost stagnant. However, since they remained on a high level and the weak Euro created additional cost pressure, companies were forced to further increase their prices. Since summer 2011, though, the upward trend of prices for chemicals leveled off significantly, but continued into the first quarter of 2013 (fig. 3). Year to date, chemicals have been, on average, around 1% more expensive than a year ago. As expected, the commodities-related sectors saw the biggest price increases.

Chemical Sales in the European Union (EU 27)
Year-on-year change (%)
Seasonally adjusted salesindex, 2010=100



Source: Eurostat, VCI © CHEManager Europe

Exports trigger momentum

Since 2011, given the weak markets in Southern Europe sales volumes have been declining throughout the industry. The downtrend continued into the beginning of 2013. Despite higher prices, the previous year's level was missed (fig. 4). Although the industrial production stabilized slightly at the beginning of the year, customers have been cautious about placing orders for chemicals. Sales for the first four months of 2012 were 3.3% below the comparable period in 2012. Only foreign business triggered some momentum; exports have increased by 2.8% between January and April. All in all, however, exports could not offset the weak domestic business.

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Plastics Europe Appoints New Executive Director

Belgium — Plastics Europe, the pan-European trade association representing European plastics manufacturers, has announced the appointment of Karl Foerster as executive director. He will take up his new position on Oct. 1, taking over from Wilfried Haensel who has been in the position since 2007.

Previously, Foerster was the CEO of Neochimiki Group in Athens. An economics graduate from the University of Wuerzburg, Germany, with an MBA from the University of Rhode Island, U.S., Foerster brings to his new role nearly 30 years of experience in the chemical and plastics industry. Before joining Neochimiki seven years ago, Foerster served as Vice President at PolymerLatex and held various executive management positions during his 20 years at BASF. He has worked in nine countries in Europe, Asia, and North America.

"We are delighted to be able to appoint someone of Karl's ability and expertise to this important role" said Patrick Thomas, CEO of Bayer MaterialScience and president of PlasticsEurope. "His experience in working in senior positions across different markets of the industry will be an invaluable asset to PlasticsEurope members and our external partners."

Foerster said, "PlasticsEurope has a crucial role to play in communicating the benefits of plastics to a wide range of stakeholder audiences, and at the same time helping drive sustainable industry responses to challenging societal issues." ■

Wrap It! - With the 2012 Karma, Fisker Automotive presented the first true electric luxury sports sedan. The model shown in the photo sports a design applied via 3M's new Envision vehicle wrap film. The eco-friendly wrap series features films and laminates manufactured with sustainable and biodegradable materials. As well as vehicles, the film and laminate can be used for projects such as boat wrapping and textured wall graphics. 3M highlights the film's ability to be applied in temperature extremes, liberal repositionability, high tensile strength for faster removal, 'exceptional' clarity and compatibility with a wide range of ink technologies.

Coming Up in the September issue of CHEManager Europe

- How multinationals can win in India by Vimal Choudhary, McKinsey
- Launch excellence for new medicines by Dr. Thilo Kaltenbach, Arthur D. Little
- The influence the proliferation of shale gas has had on the global petro industry by Michael Mbogoro, Frost
- Repercussions of the U.S. shale story and feedstock supply outlook by David Welch, JBC Energy
- Future Petrochemical Feedstock Challenges by Andy Gibbons, Euro Petroleum Consultants
- The Chinese chemical industry and environmental protection by Kai Pflug, Management Consulting — Chemicals
- Protecting the pharmaceutical supply chain using track and trace methods by Ian Parsonage, Packaging Coordinators, Inc.
- And much more!

Fresh from the press on Sept. 19!
Advertising deadline is Sept. 9!

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