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*Building momentum:
the American chemical industry
is ready for growth in 2015*

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THE NEWSPAPER FOR THE
CHEMICAL AND
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Strategy Feature

*Under pressure: is the competi-
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NEWSFLOW

M&A-News:
Dow Chemical has agreed to sell two US plastics businesses for \$225 million.

Altana has acquired Premiata and Overlake, two owner-operated Brazilian companies.

Samsung plans to sell off stakes in four chemicals and defense assets for \$1.71 billion to Hanwha.

DuPont has finalized the sale of three businesses.

Sigma-Aldrich shareholders approved the planned takeover by Merck KGaA for \$17 billion.

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Pharmaceuticals:
Merck & Co will proceed with its planned \$8.4 billion acquisition of Cubist Pharmaceuticals.

Johnson & Johnson will pay Isis Pharmaceuticals up to \$835 million for the option to license three bowel drugs.

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Investments:
Tata Chemicals plans to build a pilot plant to produce nutraceuticals at its Chennai site in India.

SGS Life Sciences Services announced to double the size of its Mumbai, India, facility.

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Companies:
Mitsubishi Chemical plans to merge its carbon fiber-related businesses, currently part of separate group companies, during 2015.

BASF is acquiring Taiwan Sheen Soon (TWSS), a producer of adhesives base material for TPUs.

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People:
Roche has appointed Michael D. Varney to lead research and early development at its Genentech unit effective 1 January 2015.

Lanxess announced that Oliver Stratmann will head the new group function Treasury & Investor Relations (TIR) with effect from April 1, 2015.

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How now, Jim Ratcliffe?

Company History of Ineos Shows Shale Crisis, Too, Can Be Mastered

With prices for crude oil now below \$60 a barrel, analysts are questioning the viability of many shale projects. But while the breathtaking price plunge may have Saudi sheiks and America's shale barons sweating in their sandals or socks, in Switzerland Ineos' top brass is keeping a cool head – and not because of wintry weather.

Clearly, the risks of betting on the wrong horse are worrying to some, but Ineos appears to thrive on risk. Over more than two decades, through cleverly orchestrated MBOs – none of which blew up in his face – chairman and prime mover Jim Ratcliffe has built a petrochemicals empire from assets other companies no longer found sexy, or even financially sound.

Since the late 1990s Ineos has bought, and occasionally resold, assets once belonging to other major

players – from BP to BASF, from ICI to Solvay, from Norsk Hydro to Lanxess. If industry deals were formulated as classified ads, they might read: Got a chemical business to sell? Call Jim.

Not even the financial crisis of 2008-2010 – when unsecured debts threatened to sink Ineos and the company's creditors were also in danger of going under – stopped Ratcliffe's relentless drive to make the world safe for petrochemicals.

Since engineering a management buyout of Inspec from BP in 1992, and six years later luring Inspec's commodity business into a new company, Ineos, the Manchester-bred top manager seems to have become increasingly skilled at sniffing the right deal at the right time and stacking the chips on the gambling table accordingly.

How many corporate chieftains could convince creditors to take a leap of faith on debts of over €7 billion? How many would have the stamina to declare "business as usual" during months-long EU



Jim Ratcliffe, CEO, Ineos

probes of the successive buy-up of much of Europe's commodity plastics capacity? How many would be bold enough to ask for loans from the country they publicly turned their back on in scorn after it declined to reduce their corporate tax bill?

In the past Ratcliffe notoriously broadcast his message from the

off, but especially after forcing a powerful UK union to its knees he has moved more firmly into the spotlight, appearing on a company YouTube channel, speaking at industry meetings and writing open letters to the EU executive. Whether he continues beating the drum for shale exploration if the market is in

disarray is open. It does not seem unlikely, however.

Dede Williams, Freelance Journalist

For a timeline of Ineos' "do-it-yourself" transition from buyout to buyout specialist see Page 8

BASF and Gazprom Gas Asset Swap Deal Collapses

BASF's ambitions of expanding its presence in Russia's gas upstream ran aground in December on political and financial turbulence that undoubtedly dashed any hope its management may have harbored of a peaceful end to 2014.

On Dec. 19, despite prior assurances by CEO Kurt Bock that oil and gas subsidiary Wintershall's planned asset swap with Russian gas conglomerate Gazprom would go ahead by year end, the German chemical giant was forced to announce that the deal had been called off.

Ten days later, on Dec. 29, BASF said Wintershall had sold its 15% share in the South Stream Transport pipeline to Gazprom.

Commenting on the failed asset swap, Bock said BASF would



Dr. Kurt Bock, CEO, BASF

continue its existing joint ventures with Gazprom and that its oil and gas business strategy "remains unchanged."

The natural gas trading business will continue to operate as a 50:50 joint venture of Gazprom and Wintershall, and North Sea oil and gas exploration firm Wintershall Noordzee will remain wholly owned by BASF rather than becoming a 50-50 JV.

Original plans for the swap, announced in 2012, called for two ad-

ditional blocks of the Achimov formation of the Urengoi natural gas and condensate field in western Siberia to be jointly developed.

The collapsed deal will negatively affect BASF's 2013 and 2014 balance sheets, which treated assets and liabilities of the gas trading business as a disposal. The group will now be required to discontinue the reporting as a disposal and instead book depreciation and the equity result, which had been suspended since 2012.

In its repurchase of the South Stream agreement, Gazprom reimbursed BASF's – unquantified – cash investment in the offshore portion of the planned pipeline through the Black Sea, which Russia has meanwhile canceled. The other European shareholders, including Italian energy giant Eni (20%) and French utility EDF (15%), also have sold their shares to Gazprom. (dw)

DuPont Spin-off Called Chemours

DuPont has revealed further details of the planned spin-off of its Performance Chemicals business. In a registration statement filed with the US Securities & Exchange Commission (SEC), the US chemical giant said the new company will be called Chemours, based at least initially in Wilmington, Delaware, and traded on the New York Stock Exchange.

In an aside, DuPont said it will leave its traditional Wilmington base, where it has been headquartered for more than a century, and move to nearby Chestnut Run. New offices were opened in the suburb in 2012.

DuPont shareholders will be entitled to shares in Chemours – the



Ellen J. Kullman, CEO, DuPont

name is a play on the group's full name, E. I. du Pont de Nemours & Co. A high-yield credit rating of "BB" is targeted for the activities to be spun off with a "commensurate level of debt."

The US multinational said it will book a \$315 million pretax charge for the last quarter of 2014. This is in line with its redesign program, which includes delivering near-term savings from the separation of the Performance Chemicals division.

In the first nine months of 2014, the businesses to become Chemours earned \$430 million in pretax income on \$4.9 billion in revenue. The biggest unit, Titanium Dioxide, accounts for 46% of sales, Fluoroproducts for 36%. Other units include Chemicals Solutions, which has a major presence in sodium cyanide, sulfuric acid and aniline.

"DuPont and Chemours will each be global leaders, well positioned to pursue their respective objectives and strategies," said DuPont CEO Ellen J. Kullman. The strategy of the spin-off with 91,000 employees will be to "pursue organic growth, primarily through capacity expansions, and penetrate developing markets." (dw)

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Indorama Buys New Polyplex's Turkish PET Plant

In a deal set to close during the first quarter of this year, Thai polyester giant Indorama, world's largest producer of PET packaging resins, plans to acquire a 252,000 t/y production facility in Corlu, Turkey, built by a Turkish offshoot of the India-based global PET film manufacturer Polyplex.

First announced in 2012, the Polyplex PET plant located near Istanbul is believed to have been idle since completion, as the com-

pany was reticent to start up in the face of a massively oversupplied market.

In 2014, Indorama acquired a 130,000 t/y PET resin plant in Turkey owned by Artenius Turkpet, a subsidiary of the insolvent erstwhile PET market leader La Seda de Barcelona. With the addition of the Polyplex facility, the Thai group will have capacity for 382,000 t/y of resin in Turkey, making it the region's market leader. (dw)

As part of its plan to shed non-core assets, Dow Chemical has agreed to sell its sodium borohydride business and a polyolefin films plant in the US Ohio for a total of \$225 million in total.

Vertellus Specialty Materials is expected to take the sodium borohydride business, while the polyolefin films plant at Findlay, Ohio, is seen as going to Valfilm North American Inc. Both sales are expected to close in early 2015.

With activist investor Daniel Loeb — of the hedge fund Third Point — breathing down CEO Andrew Liveris's neck, the chemical giant is under pressure to divest some commodity businesses to focus on high-margin products.

Recently, the group lifted its divestiture target to businesses worth \$7-\$8.5 billion by mid-2016. (dw)

Lion Copolymer Holdings has completed its acquisition of Ashland Elastomer, based at Port Neches, Texas, USA, from chemical producer Ashland. The company will be renamed Lion Elastomers.

With the acquisition, Lion said it will become one of the leading merchant providers of styrene-butadiene rubber (SBR) in the United States.

„We are excited to be back in the SBR business,” said Lion president Jesse Zeringue, adding that the hot

emulsion SBR (ESBR) product line dovetails nicely with his company's specialty low molecular weight EPDM products sold in similar market segments.

Vijay Goradia, chairman of Lion owner Goradia Capital, said: “We are now focused on growing Lion, while at the same time acquiring companies that no longer fit the plans of larger chemical companies. This acquisition fits our strategy for both Lion Copolymer Holdings and Goradia Capital.” (dw)

Clariant to Take Control of Brazilian Bentonite JV

Swiss specialty chemicals producer Clariant has agreed to acquire Geosol's 50% stake and take full control of the Brazil's Companhia Brasileira de Bentonita (CBB). Financial terms of the arrangement were not announced.

Up to now, the company has been operated as a 50:50 joint venture of Clariant and Geosol, a provider of analytical services for mineral exploration.

As part of the deal, which is still subject to regulatory approval, the Swiss company will gain a state-of-the-art bentonite production facility at Vitória da Conquista in the state of Bahia.

According to Clariant, CBB has a strong market position for products used in Iron Ore Pelletizing (IOP),

foundry, oil & mining drilling and civil engineering in Latin America.

Along with providing a modern production facility for its Functional Minerals business unit in Brazil, Clariant said the transaction will allow it to secure strategic raw clay reserves for its growing bleaching earth operations in Jacaref, Brazil.

Clariant CEO Hariolf Kottmann said the acquisition is in line with the specialty chemicals producer's “strategy to capture profitable growth opportunities in emerging markets.” He said CBB offers “excellent access to markets with great potential” such as agriculture and feed additives and also lays the groundwork for further innovation. (dw)

South Korea's Samsung Group has announced it will sell stakes in four chemical and defense firms for 1.9 trillion won (\$1.72 billion) to compatriot Hanwha Group.

Media reports said this is the latest move in the massive task of reorganizing the business conglomerate to facilitate its division among the children of Samsung Electronics chairman Lee Kun-hee, 72, who has been hospitalized since a May heart attack. In the event of his death, they could face huge sums in inheritance fees.

Prior moves have included stake transfers between Samsung units intended to narrow the sprawling group's focus.

The listing of Samsung SDS and the upcoming initial public offering

of Cheil Industries are expected to provide greater financial flexibility to manage that process.

Samsung will also sell a 57.6% stake in Samsung General Chemicals Co to Hanwha Chemical and Hanwha Energy for 1.06 trillion won. The businesses include Samsung's portion of Samsung Thales Co, a joint venture with Thales, and Samsung Total Petrochemicals Co, a 50:50 joint venture with France's Total, which produces ethylene, propylene and derivatives.

The chemicals arm also produces PTA, the feedstock for PET polymer. Samsung Electronics has told Korean regulatory authorities it would use the 761 billion won raised from the deals to invest in new businesses. (dw)

Samsung Sells Off Chemicals and Defense Assets

Lion Copolymer Completes Ashland Elastomers Buy

Germany's Altana Acquires two Brazilian Companies

In a move to expand its position in the Brazilian market, the Actega division of German specialty chemicals producer Altana has acquired two owner-operated companies, Premiata and Overlake, both based in the state of São Paulo.

Premiata's two facilities employing 140 people operate under the name of Premiata Tintas and Premiata Especialidades Químicas and specialize respectively in printing inks and coatings for the packaging industry. Overlake is an over-print varnishes specialist with 70 employees at one site.

“As both companies focus entirely on specialty chemicals and tailored customer solutions they are a perfect match for Altana,” said Martin

Babilas, member of the Wesel-based company's management board.

Going forward, all Brazilian businesses of Altana's Actega division will be concentrated in the newly established national entity Actega do Brasil.

“Taking over Premiata and Overlake means we can significantly expand our portfolio of solutions particularly for the Brazilian packaging industry,” said Actega division president Roland Peter.

The company already has a production and research site in Brazil run by its Elantans division, which develops and distributes insulating materials for the electrical and electronics sectors. (dw)

Sigma-Aldrich Shareholders Approve Takeover by Merck

At a special meeting held at the Sigma-Aldrich Life Science and Technology Center in St. Louis, Missouri, USA, 78% of the company's shareholders approved the planned takeover by Germany's Merck KGaA for \$17 billion in cash. The Sigma-Aldrich board of directors had previously unanimously approved the deal.

Under the agreement announced on Sept. 22, 2014, Merck will acquire all of the outstanding Sigma-Aldrich shares for \$140 per share in cash. A Merck shareholder vote is not required.

The Darmstadt-based chemical and pharmaceutical producer said it continues to expect to close the transaction, which is still subject to regulatory approvals, in mid-2015.

It said it is "working closely with authorities to ensure a seamless transaction."

The merger of Sigma-Aldrich and Merck's laboratory chemicals offshoot Merck Millipore would be able to offer the Laboratory & Academia sector a complementary range of products across laboratory chemicals, biologics and reagents.

In pharma and biopharma production, Merck said Sigma-Aldrich would complement Merck Millipore's existing products and capabilities with additions along the entire value chain of drug production and validation.

Merck KGaA has issued a €1.5 billion two-tranche hybrid bond as part of its financing package for the takeover of US fine chemicals producer Sigma-Aldrich. (dw)

BASF Selling Ellba Eastern Share to Shell

BASF has agreed to sell its share in the 50:50 joint venture Ellba Eastern on Singapore's Jurong Island Singapore for an undisclosed sum to its partner Shell. The transaction is due to close on Dec. 31.

Started up in 2002, the production facilities with an annual capacity of 250,000 t/y of propylene oxide and 550,000 t/y of styrene monomer are fully integrated into the Shell site.

In future, Shell will supply propylene oxide (PO) to BASF. The German group, world's largest chemical producer, said it remains "globally committed to propylene oxide (PO) and its respective value chains."

The Ellba joint venture between Shell and BASF in Moerdijk in the Netherlands, is not affected by the transaction. (dw)

Solvay Completes Buy of Chevron Phillips' PPS Unit

With effect from Jan. 1, Solvay completed the acquisition of the polyphenylene sulphide (PPS) business of Chevron Phillips Chemical Company for \$220 million.

The buy includes two manufacturing units in Borger, Texas, USA, for the polymer sold under the trade name Ryton, a pilot plant and R&D laboratories in Bartlesville, Oklahoma, as well as a compounding plant in Kallo-Beveren, Belgium and certain intellectual property rights.

Chevron Phillips Chemical's compounding unit in La Porte, Texas, which will not transfer with the business, will provide temporary tolling services to Solvay.

The Brussels-based chemical group said its Specialty Polymers segment, which claims to have the industry's broadest portfolio, will gain access to new businesses with innovative and demanding applications in transportation, automotive in particular, in electronics and in filter bags. (dw)

Mitsui and SKC to Merge Polyurethane Businesses

Japan's Mitsui Chemicals and Korean petrochemical producer SKC plan to merge their polyurethane production and their distribution channels in Asia, Europe and North America into a 50:50 joint venture.

The two companies hope their cooperation will help reduce costs and give them more critical mass in competition with industry giants such as Germany's BASF and Bayer

MaterialScience, Dow of the US and emerging Chinese market players.

April 15 is the planned launch date for the new JV, which will employ around 650 people, with the bulk of the workforce coming from SKC. The new company is expected to generate sales of \$1.5 billion in fiscal 2015, which run from April 2015 to March 2016. (dw)

DSM Finalizes Sale of Euroresins to Cathay Investments

DSM has agreed to sell its distribution subsidiary Euroresins to Cathay Investments for an undisclosed sum. The deal, still subject to regulatory approval, is expected to close before the end of the first quarter.

The Dutch-based life science and material science group said the sale

is in line with its realignment strategy, announced in November, which foresees divestment of businesses in composite resins, along with caprolactam and acrylonitrile. Earlier, it was rumored to be in advanced talks with Ineos about a deal for the latter portfolio. (dw)

Eastman Closes Commonwealth Takeover, Completes Taminco Deal

Eastman Chemical has completed its acquisition of compatriot Commonwealth Laminating & Coating, a manufacturer of window films and specialty films for automotive, architectural, and protective applications. Financial terms were not disclosed.

The deal announced in March of this year includes Commonwealth's manufacturing facility and master distribution center in Martinsville, Virginia, along with nine sales distribution centers that cater to the global market.

Eastman said the acquired business, now part of its Advanced Materials division, will be accretive to earnings (barring excluding acquisition-related costs and charges) in 2015.

The chemical producer added that the addition of Commonwealth's expertise, paint protection technology, brand and sales channels and experienced employees will enable sustained growth of its performance films product.

Eastman said it is aggressively pursuing acquisitions to promote

growth in emerging markets, especially in Asia Pacific, following the takeover of Solutia in 2012.

In June, the Kingsport, Tennessee-based company bought the aviation turbine engine oil business of BP and in November completed the purchase of specialty chemical producer Taminco for \$2.8 billion in cash and assumed debt.

Stockholders of Taminco, a major producer of alkylamines and alkylamine derivatives, will receive \$26 in cash for each of their Taminco common shares. The stock has been delisted from trading on the New York Stock Exchange.

Taminco's Specialty Amines and Crop Protection businesses will be operated as part of Eastman's Additives & Functional Products segment. Its Functional Amines business will be operated as part of the Tennessee-based chemical company's Specialty Fluids & Intermediates segment. (dw)

DuPont to Sell Polymers, Seed and Insecticide Businesses

DuPont Performance Polymers has finalized the terms of its sale of the Neoprene polychloroprene business to Japan's Denka Performance Elastomer, a 70:30 joint venture of Denka Kagaku Gogyo and Mitsui.

The transaction is expected to close in the first half of 2015, pending regulatory approvals. Financial terms are not being disclosed. About 235 US-based employees will transfer to the new owner.

Denka Performance Elastomer manufactures and distributes chemical products encompassing chloroprene rubber, organic and inorganic materials, polymer processing, electronic materials and pharmaceuticals.

Invented by DuPont in 1931, Neoprene is used in many chemical and weather resistant products such as wet suits and orthopedic braces, and also as a base resin in adhesives, electrical insulation and coatings.

Alfalfa Seed Business

In a potential two-stage deal, S&W Seed Company plans to acquire all of DuPont Pioneer's alfalfa production and research facilities assets, along with its conventional (non-GMO) alfalfa germplasm, for up to \$49 million. Closing of the first stage is expected to take place this year, provided all closing conditions including financing are met. DuPont

Pioneer would continue to distribute the products up to 2024.

Terms of this stage foresee California-based S&W paying the DuPont-Pioneer joint venture \$27 million in cash up front in addition to a promissory note in the principal amount of \$10 million payable on Dec. 31, 2017.

The purchase price also includes a potential earn-out payment of up to \$5 million based on sales of the acquired germplasm in the three years following the closing.

S&W has also agreed – contingent on satisfaction of certain conditions – to purchase DuPont Pioneer's GMO alfalfa germplasm and related assets for an additional \$7 million in cash by Dec. 29, 2017.

If this second stage is completed, the total purchase price would rise to as much \$49 million.

Asana Insecticide Unit

DuPont's Asana Insecticide business in the US has been acquired by Sumitomo Chemical. In the future the product will be distributed through Valent USA, a wholly owned subsidiary of the Japanese group. Financial terms of the deal, which is subject to regulatory approval, were not disclosed.

Asana, with the active ingredient esfenvalerate, is recommended for control of insect pests in more than 50 major field crops, vegetables, tree fruits and nuts. (dw)

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Pharma Management Radar Survey Finds Management of CMOs Has Reached New Stage

Despite a positive estimation of the current business climate and an increasing number of products in the pipeline, the global pharmaceutical industry is looking for ways to improve its cost base. More and more often this includes outsourcing to contract manufacturing organizations.

These activities are conducted primarily to reduce costs, as well as to leverage access to non-owned technologies — thereby avoiding investment in non-owned technologies. Typical VUCA challenges faced during the last years — i.e., challenges associated with volatility, uncertainty, complexity and ambiguity — are overruled by the cost maxim. At the same time, not all industry players follow the trend with an equal pace of professionalization — because of a number of risks and costs associated with outsourcing.

This is the picture that emerges from the fourth Camelot Management Consultants Pharma Management Radar survey, a biannual study based on surveys conducted with more than 100 industry executives that serves to provide an in-depth perspective on varying current management topics relevant to the pharmaceutical industry.

Between August and November 2014, the Pharma Management Radar panel members from globally active pharmaceutical companies based in 16 countries participated in an extensive online survey. Companies with a business model predominantly characterized by developing or commercializing innovative medicines (“Innovators”) composed the majority of respondents; roughly one-fifth were participants from companies predominantly active in the generics segment (“Generics”). Survey participants represent almost two-thirds of the global Top 20 pharmaceutical companies. The focus topic of the fourth Pharma Management Radar is contract manufacturing outsourcing (CMO).

The executives’ view of the business climate for the pharmaceutical industry was relatively positive in the latest survey conducted in spring 2014. Though this aspect was not measured in the current Radar, the generally bullish mood is still reflected in the way the re-

spondents describe their plans and expectations regarding product development and investments: As for the product pipeline, two-thirds of respondents expect the number of products to increase within the next five years, while less than a fifth describe the number of products in their pipeline as decreasing.

The executives’ investment plans are rather consistent with these expectations. As far as new products — whether in the development or in the pre-launch/launch phase — are concerned, nearly all respondents show a very strong will to invest in additional capacities or to at least maintain the current manufacturing footprint. As long as products are mature and still protected by patents, the vast majority of respondents plan to preserve their current footprint.

However, a substantial number of respondents believe that outsourcing in this life-cycle stage will increase in the future, as processes mature and the freeing up of capacities allows for greater flexibility. The focus here is on maintaining high margin or critical products in-house, while seeking to outsource products with lower margins or low fluctuations in demand. After this phase,



jump (from 11% in 2014 to 20% in 2020) is expected with regard to R&D, while no considerable changes are anticipated for active pharmaceutical ingredient (API) production and logistics.

seen as a correctional move to get back to normal after overestimating the benefits of outsourcing in some fields.

Speaking of geography, there seems to be a clear trend shifting outsourcing activities outside the “old established pharmaceutical world.” In 2020, nearly 30% of respondents expect to source more than half of their company’s sales volume from CMOs located outside of Europe. As far as European contract manufacturing outsourcing is concerned, the majority of respondents (57%) assume that they will buy-in around 26% to 50% of the respective company’s sales volume.

be it avoiding investments into new non-owned technologies (26%), general financial considerations (20%) or gaining efficiency by outsourcing standard technologies (17%).

Quite logically, this type of motivation also dominates when it comes to the actual make-or-buy

are relatively easy to produce — and thus rank highest in terms of outsourcing feasibility. Active substances such as biologicals and vaccines, on the other hand, require specific know-how — which is why more than 50% of respondents rate them low or very low on the outsourcing feasibility scale. When distinguishing different phases of maturity, it seems quite logical that new products in development have a rather low outsourcing viability, while the shares of “very high” or “high” answers rise for products at launch or pre-launch — and reach the top in the phase after patent expiry. Nevertheless, neither new nor complicated products are excluded from outsourcing as a matter of principle. Several executives report on outsourcing activities for niche and state-of-the-art technologies as well. As far as the latter are concerned, formulation was named most often. One might assume that this mainly refers to more complicated substances such as liquids and injections, where some companies have to rely on the help of specialists from outside.

Just as outsourcing is not seen as the perfect choice for every product and phase, it is not considered beneficial for all areas. While outsourcing clearly decreases effort for



There is a clear trend towards shifting outsourcing activities outside the old established pharmaceutical world.

Dr. Josef Packowski, Managing Partner, Camelot Management Consultants

however, things change remarkably: More than half of the respondents plan to divest assets as soon as patents have expired.

Outsourcing Trend Continues to Gain Power

This is one of the typical situations when outsourcing becomes an option. Generally speaking, the external sourcing trend, which had already been observed in the last survey, continues to gain power. While all executives expect the rates of outsourced activities to be higher in 2020 than they are today, this trend is particularly strong for Innovators. Here, outsourcing will continue in all fields of activity — with logistics and formulation achieving the highest expected outsourcing rates in 2020. As far as Generics are concerned, the biggest outsourcing

The outsourcing trend not only applies to the companies’ global business but also to their European activities: In five out of seven activity fields, executives expect the shares of European activities (R&D, API production, formulation, packaging, pricing, planning and marketing) sourced from contract manufacturing organizations (CMOs) to be nota-

It’s All About Costs — Mostly

The main reason behind the outsourcing trend becomes very clear when listening to industry execu-



The decision on CMO along the product life-cycle is mostly driven by costs and technology strategy.

Christoph Lieth, Partner and Head of Supply Chain Management, Camelot Management Consultants

decision: Overall costs and production technology are the criteria that count most, while only a minority of executives consider production flexibility the most important argument. Not surprisingly, costs are also the quality that the majority of executives look at when judging a CMO — closely followed by product supply reliability as well as high standards and systems to ensure quality.

When it comes to how and by whom outsourcing decisions are made, there are signs of an ongoing professionalization. More than 70% of respondents’ companies have a formalized and standardized process for determining make-or-buy decisions. Not surprisingly, the rate is considerably higher among Innovators (79%), than among Generics (50%) who still have some backlog in this respect.

As not every company has a dedicated CMO department yet, the selection can often be described as a multifunctional, cross-departmental process. This applies to all elements of the RACI system, which rates a party’s involvement according to whether it is responsible, accountable, consulted or informed: Both responsibility and accountability are spread over various departments including legal, procurement, strategic sourcing, manufacturing and quality control. A similar image emerges when it comes to managing relations to the chosen contract manufacturers. Regarding the grades of involvement, most executives name supply-chain management/logistics, quality control and procurement as the ones responsible for the operative management of CMOs.

Despite the general enthusiasm, not all types of products and production steps are equally suited for outsourcing. As far as product types are concerned, the survey’s results may be summarized by a very simple formula: The more “solid” a product, the better its production can be outsourced. Oral solid dose as well as powders and granulates

production and logistics, many of the more administrative areas such as planning, legal or procurement, however, are facing an increase in effort. When asked for concrete cost benefits, the panel members name labor and fixed asset most often (more than 80%), whereas supplier management and procurement are subject to substantial cost increases because of outsourcing manufacturing.

Regarding the risks of outsourcing manufacturing, the answers differ according to the various production steps. For API production, executives consider increasing administration and coordination costs the highest risk, while for formulation they fear loss of control most. As far as packaging is concerned, increased lead/response times are most often suspected as a substantial hazard of outsourcing manufacturing. All in all, these risks as well as the costs associated with outsourcing indicate that outsourcing surely implicates growing complexity — which in the end is expected to be overcompensated by cost reductions in production and logistics.

Dr. Josef Packowski, Managing Partner, Camelot Management Consultants

Christoph Lieth, Partner and Head of Supply Chain Management, Camelot Management Consultants

Order a free copy of the survey at: www.camelot-mc.com/surveys

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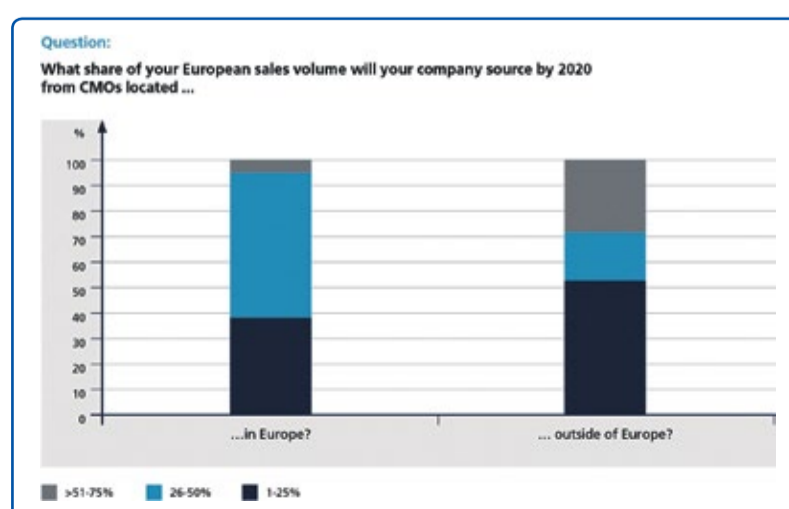
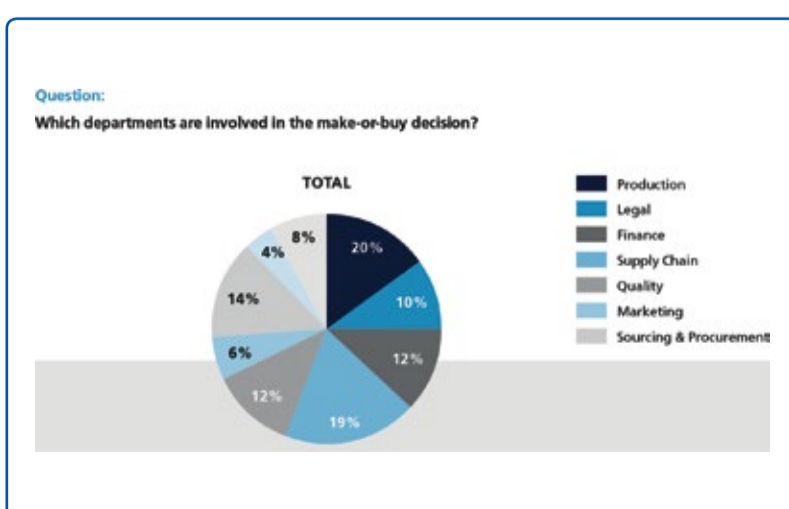
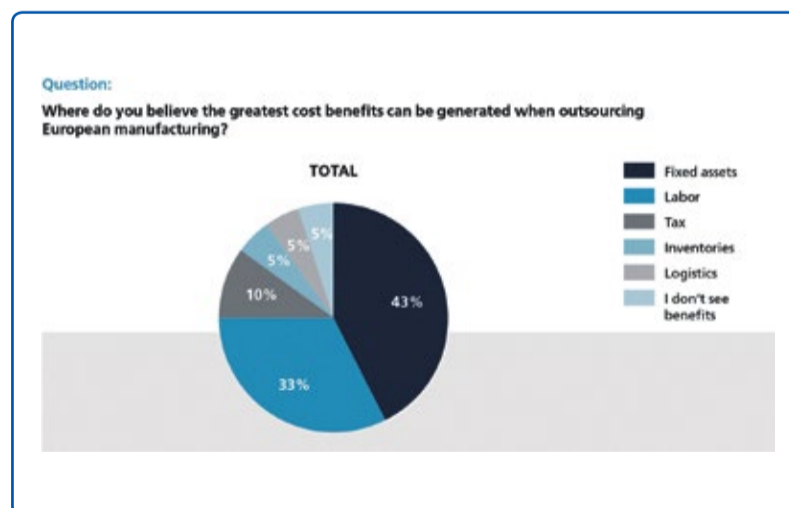
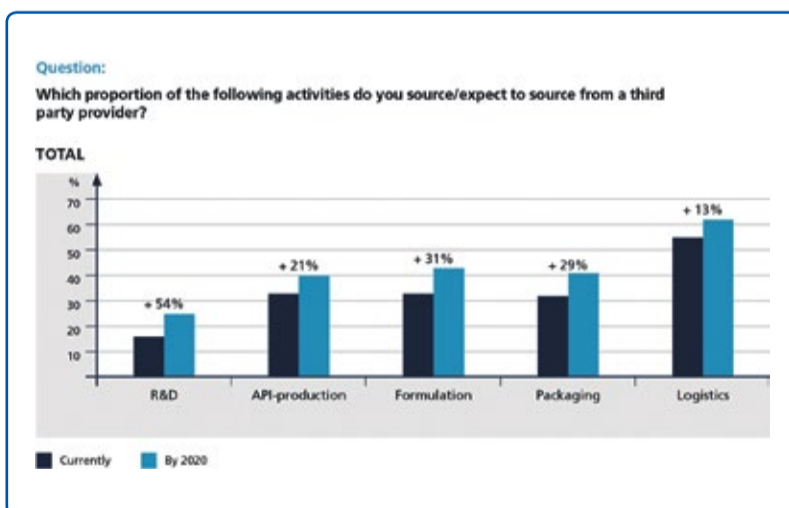


The challenge is to deliver reliable supply while balancing portfolio complexity and increasing standards at competitive costs.

Klaus Wenig, Head Global Supply Chain, Novartis Animal Health

bly higher in five years than they are now. Product pricing and marketing are the only exceptions to this rule of outsourcing growth. This might be

tives. Asked for the main drivers for considering external manufacturing, most of the respondents provide answers related to saving money —



Top 30 Pharma Companies' R&D Spending Reaches \$112 Billion

The world's leading 30 pharmaceutical companies spent a combined \$112 billion on research and development (R&D) in 2013, an increase of \$723 million over the previous year, according to research and consulting firm GlobalData.

The company's report states that Roche was the R&D spending leader, outlaying nearly \$10 billion in 2013. Meanwhile, Novartis and Johnson & Johnson (J&J) increased their R&D spend the most between 2012 and 2013, with each adding around \$500 million to their respective clinics. Novartis' R&D spending grew by 5.6% to \$9.8 billion, and J&J spent \$8.2 billion, which was up by 6.8% from 2012.

Adam Dion, an Industry Analyst with GlobalData, says that the increase in R&D spending was partly due to drug makers advancing their pipeline programs into later-stage clinical trials, which are generally more costly. Dion comments: "Roche's R&D spending was bolstered by continued investments in its oncology and neuroscience therapeutic areas, such as the company's investigational anti-PD-L1

antibody targeting lung cancer, and the advancement of its programs for Alzheimer's disease.

"Novartis' R&D spending grew largely due to its Alcon subsidiary, which allocated additional resources to R&D to develop new eye care products. The company's Vaccine and Diagnostics products business invested heavily to bring to market its meningitis B vaccine, Bexsero." Despite the sector increase in R&D spending, a number of large pharmaceutical firms pulled back on clinical investment in 2013.

The analyst explains: "In efforts to improve profit margins, cost-cutting still remains a strategic necessity for some players. Many companies reduced their workforces to help stabilize profits in the aftermath of patent losses. "Pfizer shaved over \$1.2 billion in R&D spend after losing market exclusivity on Lipitor and Caduet, while Merck continued with its multi-year restructuring program, cutting over \$600 million from its clinical operations in 2013 after its respiratory therapy Singular saw its patent lapse." (dw) ■

Express Scripts to Reimburse AbbVie Hepatitis C Drug

The largest pharmacy benefit manager in the US, Express Scripts, has negotiated a cheaper price from AbbVie for its Viekira Pak hepatitis C treatment approved by the US Food and Drug Administration (FDA) on Dec. 19. The pricing agreement covers Express Scripts' National Preferred Formulary, a list of approved and covered drugs that applies to 25 million Americans with its pharmacy insurance. In most cases, Express said, it will no longer reimburse a competitive drug made by Gilead Sciences for patients who have the genotype 1 form of the disease – which includes 70% of US patients.

While Gilead's medicines have set a new standard, curing the vast majority of patients in only 12 weeks, the high prices for hepatitis C drugs has opened a national debate in the US about drug prices altogether as well as increasing insurer pressure on drugmakers to cut prices.

Express Scripts has opposed the \$84,000 price tag of Gilead's Sovaldi treatment – for the 12-week course of therapy – since it was approved a

year ago, on grounds it was unaffordable. Gilead's Harvoni costs \$94,500 for 12 weeks of treatment. AbbVie said the wholesale price of Viekira Pak would be \$83,319 for a typical 12-week course. That is less than the Gilead drugs, observers note, but probably not enough of a discount to allay complaints about high prices.

Nonetheless, health plans and pharmacy benefit managers generally negotiate discounts in exchange for a better positioning on the formulary, and AbbVie is believed to be prepared to offer more concessions.

Express Scripts' chief medical officer Steve Miller said the AbbVie offer narrows the gap to the lower prices Western European countries have negotiated for Sovaldi. These are said to range from \$51,373 in France to \$66,000 in Germany.

Express Scripts' national preferred formulary is said to be planning to exclude about 70 drugs in 2015, including Harvoni, Sovaldi and another new hepatitis C drug, Johnson & Johnson's Olysio. (dw) ■

Sanofi and Evotec R&D Pact to Include Toulouse Transfer

An R&D collaboration between France-based drugmaker Sanofi and German drug delivery specialist Evotec, announced on Dec. 2, foresees the transfer of the French company's site at Toulouse as well as on-site research and development jobs and activities to its German partner. The deal expected to be signed in the first half of 2015 will cost Sanofi €250 million euros over five years, money that would fund future research projects matching the Evotec portfolio. Evotec would guarantee the related jobs and current levels up to 2019.

Under the plan, Sanofi's activities in research in tumor environment would be combined with Evotec's EVT Innovative segment. Teams dedicated to technological services activities, from identification and validation of new target therapies to discovery and validation of new drug candidates, would be integrated into Evotec's EVT Execute segment.

Also as part of the collaboration agreement, the French and Ger-

man companies would both work on the discovery of new drug candidates in oncology and other fields and support scientific collaborations with academic institutions in France. Along with know-how, Evotec would contribute existing collaborations and research contracts with other pharmaceutical producers. To support the Toulouse site's "scientific and technological mission," Sanofi said it intends to entrust Evotec with research assignments over the next five years. The German company would also gain access to the site's chemical library with an estimated 1.7 million compounds.

The Evotec deal will ensure the success and sustainability of the activities at Toulouse, said Sanofi's global research chief Elias Zerhouni. It also may help to allay investor concerns that Sanofi is too heavily dependent on France, following the October ouster of German-Canadian CEO Chris Viehbacher, the news agency Reuters said. (dw) ■

Merck & Co Still Plans to Buy Cubist, Despite Patent Setback

Merck & Co has said it will proceed with its planned \$8.4 billion acquisition of Cubist Pharmaceuticals in the first quarter of 2015 and still expects the deal to boost its long-term earnings, despite a court ruling that could speed the arrival of generic forms of Cubist's top-selling product, Cubicin.

The purchase would give Merck & Co, the US market's second largest drugmaker, entry into the market for drugs that fight so-called superbugs.

A day before the Merck & Co statement, Judge Gregory Sleet in Delaware had invalidated four Cubicin patents and ruled that Hospira can launch a generic version of Cubicin as soon as 2016 – two years sooner than Wall Street expected.

Merck & Co noted that Sleet's decision is subject to appeal.

"The combined strength of both companies will provide both incremental and long-term value, and Merck & Co expects the transaction to add more than \$1 billion of revenue to its 2015 base, with strong growth potential thereafter," the US drugmaker said in a statement.

If Sleet's ruling stands, Leerink Partners analyst Seamus Fernandez told the news agency Reuters he expects several less expensive generic forms of Cubicin to be introduced in the US by late 2016.

Fernandez said lost sales from the Cubicin patent expiry suggest the price Merck & Co may be paying is \$2-3 billion too much. This is a "very tough start to a relatively sound strategic deal," he said. (dw) ■

India's SRF Acquires DuPont's Pharma Propellant Arm

Mumbai, India-based refrigerants manufacturer SRF said in late December it had agreed, with immediate effect, to acquire DuPont's global pharmaceutical propellant business for an undisclosed sum.

The business is part of the US chemical giant's Performance Chemicals segment planned to be spun off by mid-2015.

Under the terms of the deal, SRF will own the DuPont Dymel brand and will also receive the technology and know-how for setting up its own manufacturing facility for this product. DuPont will continue to supply

SRF with the product from its plant until SRF's new facility receives regulatory approval. Currently, SRF is the only manufacturer of the HFC 134a-based pharma in India. The transaction gives it immediate access to DuPont's technology, brand and customers, thus enabling an instant entry into the niche pharmaceutical segment at a global level.

"This acquisition is in sync with our long-term strategy to move up the value chain and will enable us to enter the niche pharma product segment," said Ashish Bharat Ram, managing director at SRF. (dw) ■

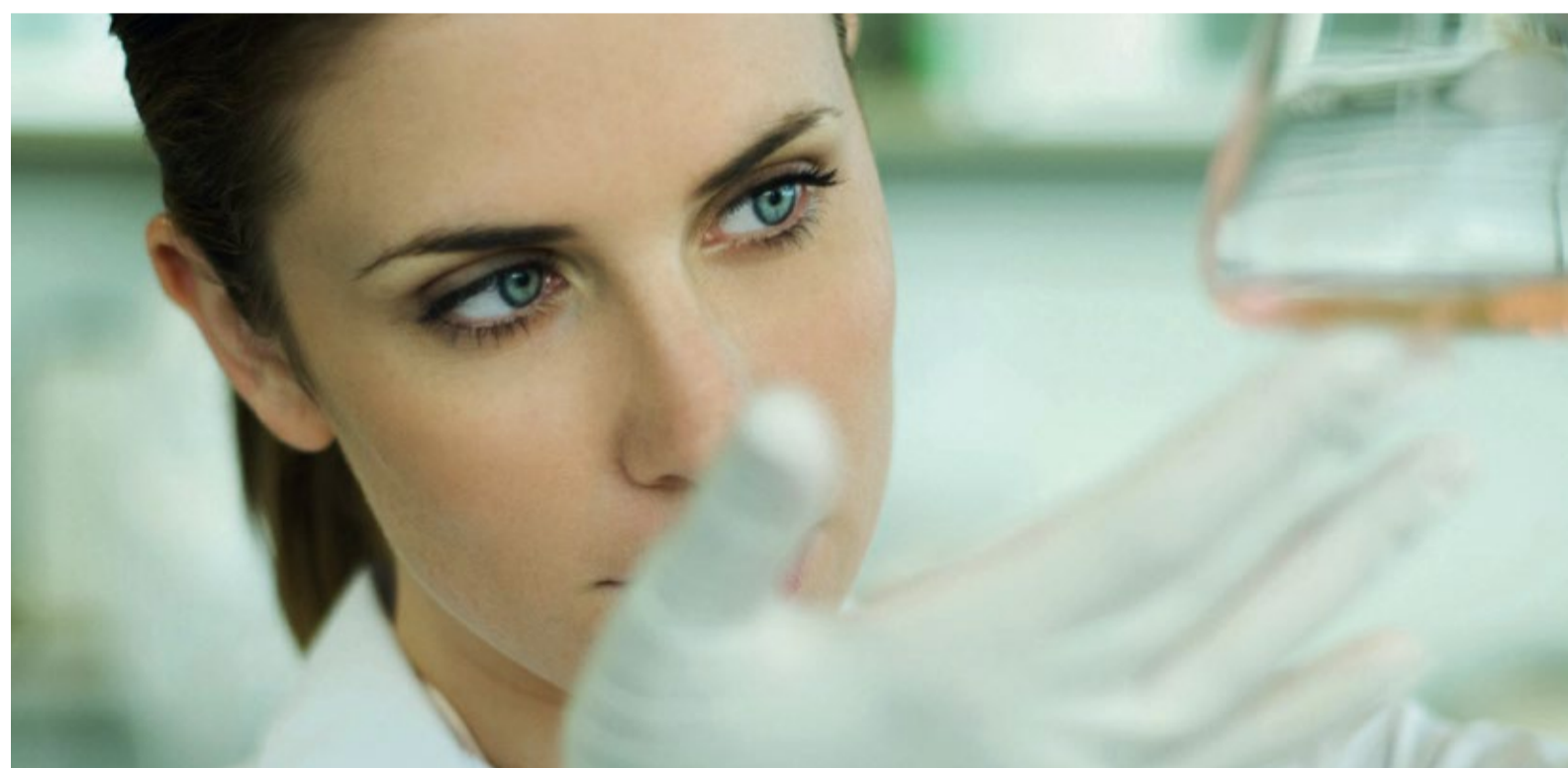
J&J Buys License Option for Isis Pharma Bowel Drug

US over-the-counter drugmaker Johnson & Johnson will pay Isis Pharmaceuticals up to \$835 million for the option to license three drugs targeting autoimmune diseases in the bowel.

Isis Pharmaceuticals said it will receive \$35 million in an upfront

payment and will be eligible to receive royalties on sales of the drugs.

Janssen Biotech, a unit of Johnson & Johnson, will have the right to license a drug from each of the programs once a candidate is identified, the Carlsbad, California-based developer said. (dw) ■



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Tuning Out the Noise in Emerging Electronics

Using Start-up Data to Make Informed Decisions

The two most common questions Lux Research receives in printed, flexible, and organic electronics are "What's hot?" and "When can we make money?" To answer these questions in a new way, Lux Research used their new Member Site and the nearly 500 company profiles in the Printed, Flexible, and Organic Electronics service between 2008 and 2013 to look for trends in our data, primarily on start-ups and small emerging companies.

Each company was evaluated with a one-to-five score on 10 scorecard metrics, and capture quantitative technology performance metrics, as well as statistics like revenue, employee count, and profitability. Years of aggregated company data was analyzed to discern trends and understanding of industry dynamics, to help our clients make well-informed decisions about market and partnership opportunities. In particular, momentum scores, based on a company's recent commercial progress, as an indicator of what fields are "hot" were looked at – not those that are (merely) generating lots of hype, but ones actually generating concrete results.

This quantitative foundation can help take the guess-work out of strategy and decision making in emerging technologies. When a field like



Jonathan Melnick, Ph.D.,
Senior Analyst, Lux Research

transparent conductive films (TCFs) shows near-term commercial opportunity, corporate players need to understand today's key developers and how to enter the supply chain. In contrast, fields that are far from commercial maturity, such as thin-film batteries and organic photovoltaics (OPV), call for a different approach – and may present opportunities to capitalize on the misfortune of those that have mistimed the market.

TCFs and sensors are hot - thin-film batteries, organic photovoltaics, and reflective displays not

Lux Research looked at the average momentum of technology developers in seven different technology categories – conductive inks, emissive displays, organic photovoltaics (OPV), reflective displays, sensors, thin-film batteries, and TCFs – from 2008 to 2013. TCFs and sensors are hot now, with both averaging 3.6 momentum scores (out of 5) in 2013. TCFs have been slowly and steadily increasing since 2008, rising each year from an

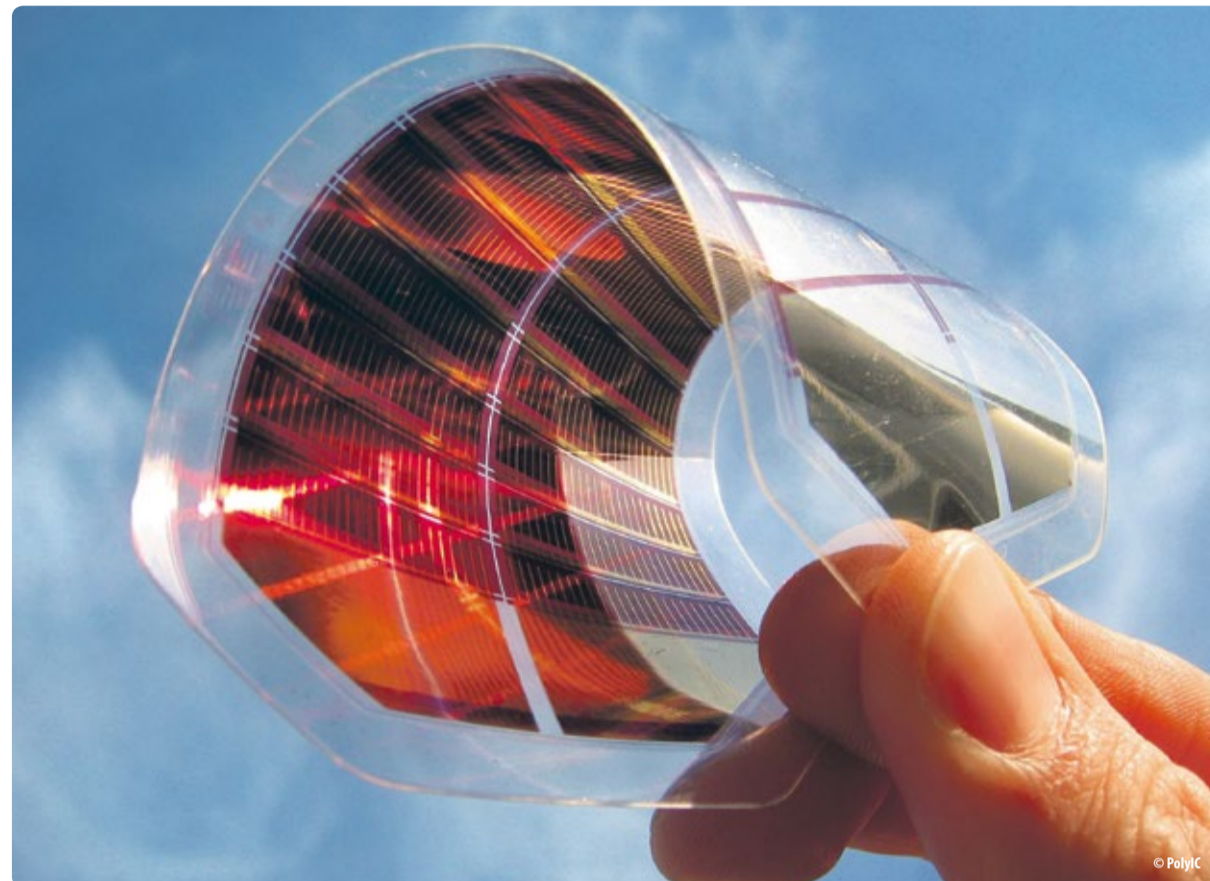
average score of 3.0 in 2008 up to 3.6 in 2013. This upward climb has coincided with solution-processed TCFs coming to market, most notably with materials from Cambrios making their way into products like LG's all-in-one PC. Sensors, on the other hand, have had a volatile history, being the highest scoring (4.0) category of 2008, falling to one of the two lowest (2.0) in 2010, and rebounding quickly up to 3.6 in 2013.

In contrast, thin-film batteries, reflective displays, and organic photovoltaics entered 2014 with below average momentum. Thin-film batteries finished 2013 with the lowest average momentum score, 2.5, of any of the categories, despite some past flashes of promise, particularly in 2010 when, among other milestones, Infinite Power Solutions closed a \$20 million funding round and released its first series of products. Organic photovoltaics have hovered right around the printed, flexible, and organic electronics average, not seeing any highs from added hype or technology development over this time. Reflective displays, with a score of 2.8, were slightly below average in 2013, but have been overall on the upswing since scoring at the bottom in 2009 and 2010.

Technology Performance Correlates to Commercial Success – Only in Maturing Fields

To answer "When can we make money?", Lux Research examined what companies look like when they are still years away from a meaningful market opportunity and what they look like when they are primed for commercialization. The relationship between a company's size (revenue and employees) and its product performance was analyzed, based on the "Key Metrics" included in each company profile – efficiency for OPV, energy density for thin-film batteries, and sheet resistance/transparency for TCFs.

Within TCFs, the top revenue-generating TCF developers all have products in their portfolio at 25 Ω /sq or less, but the impact of transparency is less pronounced. Among the firms that can offer such low sheet



Conductive and transparent plastic film with metallic grid patterns for flexible touch display sensors

resistance films (below 25 Ω /sq), there are several companies with more than \$1 million in revenue, though their transparency values range from 86% to 96%.

No such correlation between technology performance and company growth exists in OPV and thin-film batteries. Several OPV companies, like Dyesol, Konarka, Heliatek, and G24 Innovations, have had more than 70 employees, but these companies do not have standout technology; all except for Heliatek have cells below 8% efficiency. Similarly, the top thin-film battery companies by employee count – Cymbet, Infinite Power Solutions and Prologium – have products with energy densities from 40 Wh/L to 400 Wh/L, meaning they are in the lower half of all developers on technical performance.

Different Technology Areas Call for Different Strategies

For near-term opportunities like TCFs, supply chain and top devel-

oper assessments are vital. Here, firms need to go to downstream to films to capture more value. Films present a market greater than \$700 million 2017, while inks will only account for 16% of that total, albeit at higher margins than films.

The longer term proposition of OPV and thin-film batteries dictate a different approach. Within these areas, it is too early to engage in commercial partnerships, but academia is a hot-bed of OPV research, and is actually the most widely researched academic area in all of PFOE, accounting for nearly half of all recent PFOE publications (see the Lux Research report "Getting Full Credit from Academic Partnerships: The Top Technologies, Regions, and Universities").

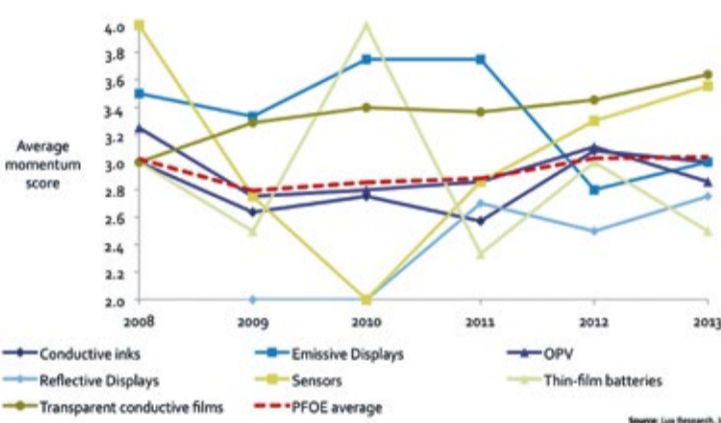
On the other hand, thin-film batteries are an attractive area to find value in overfunded start-ups. The venture community overfunded many thin-film battery technology developers, such as Cymbet (\$104 million invested), Infinite Power Solutions

(\$100 million), and Solicore (\$72 million). Many overfunded companies in printed, flexible, and organic electronics – such as Kivio, Plextronics, and Konarka – were acquired in distress for small fractions of the total investment that previously went into them. Some of these thin-film battery firms may be posed to follow in their wake, so monitor over-extended developers for distress.

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TCFs and Sensors Stand-out for High Momentum Recently



OE-A Predicts a 19 Percent Increase in Sales Revenue for the Industry in 2015

In the organic and printed electronics industry, all signs continue to point to growth. This also has a positive impact on the employment situation.

The industry for organic and printed electronics can optimistically look to the future. The OE-A (Organic and Printed Electronics Association) is predicting an increase

in sales revenue of 19% for 2015. As a result of the the second OE-A business climate survey all signs point to growth. For the current year, expectations continue to be positive as well. The survey's respondents expect an increase in revenue of 10% for 2014. This is slightly below previous expectations (May survey: 16%). However: „At this point in the

year, companies are able to turn in precise data“. OE-A Chairman Dr. Stephan Kirchmeyer said in reference to the end of this year. "An increase in sales is a great result for the organic and printed electronics industry", he says – especially since the results are applicable to all areas, from material suppliers to end-users, and in all regions: Europe, Asia and the United States.

The positive sales forecasts for the upcoming year 2015 also affect other areas of business. 53% of the companies assume that their incoming orders will increase up to 20%. 47% want to continue to invest into expansion of production. There is also a bright outlook for employees in the organic and printed electronics industry: 45% of the companies want to hire additional employees in the upcoming six months. By way of comparison: in May that figure was only 23%. Furthermore, the survey participants want to continue to invest in R&D activities. 78% (May: 72%) expect general growth of the industry.

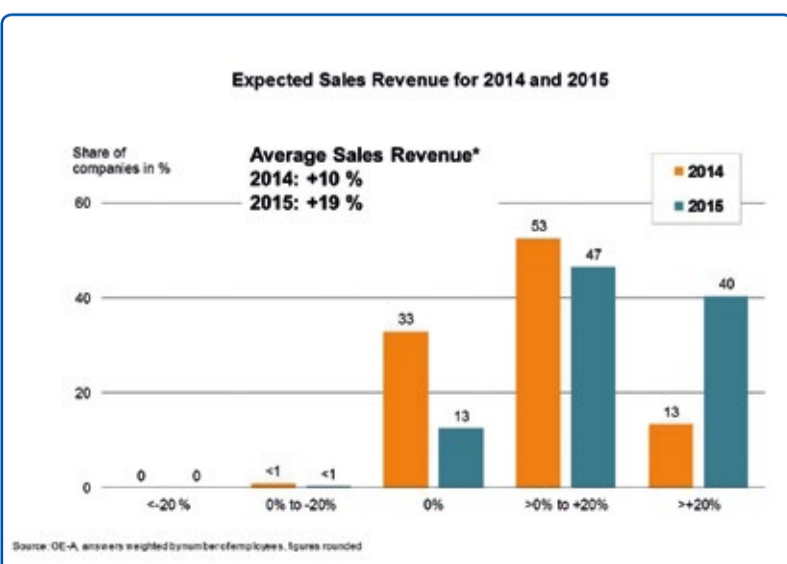
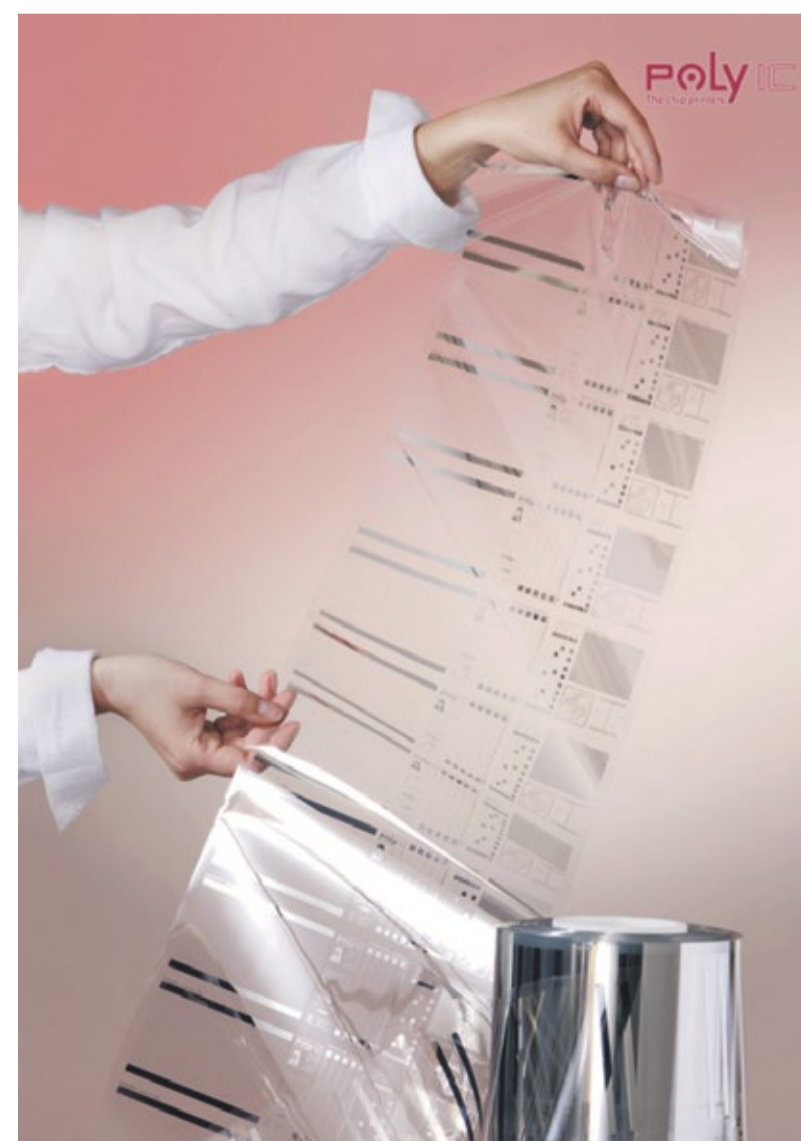
Thin, lightweight and flexible are characteristics of organic and printed electronics. These features enable applications in numerous areas. The industry's particular focus is on packaging and printing, consumer electronics, automotive, lighting, pharmaceuticals and energy.

The next OE-A Business Climate Survey will be published in March 2015 during the LOPEC main press conference.

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Flexible organic photovoltaic cell ▶

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Roles Under REACH

Contrasting the Requirements Inside and Outside the EU

There is a chemical company in southwestern Germany. As Germany is part of the European Union, REACH is part of daily business, and the company has registration obligations for all substances that are manufactured in volumes of 1 ton per annum (t/a) or more on its site. The whole amount manufactured within a calendar year needs to be covered by the registration.



Dr. Susanne Kamptmann

A stone's throw away there is another chemical company. This company is established in Switzerland; consequently, the situation in regard to REACH (Registration, Evaluation, Authorization and Restriction of Chemicals) is different. Switzerland is on the European continent but is a member neither of the European Union nor of the European Economic Area (EEA). Therefore REACH is not directly applicable.

However, the Swiss company is also affected by REACH whenever it fosters business relationships with European suppliers or customers. For each manufactured substance for a European customer, the Swiss company has to decide whether it is willing to appoint an Only Representative to take care of the registration obligations. If the Swiss company takes care of the registration obligations via an Only Representative, the European customers will benefit from being Downstream Users, and the situation for the customers is comparable to purchasing from European sources. If the Swiss company does not want to appoint an Only Representative, its European customers have the role of an Importer under REACH.

Case-By-Case Strategy

The following two examples illustrate the situation of the German company compared with the Swiss competitor. In Example 1 the Swiss company appoints an Only Representative, whereas in Example 2 the Swiss company reaches a converse decision.

Example 1: Both a German company and a Swiss competitor manufacture substance A in the volume of 1,000 t/a. Both sell 900 t/a to European customers and 100 t/a to a customer established in the U.S. The Swiss company is willing to appoint an Only Representative. Table 1 gives an overview of the consequences for the German company and for the Swiss competitor.

Table 1: Comparison of the situation for a German company and a Swiss competitor

| | German company | Swiss company (via OR) |
|--|--------------------------------------|--|
| Tonnage band for the registration | 1,000 t/a (manufacture of 1,000 t/a) | Below 1,000 t/a (900 t/a imported into EU) |
| Data requirements in case of a standard registration | REACH Annex VII-X | REACH Annex VII-IX |
| Data requirements in case of a registration as a transported isolated intermediate | REACH Annex VII | No special data requirements |

Table 2: Deciding which substance needs to be registered under REACH and which type of registration will be appropriate

| Substance | Type of registration that is required (minimum requirements) | |
|-----------|---|---------------------------------------|
| | Case as in figure 3a, available online | Case as in Figure 4, available online |
| A | Transported isolated intermediate | - |
| B | Transported isolated intermediate | - |
| C | If not isolated: no registration required If isolated: on-site isolated intermediate | - |
| D | Transported isolated intermediate | Transported isolated intermediate |
| | 3-4 substances have to be registered | 1 substance needs to be registered |



Obviously, the Swiss company has to deal with fewer data requirements as it does not need to register the whole tonnage manufactured per calendar year but only the volumes that are delivered to EU customers.

Example 2: A German company manufactures exactly 10 t/a of substance B. The total amount is distributed to 10 customers. Each of the customers purchases exactly 1 ton of substance B per calendar year.

The Swiss competitor decides to manufacture 20 t/a of substance B and delivers this substance to 10 EU customers and to one Non-EU customer. Each of the EU customers purchases exactly 999 kg of substance B per calendar year, whereas the Non-EU customer purchases 10.01 t/a.

The German company is obliged to register substance B in the tonnage band 10 to 100 t/a. In the case of a standard registration, a Chemical Safety Report will be required. Costs for the registration have to be passed on to the customers.

The Swiss company in this case does not have any registration obligations, as it does not appoint an Only Representative. Therefore each EU customer will act as an Importer under REACH. If the EU customers purchase less than 1 t/a there is no need to register. Once again the Swiss company benefits from being outside of the EEA, and its EU customers may also benefit, as they do not have to pay registration costs. Particularly smaller companies among the EU customers will appreciate that.

We can learn from Example 1 and 2 that the Swiss company may decide on a case-by-case basis whether it is a wise strategy to take care of the registration obligation by appointment of an Only Representative or not. The same can be applied to all Non-EU Manufacturers that have business relationships with customers established within the EEA.

Synthesis And Shipping

In a further example, we will compare the REACH registration obligations for a multistep synthesis that is performed at different sites. Although this example seems complex, it reflects the real situation within globally acting enterprises.

Example 3: A European company group composed of several manufacturing sites (separate legal entities) within Germany and France intends to manufacture substance D for an EU customer that uses substance D for the synthesis of another substance (product). The German site of the European company group will import substance A from India to produce intermediate B. Intermediate B is then shipped to the French site. In France, substance B is used for the synthesis of intermediate C that afterward is transformed into the desired product D. Currently it is not determined whether substance C will be isolated. However, we may expect that three or four substances have to be registered by the European company group (see table 2).

Assuming that the multistep synthesis from A to D is instead performed in Switzerland there is a registration obligation under REACH only in regard to substance D. This registration obligation may either be fulfilled by the Swiss manufacturer via an appointed Only Representa-

tive or by the European customer. As substances A, B and C do not need to be registered under REACH and therefore will not be published on the home page of the European Chemicals Agency connected with a certain registrant, the synthetic route can be kept in confidence.

PREVIEW:

This is the second of a series of three articles from Dr. Kamptmann on the REACH legislation. Part 1 was published in issue 11-12/2014, and Part 3 will be published in the upcoming issue of CHEManager International on March 26, 2015.

Conclusion

Swiss companies as well as other Non-EU Manufacturers have the chance to decide on a case-by-case basis whether they will take care of registration obligations by appointment of an Only Representative. Only the volumes that are imported into the EEA have to be considered for a registration under REACH, irrespective of the total volume manufactured.

In case of multistep syntheses, Non-EU Manufacturers and their EU customers benefit from having registration obligations only for the substances that are imported into the EU, whereas previous intermediates do not need to be registered. Consequently Non-EU Manufacturers profit from being established outside the EEA.

However, the workload in regard to documentation to be done by Non-EU Manufacturers, e.g., for Substance Volume Tracking, is higher, and the appointment of an Only Representative may be costly.

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Ineos Still Bullish on Shale Gas

Swiss-based Petchems Giant Hopes to Become a Major Onshore and Offshore Producer

As the UK government's push to repeat the US shale gas boom on its own soil moved up a notch in late 2014 with the sale of exploration licenses, Ineos revealed plans to expand upstream into onshore and offshore oil and gas.

The boldness and inventiveness of the now Swiss-based petrochemicals giant's move is characteristic of a company that likes to keep ahead of competitors in setting new trends. Although plunging oil prices have aroused market concern about the viability of the upstream drive – Ineos itself appears to have no worries.

Typically, the Swiss-based holding with \$54 billion in annual sales – Ineos does not reveal group profits – is thinking big. It aims to invest \$1 billion in shale gas production and infrastructure in Scotland and elsewhere in the UK.

Ineos has already acquired licenses in central Scotland from where it hopes to eventually pipe gas to use as an energy and feedstock source for its petrochemicals and refinery complex at Grangemouth (photo). The Scottish site, shaken by a much-publicized strike in 2013, is currently supplied with ethane from dwindling North Sea gas reserves at a cost Ineos says is two to three times that paid by consumers in the US.

Along with using the self-produced ethane as a feedstock for its own plants, Ineos also hopes to enter the North Sea oil and gas sector



The Grangemouth site located on the Firth of Forth in Scotland, commenced operation in 1924 as Scottish Oils and today represents Ineos' largest manufacturing site by volume of products.

weakened amid investors' concerns it may have paid too much for the licenses. They fear the company could be forced to sell polymers and other petrochemical derivatives at prices dictated by the cost of crude, threatening any margins it might

that the UK upstream projects are long-term with full benefits to be realized only over a 10-15 year period.

"The oil price collapse will have no effect at all on our UK shale plans," Tom Crotty, Ineos corporate affairs and communications director, asserted in an interview with CHEManager International. "Our interest is in gas, not oil. We want the gas more as a feedstock than an energy source. As gas is still expensive in the UK, the incentive to explore for and produce it in the country is extremely high."

Ineos aims to become one of the leading shale producers in the UK, with the yield supplying a high proportion, if not all, of the country's gas needs. "Our objective is to establish an indigenous source of internationally competitive feedstock over a 10-15 year period," Crotty says.

The company hopes shale feedstocks will not only safeguard the fu-

ture of Grangemouth but of UK and European manufacturing altogether. Securing competitive energy and raw materials is the golden thread running through Ineos chairman Jim Ratcliffe's public statements. "Our aim is simple, he says — we hope to maintain and create jobs in Britain's industrial heartland."

Ratcliffe's top priority is to turn the loss-making Grangemouth site — which Ineos threatened to close

of US shale gas-derived ethane or, as John McNally, chief executive of Ineos' UK olefins and polymers business, puts it, "Grangemouth will be brought back into the premier league of petrochemical sites in all of Europe."

First shipments by a dedicated fleet of specially equipped vessels will arrive in Scotland next year following completion of an ethane import terminal, storage tanks and

US ethane is expected to enable Grangemouth's 720,000 t/y gas cracker, which has been running at 50% of capacity, to be operated at 100%.

The US gas is to be supplemented by ethane feedstocks from Ineos' first UK shale output, which according to a timetable submitted to the UK government last year should be around 2017-2019.

The company hopes to speed the process of winning permits for production of shale gas by promising to share profits of its wells with communities. It plans to allocate 6% of revenue to homeowners, landowners and local authorities, with the total eventually topping £2.5 billion.

"We think our plan could be the game-changer in Britain," Ratcliffe said when explaining the revenue-sharing scheme. "The rewards will be fairly shared by everyone. It's what they do in America, and we think it is right to do this here."

As it presses ahead with its onshore shale gas projects, Ineos wants to begin establishing itself as an offshore player in the North Sea oil and gas fields. But rather than internationally competitive feedstocks, these plans are aimed at providing energy supplies from oil and gas reserves.

Ineos has advertised for a chief executive, an operations director and positions for four other managers to run its offshore oil and gas production business. Their immediate task will be to assess opportunities for asset acquisitions in the North Sea at a time when existing operators and investors are looking to sell.

As Crotty explains, "our strategy has always been to take over commodity chemical assets and improve their performance by reducing costs. We are adopting a similar approach with oil and gas. The current low oil price is a good thing for us in this respect because it could accelerate the sale by some big companies of North Sea assets."

"As both a chemicals and energy producer, Ineos will be a different company," he notes. "But you have to evolve."

Sean Milmo, Freelance Science and Business Journalist, Essex, United Kingdom



We think our plan could be the game-changer in Britain.

Jim Ratcliffe, CEO, Ineos

to take advantage of a buyers' market for production assets.

The risks behind the upstream initiative became evident in summer 2014, when oil prices began pointing sharply downward. By January 2015, they were less than half the level of six months ago. The value of Ineos' high-yield bonds also

enjoy from shale-based ethane in European petrochemicals derivatives markets.

But these fears could be offset by the likelihood that Ineos' entry into the North Sea fray when oil is cheap would allow it to buy up offshore assets at a bargain. Company executives have consistently emphasized



The oil price collapse will have no effect at all on our UK shale plans.

Tom Crotty, Corporate Affairs and Communications Director, Ineos

in 2013—into a highly profitable operation. The company's managers believe the site's finances will be transformed by the exploitation

other infrastructure into which Ineos is pumping £300 million. A terminal is also being erected at Rafnes, Norway.

Building a Chemical Giant from Scratch

1992
Ratcliffe drives Inspec split from BP

1998
Ratcliffe leads £84 million MBO of Inspec's Antwerp petrochemicals arm

Private equity-backed £505 million grab for ICI Acrylics. Renamed Ineos Acrylics.

2000
Ineos Acrylics pays £11.5 million for methacrylates firm Bonar Polymers

Takeover of South African sheet producer Acrylic Products

2001
ICI's Runcorn chlorine and silicates business bought for £300m; ICI keeps 15%, grants £50 million loan.

Ineos takes majority of PVC maker EVC for €75 million

Dow's ethanolamines portfolio acquired

2002
Purchase of Enichem's EVC stake

Ineos Acrylics renamed Lucite

2003
Ineos asks UK for aid to repay BP loan

Ineos Chlor pension scheme altered
Moody's upgrades Ineos

Runcorn revamp cost jobs

2004
Buy of Rhodia's UK chlor-alkali and sulphuric acid

Specialty chromium catalyst business to Basell

ICI exits Ineos Chlor, writes off debts

2005
\$9 billion buyout of Innovene from BP

BASF exits North American PS JV

PS JV with Nova starts up

Deal for Solvay rigid film business
Magazine names Ratcliffe "top entrepreneur"

2006
Moody's gives Ineos negative rating

Purchase of BP's German EO, EG portfolio

First Chinese plant announced

Magazine names Ratcliffe "top power player"

2007
Nova PS JV extended to Europe

Ineos takes BASF Seal Sands site

51% of Lanxess ABS foreshadows buyout

Purchase of Hydro Polymers

Sale of E-PVC paste to Vinnolit

Norwegian PP acquired from Borealis

Plans for Saudi cracker ditched

2008
Norwegian PP plant closed

Takeover of BP's VAM and ethyl acetate

Pension dispute at Grangemouth

Merger of olefins and polyolefins

Mitsubishi buys Lucite

Ineos asks for debt repayment waiver

2009
Compound business consolidated

Banks agree to reset debt covenants

Moody's downgrades Ineos

2010
Nova to sell PS stake to Ineos

New holding for vinyls

Debt refinancing shaky

HQ moved from UK to Switzerland

Record profits touted

Exit from Italian vinyls

Global plastic films sold to India

2011
Styrolution JV with BASF

PetroChina buys into two refineries

2012
Private equity takes Tarragona ABS

Long-term agreement for US ethane

2013
Ineos wins Grangemouth conflict

HDPE JV with Sasol on US Gulf

Vinyls plants at Runcorn to shut

Belgian deepsea terminal for US ethylene

2014
BASF sells Styrolution share to Ineos

Patent infringement suit against Sinopec

Plans to invest US\$1 billion in UK shale gas

Ineos-Solvay PVC JV approved by EU

Ratcliffe urges EU to support manufacturing

The timeline of Ineos' "do-it-yourself" transition from buyout to buyout specialist — here in abbreviation — reads like a how-to for building a business through leveraged takeovers and joint ventures (JV). The deals are almost always debt-financed and Jim Ratcliffe center stage.



Building Momentum

American Chemical Industry Ready for Growth in 2015

In the US, where economic growth has been characterized as “slow and steady” for some time, expansion and strength in the chemical industry continues and momentum is building. In spite of weakness in key export markets and adverse winter weather, American chemistry output rose 2.0% in 2014. Growth in the chemical industry is expected to accelerate in the coming years and will be a major driver for the American economy.



Emily Sanchez, American Chemistry Council

Unconventional oil and gas development in the US has led to an abundant domestic supply of affordable natural gas for the manufacturing industry, providing the American chemical industry, in particular, with a competitive advantage. The chemical industry uses natural gas not only for heat and power at their manufacturing plants, but also as the key raw material, or “feedstock,” for chemistry products. Chemical

products are key ingredients in 96% of all manufactured goods, including cosmetics, electronic products, pharmaceuticals and plastics. Thus, the positive effects from the “shale gas revolution” are felt along the entire supply chain and have provided a boost to the manufacturing industry. Indeed, the US manufacturing industry is in full swing and we’re seeing strength in end-use industries that are important for chemical producers such as light vehicles and housing. Steady improvements in the US labor market and in other factors (such as still low mortgage rates and more recently, very low prices for gasoline) are contributing to positive performance in those industries as well. Though several segments remain below their pre-recession peaks, most key end-use markets for chemistry have recovered and further improvement is expected in 2015.

American chemistry is building momentum as a growth industry as a wave of announcements to build new chemical capacity and expand existing continues. Due to growth in shale gas production, there has been — and continues to be — a significant increase in capital investment by chemical and other manufacturing industries, driving new business and job growth. The American Chemistry Council (ACC) maintains a list of shale-related chemical projects announcements and as of December 2014, the list of chemical industry projects totals 215 projects, representing cumulative capital investments totaling \$132.6 billion in the US, 60% of which represents foreign direct investment. These investments will capitalize on the profound and sustainable competitive advantage enabled by shale gas development.



In addition, the industry is adding high-paying American jobs after years of trimming payrolls. Chemistry companies in the US continue to innovate, focusing on improving efficiencies as well as on new leading-edge product development. In 2014, capital spending by the chemical industry grew 11.8%. Capital expenditures are expected to grow by another 8.8% in 2015 and to grow another 8.8% in 2016. The industry’s expansion has also reversed a falling trend in employment. Employment in the chemical industry grew by 1.2% in 2014 and new jobs will be added through 2019.

Led by consumer chemistry and specialty chemicals, US chemistry production volumes increased in 2014. With inventories having remained balanced, growing demand in 2015 will require new production.

Advances in manufacturing and exports during 2015 will drive demand for basic chemicals, especially those segments in which the United States enjoys a renewed competitive advantage. Chemical output is expected to grow 3.7% in 2015, 3.9% in 2016 and by 4.8% in 2017 by which time much of the shale related investment should be online. Improving operating rates are expected in 2015, and with strengthening production volumes, capacity utilization is expected to be about 76.9% in 2015 and improve annual to reach 78.0% by the end of the decade. Growth in chemicals will be noted in rising shipments (turnover) values. Chemical shipments were \$805 billion in 2014 and will grow to nearly \$850 billion in 2015. By 2019, American chemistry revenues will exceed \$1.0 trillion.

While strength in American manufacturing, improvement in labor markets and growth in key end-use markets have translated to solid domestic demand for chemicals, weakness in external markets have limited US chemical export sales. Despite the competitive position American chemistry owes to a comparably favorable oil-to-gas price ratio, trouble in the economies of major trading partners means that the industry likely will not post a trade surplus until 2017. This trend is expected to reverse in 2017 with the industry positioned as a net exporter over the longer-term. However, considering chemicals trade excluding pharmaceuticals, the US is a net exporter. By this measure, the industry had a trade surplus of \$37 billion in 2014 reflecting a \$32 billion surplus in basic chemicals.

As new investments in the chemical industry come online, basic chemicals export growth will accelerate. Excluding pharmaceuticals, the surplus in chemicals trade will grow to \$77.4 billion by 2019.

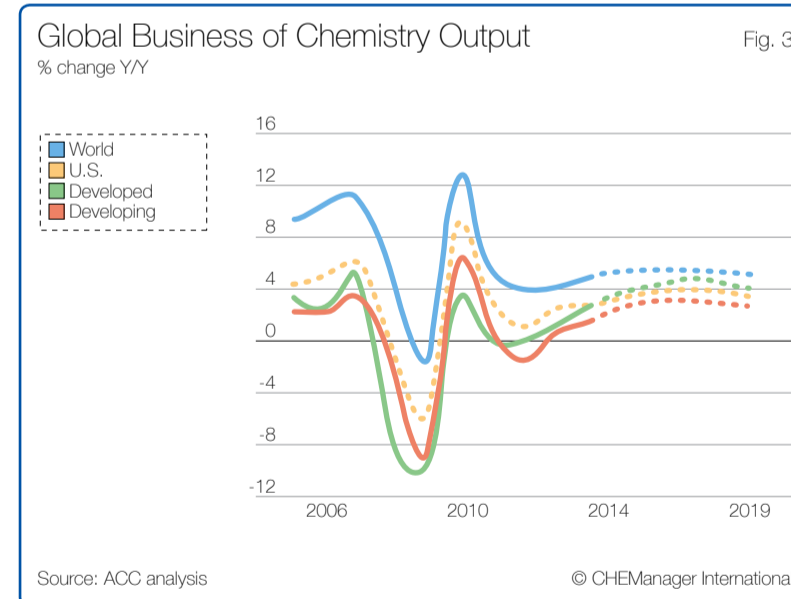
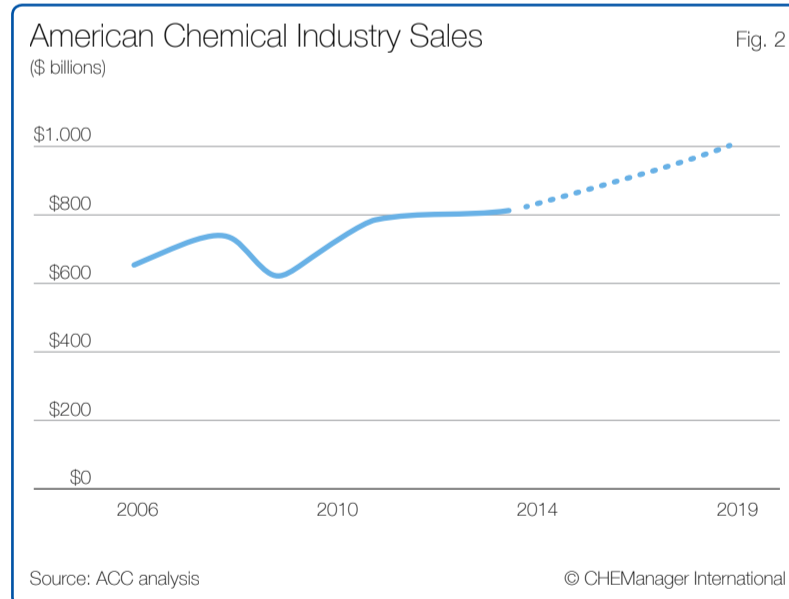
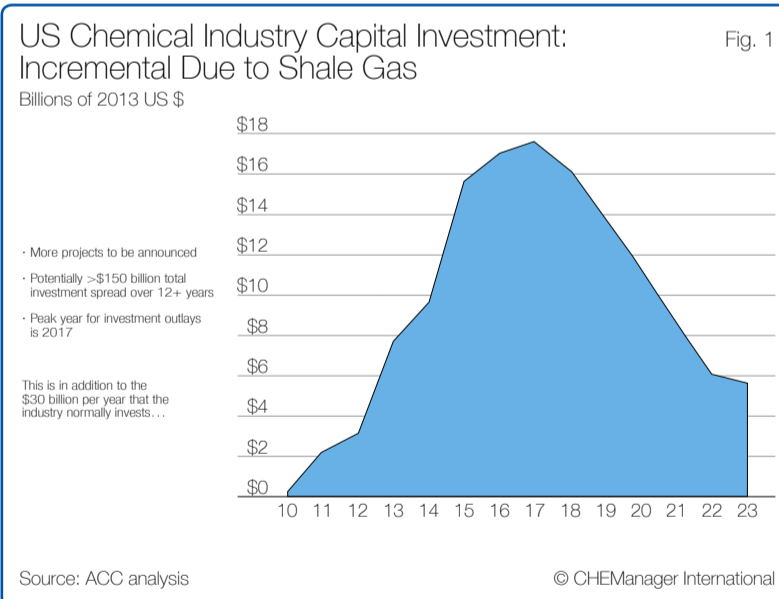
Clearly, the American business of chemistry is building momentum. Health in the domestic market and the eventual return of global economic growth will lift demand for American chemistry over the next several years. In global chemistry, economic challenges in Europe and the slowdown in China and other emerging nations clearly affected global chemistry volumes. After much promise at the start of the year, overall global production likely advanced only 2.8% in 2014, about the same as in 2013. With improving economic prospects headline growth will improve to 3.6% in 2015 and 3.9% in 2016. The most dynamic achievements will be found in the developing nations of Asia-Pacific and Africa & the Middle East. But due to competitive advantages from shale gas, growth will be strong in North America as well. With long-term structural and competitiveness challenges, Western Europe and Japan will lag as will Latin America in the short-term. With strengthening production volumes, global capacity utilization will improve in the years to come.

Emily Sanchez, Director - Surveys and Statistics, American Chemistry Council Washington, D.C., USA

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Infobox

In December 2014 the American Chemistry Council prepared a Year End 2014 Chemical Industry Situation and Outlook based on the latest data available. A copy of this report is available from the author.



EU Leaders Beat the Drum Harder for TTIP

In the face of only sluggish progress in finding support for the proposed Transatlantic Trade and Investment pact (TTIP) between the European Union and the United States, EU leaders have begun to hit harder in an effort to see the treaty ratified before the end of 2015. The world’s biggest trade deal, first broached in 2013, would create a transatlantic market of 800 million people and encompass almost half the world economy.

According to a draft of the final statement on EU talks in Brussels, the union’s leaders will say both sides “should make all efforts to conclude negotiations on a mutually beneficial TTIP (Transatlantic Trade and Investment Partnership) by the end of 2015”.

Opposition to TTIP has continued strong on both sides of the Atlantic. European activists, including environmental and anti-globalization campaigners oppose the pact as they fear US multinationals corporations will coerce EU governments into lowering food, labor and environmental standards or influence health care services.

British Prime Minister David Cameron, who discussed the trade deal with his peers from Spain, Italy, Denmark and several other EU leaders before the Brussels meeting, said “nothing of the sort” was being considered in negotiations.

“We need to bust some of the myths that are being put around,” Cameron is quoted as saying. “Brit-

ain’s public health service would not be under threat from a deal. There are not the risks that some people are putting forward.”

Italian Prime Minister Matteo Renzi and German Chancellor Angela Merkel also called for the deal to go through. Merkel has warned that Europe risks losing out to Asia as the US finalizes an accord with Japan and Pacific nations.

European opposition to the treaty focuses in particular the so-called investor-to-state dispute settlement (ISDS) mechanism, under which US-based companies could challenge EU laws on the grounds that these were restricting free commerce. (dw)

Receding Oil Prices Clip US Petrochem Producers’ Wings

Declining crude oil prices are taking their toll on US petrochemical companies that in the recent past have been riding the shale gas boom and expanding their production using cheaper gas feedstock.

Natural gas liquids have been a source of profits for energy producers because until recently their prices stayed high even as natural gas prices dropped. However, they also have offered a potential competitive advantage for US petrochemical producers in international competition.

Ironically, prices for NGLs, including ethane, propane, butane, isobutane and natural gasoline, have plummeted in major part because of the US shale boom. According to Oil Price Information Service, which

tracks these markets, propane and butane are at more-than 10-year lows.

The glut in the US oil and petrochemicals market is also doing its part to lessen the advantage of US chemical giants. While still facing high fuel taxes, competitors in Europe and Asia stand to improve their position — especially as the price of naphtha has fallen globally along with oil.

Up to now, LyondellBasell and Dow Chemical have been two of the biggest beneficiaries of the shale boom, but they could be among the biggest losers of the ongoing oil price crash, according to analysts at Credit Suisse, who noted that LyondellBasell’s shares have lost 34% since early

September, and Dow’s have dropped 19%.

According to a report compiled by European Parliament’s Economic and Scientific Policy Department at the request of the EP’s Research and Energy Committee (ITRE), since mid-2014, crude oil prices have fallen by more than 40% in euro terms, due to both sluggish demand and much higher supply. The report also concludes that prices will not recover in the short term.

If petrochemical feedstocks keep growing cheaper, by the reverse token higher consumption of fossil fuels will make a switch to renewable energies costlier, the report says. This could also increase deflationary pressure in Europe. (dw)

Shale Booms into Plastics Export Market

How Much Margin Will US Producers Leave on the Table?

The development of shale gas and the resulting low prices for natural gas in the United States have resulted in a major change in the production costs of plastics. According to the American Chemistry Council, in May 2014 a total of \$113 billion of chemical industry investments related to shale gas had been announced.



Dr. Paul Cherry, Officiu Projects



Dr. Kai Pflug, CEO, Management Consulting — Chemicals

According to ICIS, a provider of marketing intelligence on the global chemical industry, this includes 7.1 million tons of new polyethylene capacity that has been announced for the US through 2020, and the number is expected to rise as further derivative plants for previously announced US ethane cracker projects are revealed.

Though all these projects may not be executed, the added capacity is likely to be much higher than the estimated US polyethylene demand growth rate of an annual 3% in this period.

Expanding Exports

Polyethylene producers therefore will have to rely on exports to make their investments viable. The US is already an exporter of PE — in 2012, about 20% of production (or 3.6 million metric tons, according to American Chemistry Council data) was exported. Currently the largest export destination is the North American Free Trade Agreement (NAFTA) region followed by Latin America (see figure). Together, these two “near” markets account for almost 70% of US exports of PE.

However, demand for US exports within NAFTA exports is expected to contract significantly. Nova is constructing a 450 kt/a linear low-

density polyethylene (LLDPE) plant at Joffre, Alberta, which is due to start up in 2015, and is debottlenecking existing LLDPE and high-density polyethylene (HDPE) plants at Moore, Ontario. In addition, the Braskem/Grupo Indesa Ethylene XXI project, which is due to start up at Veracruz, Mexico, in 2015, will include 750 kt/a of HDPE capacity and 300 kt/a of LDPE capacity.

Europe is another option for US polyethylene exports, but not a very promising one because of local competitors (though with a cost disadvantage) and very limited growth prospects. This leaves South America, Asia, and to some extent Africa, as the core target markets for increased PE exports from the US. It is expected that by 2020, US polyethylene producers will need to export between six million and seven million tons of polyethylene to South America, Asia and Africa, with at least half going to Asia.

Weighing Margins And Risk

Who will manage these exports? US producers will have two basic options. They can leave the export to third parties, such as traders and distributors. This is simple and straightforward, but also has huge disadvantages. It means accepting substantial losses in margin. It also prevents US producers from fully understanding the fast growing and developing markets of Asia, South America and Africa and their specific requirements. It therefore is certainly not an ideal solution, particularly if these exports keep increasing.

The other option is for US producers to manage these exports themselves — with the advantages of improved margins and better market understanding. However,



currently US producers have only limited resources and capabilities to manage these exports, as markets outside NAFTA were not their particular target regions in the past. And even those of the bigger plastics producers with a substantial presence in Asia — e.g., via regional offices — frequently prefer to use US traders rather than managing the exports themselves.

This is partly due to the conservative attitude of these producers. Their core expertise is in production of plastics, not in price speculation. They are therefore highly averse to price risks. However, such risks are almost inevitable because of the long shipping times from the US to Asia. Customers will generally be willing to settle the price only upon arrival of the goods in Asia and, if forced to agree to prices prior to

shipment, will demand a premium to compensate them for the price risk they are taking. Without such a premium, they prefer to delay the purchasing decision for some weeks and then buy from a regional producer with a much shorter supply chain.

If a US producer agrees to price settlement upon arrival of the cargo, any positive or negative change in plastics prices during the shipment period affects its profit. While overall these risks will even out over a longer period, they can still be quite worrying for an employee at a risk-averse plastics producer. Furthermore, the additional working capital tied up in unsold cargoes on the water between the US and Asia creates stress for the finance departments of the plastics producers.

Physical Barriers

Apart from the conservative attitude, another obstacle for managing exports is the lack of physical and administrative resources:

Bagging: As the vast majority of domestic US plastics sales are sold in bulk rail cars, plastics producers do not have the equipment to package plastic resin in the 25-kilogram bags considered to be the standard packaging for plastics in the developing world. Producers are reluctant to invest in the capital for such equipment and the space to store the bagged resin.

Logistics: US plastics producers are reluctant to establish the staff and contractor resources to handle logis-

tics at both ends of the international trade, e.g., facilities to load 25 kg bags into 20- and 40-foot shipping containers as well as bonded warehouses in destination countries to provide local stock for customers.

Credit: Traders are experienced in handling the financial aspects of international trade, which can involve a wide range of payment options — for example, letters of credit, documents against payment and open account — and requires dealings not only with customers but also with banks in the US and export countries. Plastics producers mostly focusing on domestic trade would need to develop the in-house expertise to manage the financial aspects of international trade and judgment to make decisions that balance risk and cost.

Documentation: Documentation of international trade is much more complex than domestic trade. It needs to satisfy the exacting requirements of not only inbound customs officials, whose requirements vary from country to country, but also the banks of both parties. This is therefore another aspect of exports that US plastics producers want to avoid if possible.

In-Customs Handling: Similarly, plastics producers have less experience in dealing with import regulation for their goods than experienced traders. Again, they are reluctant to develop such knowledge in-house, which is vital if a producer is to offer short lead-time supply to export customers. This would require setting up bonded warehouses or foreign-

invested commercial enterprises, which enable foreign companies to sell products in the domestic China market in local currency.

Risks of Third-Party Model

Of course, many other US chemical companies do sell their products directly to overseas customers via their own channels. A large number of chemicals require technical service, which on a sufficient level can only be provided by the producers themselves. However, plastics producers primarily export commodity grades. These grades generally are exchangeable, and customers do not expect any particular service. Therefore these chemicals are in principle highly suitable for sale via third parties such as traders.

This also points to another limitation of the current, third-party driven export model apart from the loss in margin. Once plastics producers want to sell higher-value grades to export markets, the exclusive arrangement via traders becomes a severe obstacle. Clients of such materials require technical service from local staff. As their perceived risk in using such materials is also much higher than for commodity grades, they also expect direct contact with the producers as an indication of producer commitment to their products.

Benefits and Advantages

Overall, US plastics producers will therefore be well advised to expand their capabilities in directly managing their global plastics exports in the face of increasing dependency on such exports. This will bring both immediate benefits with regard to improved margins and longer-term advantages for the sale of higher-value grades. In our opinion, these points more than compensate for the extra resources established, and for the slightly higher risk.

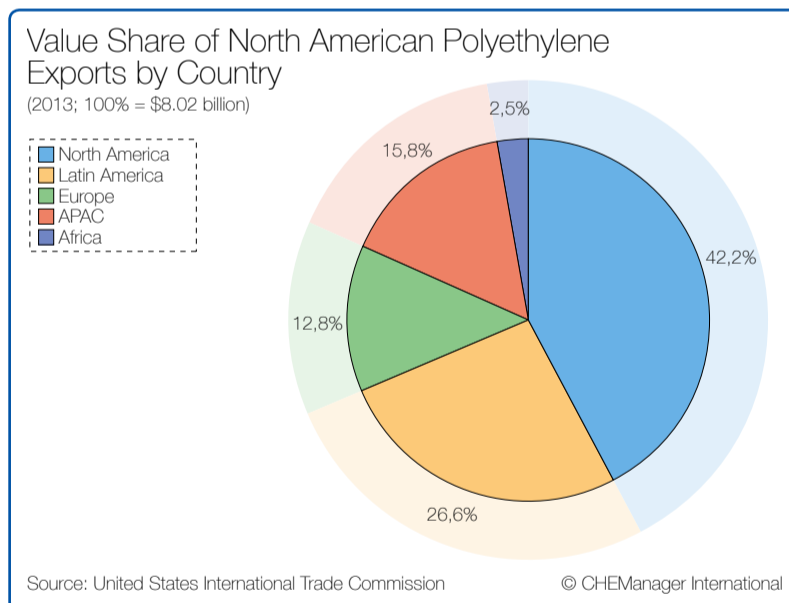
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Tata Chemicals Plans Pilot Plant for Nutraceuticals

India's Tata Chemicals plans to commission a 300 t/y pilot plant to produce nutraceuticals at its Chennai site at the beginning of 2015. The start-up will mark the company's entry into the business, and is part of its plan to increasingly focus on specialty and consumer products businesses. A scale-up to 1,000 t is

planned. Products to be made at the Chennai facility include oligosaccharides and polyols.

At an event to promote a new book on Tata's history, managing director R. Mukundan said the Indian company has evolved from a commodities enterprise producing mainly inorganic chemicals to one

that provides solutions to end-customers.

Tata Chemicals is today world's second largest soda ash producer and the largest salt manufacturer, Mukundan said, adding that it is “completely committed to Indian agriculture.” (dw)

SGS Life Science Services Doubles Mumbai Plant Size

Geneva, Switzerland-based SGS Life Science Services, a leading provider of pharmaceutical, clinical and bio-analytical contract solutions, has announced plans to more than double the size invest of its Mumbai, India, facility to 3,994 square meters.

The company said the expansion is being driven by increasing

demand for Full Time Equivalent (FTE) activities for key pharmaceutical customers, as well as an increase in stability projects from both local operations of multinational companies and overseas organizations.

SGS' expanded laboratory at Mumbai facility, which is focused on

stability studies and dedicated FTE models, will act as a dedicated cGMP pharmaceutical testing site. Due for completion and validation in Q2 2015, it will feature three new 100 cubic meter capacity stability chambers, HPLCs, dissolutions, Gas Chromatographs and additional general laboratory instruments. (dw)

Petronas to Use LyondellBasell PP Technology

Malaysian national oil and gas giant Petronas has chosen LyondellBasell's technology for its 900,000 t/y polypropylene plant scheduled for mechanical completion in July 2018.

LyondellBasell is also preparing front-end engineering and design work to develop a detailed scope, execution plan and cost estimate for the plant. This is set to be completed

by February 2015, with engineering, procurement, construction and commissioning expected for November 2015.

The facility projected to cost up to \$27 billion is part of Petronas's Pengerang Integrated Complex project in the southern Malaysian state of Johor, aimed at strengthening the group's presence in the Asian chemicals market.

Capacity at the site will rise from 423 cubic meters to 723 cubic meters, while the company said 39 new jobs “ultimately” will be added to the current 88 member workforce.

Paul House, managing director of SGS India, said the Mumbai laboratory will be the largest stability testing facility in the company's life science services network. (dw)

Saudi Aramco May Halt Ras Tanura Clean Fuels Project

State-owned Saudi Arabian oil giant Saudi Aramco has suspended plans to build a \$2 billion clean fuels plant at its largest oil refinery in Ras Tanura, industry sources told the news agency Reuters.

The energy project appears to be one of the first suspended in Saudi Arabia in response to the halving of the oil price in the last six months, the news agency said.

The Ras Tanura clean fuels project, including a naphtha hydro-treater, was to be part of a second phase of upgrades to Aramco's refineries, and was originally due to go on stream in 2016.

Reuters pointed to conflicting reports, with one source saying that bidding on the project had been withdrawn, while another speculated that the postponement was

only for a year. A third source said Aramco was evaluating its projects following the fall in oil prices to determine which should have priority.

In November, Aramco CEO Khalid al-Falih was quoted as saying that the cyclical moves of oil markets would not throw the company's long-term corporate strategy off track. (dw)

Under Pressure

Is the Competitiveness Of European Chemicals On The Line as the Industry's Global Market Share Drops?

The European chemical industry's share of the global market remains on a downward trajectory in continuation of the negative trend visible to observers for years. Europe's chemical industry has no choice but to act if it is to respond to the strategic and structural challenges it faces and retain its global positioning and competitiveness going forward.



Dr. Alexander Keller, Roland Berger Strategy Consultants



Alexander Belderok, Roland Berger Strategy Consultants



Dr. Sebastian Kühner, Roland Berger Strategy Consultants

In 2011, Roland Berger Strategy Consultants published a global study on trends in the chemical industry, titled "Chemicals 2030." It featured long-range trends and projections for the next 20 years. Two special editions followed: "Chemicals 2030 China Edition" and "Chemicals 2030 US Edition" focused on the market and competitive situation and on the specific challenges and circumstances in each region.

In light of the considerable interest shown in the publications by industry and media, and given the numerous significant changes that have since taken place in the market and competitive environment, Roland Berger decided to publish a new edition of the global chemicals study. It contains an updated quantitative and qualitative analysis spanning different regions and sectors highlighting how the global chemical industry is expected to evolve through 2035, and it features numerous case studies.

The motivation was unchanged from the previous study: Examine the dynamic chemical markets in detail and provide insights, scenarios and recommendations for the industry, thinking in long-range plan-

ning cycles. Based on discussions with clients, business partners and other stakeholders, a further key topic was added to the "Chemicals 2035" study: the future role and competitiveness of the European chemical industry.

Contrasting Growth Rates

Global sales of chemicals are set to almost double in the coming 20

years. Yet there is definite variation in the growth dynamics when we look at eight key/exemplary sectors of the chemical industry (petrochemicals, inorganics, commodity and engineering plastics, fertilizers, agrochemicals, paints and coatings, flavors, and fragrances). Agrochemicals and engineering plastics, for instance, exhibit the strongest growth rates in the long-range trend, whereas fertilizers will see the lowest growth over the period. The difference is even greater looking at the historic and anticipated development in the regions. Growth impulses originate mainly in China and also in Asia's emerging nations and the Middle East. Conversely, other regions such as North America and Europe exhibit comparatively low growth rates.

Europe's Shrinking Market Share

Europe's market for chemical products looks set to exhibit the weakest growth of any of the world markets in the coming years. Though the chemical industry has been able to make up for the substantial setbacks suffered in the crisis years of 2008-2009, growth has been stagnating ever since. This sluggish development has a number of underlying causes, including the weak demand from within Europe, the growing competitive intensity from Asian and American rivals, and the less favorable environment owing to the high cost of energy and raw materials. The European chemical industry's share in the global market has been in decline as a result. Having been up at around 35% in 2000, the share subsequently began to fall continuously, coming in at ap-



The only way for the industry to respond is to get itself even better positioned to stay competitive.

The companies are too diverse and the circumstances too complex for one all-encompassing recommendation to be made on how

to survive in the global market long term. However, there are commonalities; many EU-based chemical companies have been and are currently addressing pressures in their businesses with a very similar "portfolio play" — shifting activities further into the life sciences sector. There are a lot of good arguments to do this, but it nevertheless has to be carefully investigated — if this equally makes sense to all market participants and what the effect of this development may be, e.g., for the evaluations of targets and recoverability of the respective investments.

In addition, many individually tailored single measures can help companies permanently raise their level of competitiveness. Examples would be further increasing efficiency in production, entering into a long-term cooperation to secure and source raw materials, and engaging in continuous R&D work to find answers to the big challenges of the future with innovative products and processes. After all, one thing is certain: the earlier these aspects are addressed, the more effective and efficient the efforts will be.

Dr. Alexander Keller, Partner, Roland Berger Strategy Consultants, Düsseldorf, Germany

Alexander Belderok, Partner, Roland Berger Strategy Consultants, Amsterdam, Netherlands

Dr. Sebastian Kühner, Project Manager, Roland Berger Strategy Consultants, Düsseldorf, Germany

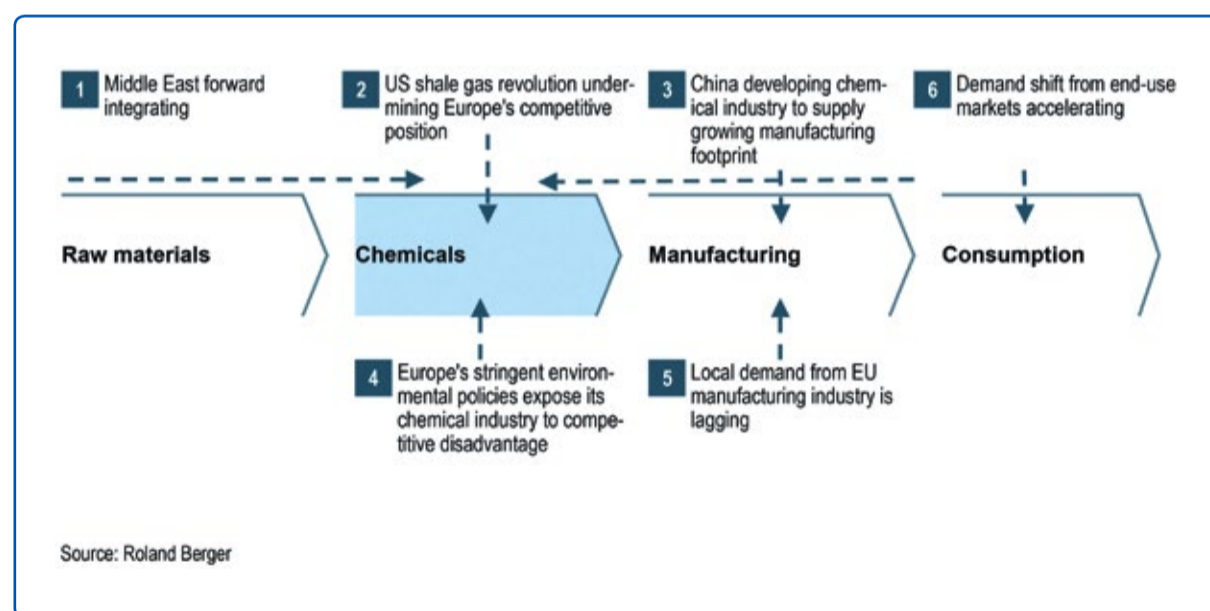
panies there forward-integrating in a bid to make even more commercially efficient use of their fossil resources. A second factor is the shale gas revolution in the US, which is undermining Europe's competitive position through significantly lower raw materials and energy prices. China is expanding its chemical industry in parallel in order to meet the strong domestic demand for chemical products by local manufacturers with local plants. At the same time, stricter environmental standards and tougher restrictions within Europe (e.g., REACH, or Registration, Evaluation, Authorization and Restriction of Chemicals) are making life increasingly difficult for producers. A fifth aspect is the fact that local demand from the European manufacturing sector is in a low phase owing especially to the structural transformation from manufacturing industry to service sector. The final strategic threat is the accelerating pace of change and the shift in demand in the various end-use markets given that consumer demands and habits are changing with increasing speed these days.

Staying Competitive

For many decades, the European and especially the German chemical industry has managed to assert a leading role globally on the basis of superior expertise and a pronounced focus on quality and innovation. It is evident, however, that the European chemical industry is under ever-increasing pressure, and the pressure looks set to intensify.

Threats From Many Sides

The European chemical industry needs to face six principal strategic threats (see fig.). One of them is the growing competition emerging from the Middle East as a result of com-



Threats facing the European chemical industry

Mitsubishi Chemical to Merge Carbon Fibers Businesses

Mitsubishi Chemical Holdings plans to merge its carbon fiber-related businesses, currently part of separate group companies, during 2015.

The Japanese conglomerate said the move is aimed at better leveraging the advantages of its group companies' products in advanced-technology fields such as special pipes to pump up petroleum, rare earths and other resources from the ocean bottom, as well as components for satellites.

Another intent is to help Mitsubishi compete with other Japanese manmade fibers producers, including Toray and Teijin.

In particular, plans call for the carbon fiber businesses of subsidi-

ary Mitsubishi Plastics to be integrated into another subsidiary, Mitsubishi Rayon.

While the former produces highly heat-resistant fibers for satellites and industrial robots, the latter focuses on high tenacity products for automotive and aeronautics applications.

With the integration of their carbon fiber businesses, the Mitsubishi group companies will share knowledge between their research and development departments. The merger is also expected to help utilize the capabilities of Mitsubishi Plastics, which is said to possess expertise rival companies lack.

The Japanese player said it expects the fibers merger to help ad-

vance research and development in utilization of ocean bottom resources. Mitsubishi Plastics is also developing pipes for ocean bottom research in cooperation with the Japan Agency for Marine-Earth Science and Technology.

In ocean bottom research, special pipes are extended from vessels at the surface to seabeds for drilling. The government wants to take samples of resources in seabeds at least 4,000 meters deep, but the manufacture of stronger, lighter pipes for this purpose remains a challenge.

The expanded Mitsubishi Rayon, including the newly incorporated plastics arm, will seek to develop

special pipes by combining the two types of carbon fibers to make products that will be lighter without sacrificing strength.

Toray, Teijin and Mitsubishi Rayon hold a combined share of about 70% of the global market for carbon fibers; however, while the first two have close business ties with major aircraft manufacturers, such as Boeing in the US and Airbus in Europe, Mitsubishi Rayon is said to lag its rivals in this application. At the same time, players in countries such as South Korea, have also improved their technological capabilities. (dw)

BASF Buys Taiwanese Adhesives Firm

As part of its drive to become an integrated solution provider for thermoplastic polyurethanes (TPU) and TPU-based adhesives, BASF is acquiring Taiwan Sheen Soon (TWSS), a producer of adhesives base material for TPUs.

The deal, for which financial details were not disclosed, is slated to close in 2015 following internal and external approvals. It will include the acquired company's business and all assets in Taiwan and mainland China.

BASF said the TWSS portfolio complements its own "established position" in TPU extrusion as well as injection moulding grades for applications with short innovation

cycles, such as footwear. "As TWSS has been at the forefront of TPU adhesives innovation, the acquisition is a strategic move that will strengthen BASF's competences in this important growth field," said Raimar Jahn, president of the German chemical giant's Performance Materials business segment.

The Taiwanese firm's assets, customers and employees will be integrated into BASF's existing legal entities and businesses. Jason Chou, owner and manufacturing director of TWSS, will continue to oversee the company's activities as a consultant to BASF. (dw)

Linking the Physical to the Digital

Chemical Companies Should Be Preparing for Next-Generation B2B Marketing

In the chemicals industry, electronic business-to-business (B2B) interactions between buyers and sellers typically rely upon tried-and-tested tools and techniques. These approaches have brought greater efficiency and speed to transactions between companies and their business customers. However, evolving technology and business practices, along with the changing expectations of chemical company customers, are changing the industry's B2B practices.



Matthias Hegele, Accenture

Soon, electronic commerce interactions in the chemicals industry will need to be richer, offer broader functionality, and encompass the end-to-end process of selling products. To move to this next generation of B2B, chemical companies must adopt a broad range of digitally enabled processes and practices. We anticipate, in fact, that nearly all B2B processes will be digitized, enabling companies to sharpen their marketing efforts and reach customers more efficiently.

Our research shows that a number of chemical companies — particularly high-performing companies — are already pursuing this next generation of B2B capabilities. In a recent Accenture survey, 94% of chemical companies said that they expect to increase their investment in digital capabilities in the next three years, and 58% said that they are embracing digital to gain a competitive advantage over industry peers.

To do this the right way, however, we believe that chemical companies need to master three key capabilities in digitizing business-to-business marketing:

■ **Building stronger and deeper customer relationships.** With current B2B processes focusing on the purchase transaction, chemical companies have been missing a tremendous opportunity to find and nurture customers leading up to the sale. Chemical companies can take advantage of packaged solutions — already used by many online consumer retailers — to link product finders and catalogs to broader digital commerce capabilities. All of this can add up to a better customer experience and larger sales. For example, by implementing an intuitive, more comprehensive customer portal, a leading materials and life sciences company expects to increase online sales from 10%–20% to at least 40%.

Traditional channels are by no means dead. Rather, chemical companies need to bridge the physical and online worlds. This will entail tying contact data management into



digital prospect profiles, and taking a more systematic approach to feeding leads from trade shows, sales calls and other person-to-person interactions into the digital pipeline.

■ **Extending the company's reach.** While chemical companies realize the value of reaching not only their own customers — such as major suppliers and original equipment manufacturers (OEMs) — they also realize that they have not been so effective at reaching their customers' customers. To a large extent, that is because their content is not

differentiated for various audiences. Instead, they often take a one-size-fits-all approach.

Today's online tools make it possible to provide different experiences for different audiences. Using customer research, audience analyses and journey maps that track movement through e-commerce sites, companies can develop "personas" that represent different types of customers, and then deliver tailored content designed for each persona. Thus, OEMs could be guided to one set of tools and information, while end-customers could be guided to another set — allowing the chemical company to communicate with each group in the most appropriate way. Over time, companies can use analytics to track the effectiveness and accuracy of these personas, and keep adjusting them to better reflect the customer base.

■ **Streamlining lead qualifications.** Until recently, online B2B efforts have had a narrow focus on sales transactions, making the ability to understand the potential value of leads, and pursuing them accordingly, largely a manual process. Using today's technologies, chemical compa-

nies can automate these efforts and seamlessly collect and feed high-value leads into the sales pipeline.

Companies can begin by defining the behaviors that make a good digital prospect. For example, a company may determine that customers who download a cost calculator or view a certain product video have high potential. These actions can be automatically tracked, scored and weighted to identify the best leads, which can then be routed via workflow software to the sales force or the appropriate online sales channel. Progress with these leads, as they move through the sales process, can then be tracked automatically as well. Overall, this type of approach means that fewer leads fall through the cracks, and sales efforts are systematically focused on the right opportunities.

Digitization can do more than help companies keep up; it can enable them to get ahead. Several years ago, for example, a specialty chemical company established a website to efficiently handle the sale of commodity silicones at a discount. This channel was designed to reach cost-conscious customers who wanted to buy products, but who were

not interested in associated services. This allowed the company to expand into this customer segment, extend the business into new countries and cut logistics costs by 60%. The investment in the online channel was recouped in just three months. Since then, the company has continued to add products and customers. Now, the website is a true customer-focused portal where customers can tailor their product requirements.

To make an effective transition to digital B2B, companies need to define a digital operating model and strategy. Typically, they will have to make changes in the organization, as well. As a rule, a next-generation B2B approach will require working across functional silos.

Next-generation B2B will also require a different perspective on technology itself. Chemical company IT groups have traditionally focused on reducing costs, moving all processes onto enterprise systems for efficiency, and "bleeding" technology assets for as long as possible — often, well past their intended lifecycle. But with customer-focused B2B, the IT departments will need to look beyond those goals, and factor in the larger benefits of value creation, growth and delivering the right customer experience. To help, companies should consider establishing a separate group within IT that is not part of ongoing enterprise system operations, but is instead charged with agile development in the support of B2B commerce.

Developing the capabilities needed for next-generation B2B will take time, and customer expectations for a richer digital experience are rising rapidly. Chemical companies that seek to meet these expectations will be in position to stay close to their customers, which is an increasingly critical asset in an ever more competitive industry.

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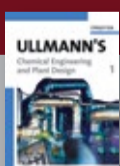
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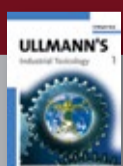


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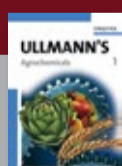
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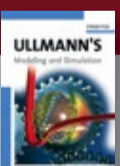
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Jacobs Engineering Wins BP Contract for Geel Upgrade

Jacobs Engineering Group has received a contract from BP Chembel for basic and detailed engineering services to upgrade that company's production facilities at Geel, Belgium.

BP Chembel is a major supplier of purified terephthalic acid (PTA)

and paraxylene (PX) used to produce polyesters.

The California, USA-based engineering firm will install new equipment and performing upgrades in the facility's PTA units and optimize the site's operational performance.

In announcing the project, Jacobs Group vice president, Mark Bello, said the US contractor has "provided services" to BP at Geel for a number of years and is "delighted to further develop the relationship." (dw)

ExxonMobil to Close French Rubber Plant

ExxonMobil Chemical in late December 2014 confirmed plans to close its standard butyl rubber plant at Notre Dame de Gravenchon, France.

At press time, the closure was being discussed with the site's works council. Current plans call for the

shutdown to take place in the third quarter of 2015, with workers to be offered jobs at other company sites.

The petrochemicals subsidiary of the US oil group said it would continue to produce standard butyl rubber at other facilities. It added

that the shutdown in France had "no impact" on its halobutyl operations.

ExxonMobil claims to have the world's largest installed capacity for halobutyl rubber, which it produces in the US and UK as well as in a Japanese joint venture. (dw)

BASF Builds New Chemical Catalyst Plant at Shanghai

To meet growing demand from China and Asia-Pacific generally, BASF is building its first world-scale chemical catalysts production facility in the region.

The plant at the German group's site in Shanghai Chemical Industry Park at Caojing, China, will produce base metal catalysts, custom catalysts, and adsorbents used in

the production of fatty alcohols, sulfuric acid and butanediol and for the removal of impurities from olefins.

Construction began in December 2014, with the start of production planned for the fourth quarter of 2016. When operating at full capacity, the plant will create 75 new jobs in Shanghai.

The Caojing facility is designed to provide a strong regional manufacturing base and improved proximity to customers in Asia Pacific, which Detlef Ruff, BASF senior vice president, Process Catalysts & Technologies, said "is the fastest growing region for our base metal and custom catalysts solutions". (dw)



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Resilient Amid Globalization

What Does Supply-Chain Design Mean at the Dow Chemical Company?

Elements of supply-chain (SC) design at Dow are a sound work process, modeling capability, resiliency study, customs and duties, and carbon footprint, which together will make the total SC cost transparent for decision-making purposes. Why is SC design — or better, value-chain design — so important?



Wubbe Prins, Global Supply Chain, Technology Center Project Director, Dow Olefinverbund

Products are manufactured with an expectation of return on capital. However, increasingly complex, longer global supply chains and associated accessorial costs are eroding its profit. Therefore, SC design and modify work process (SC D&M WP) was designed to help businesses accelerate success. What is the added value? SC design is not only about how to get goods from A to B, but it's also about optimizing the total value chain, from supplier to customer. Complexity is the new reality.

With globalization, the flexibility for customers to make a choice, and the uncertainty, it is more important to have robust, reliable and visible supply chains. And generating value for our customers is another reason. The final customer is paying our bills and salaries, so cooperation and partnership is needed to deliver solutions, not only the product. In the previous landscape, we had a poorly defined work process, which was not integrated with other major global processes, resulting in below best-in-class supply chains.

So we had to change the game: SC D&M WP is designed to support the efficient and effective design of new, or modification of existing, integrated supply chains for lowest cost to serve and maximum business value and customer service. The SC Expertise and Technology

Center (E/TC), an established work group at Dow, is the owner of the work process. The businesses, and therefore also customers, are addressing requests to this group, and it is delivering solutions back to the businesses. This is done by applying tools and technologies, and by involving subject matter experts, stakeholders, logistics service providers, operations and logistics purchasing. It is a concerted management effort.

Methods of the SC Design Process

The services of the SC E/TC can be summarized as design new efficient and effective supply chains through modeling, support major projects, support modifications to existing supply chains, conduct supply chain of the future studies, and develop and maintain supply-chain most effective technology. Design and modify supply-chain projects are aligned to work types that reflect the project's effects and objectives.

Some projects may use multiple work types. The different work types are: plant/facility, feasibility study, network optimization, work process and IT, mergers and acquisitions, exchange/swaps/tolls, and SC resiliency. Other elements, such as environment, health and safety (EH&S), and logistics procurement, are included. As an example of plant/facility, this work type is split up in four major parts: SC scope identification, SC definition and initial design, SC final design and constructions, SC initial startup and review. Each of these major parts has sub-elements and tasks to properly execute the work process with described purposes and outputs, which are documented in workbooks.

For SC modeling, different methodologies and tools are used depending on the purpose. For simulation, typically Arena (discrete event simulation/Rockwell) and iThink (systems dynamics modeling/Isee systems) are applied. Modeling approaches to represent changes in a system over time are particularly useful for understanding the influence of variation in inputs (e.g., the effect of variation in transit time on tank-size requirements). For optimization, typically LogicNetPlus (IBM



and other methodologies are used. Mathematical approaches for rigorous minimization or maximization of an objective function are subject to constraints (e.g., supply); they are particularly useful for balancing competing factors in supply-chain network optimization and design. Reasons for network optimization can be the following: distribution network planning, strategic sourcing, global sourcing decision, multi-time period modeling, mergers and acquisition analysis, service level modeling, and margins. The potential objectives are to minimize freight costs, minimize facility costs, minimize transportation risk and maximize customer service levels.

Resiliency of the Supply Chain

SC resiliency is added to the work process, as globalization and uncertainty are the new reality. How does resiliency relate to risk management? Conventional risk management relies on risk identification and assessment to prevent disruption.

But unfamiliar risks may be hard to anticipate and still harder to quantify. By improving the resiliency of its supply-chain operations, a business can increase its chances of coping with disruptions and prospering during times of upheaval.

How does resiliency relate to sustainability in real time. By sensing and responding to external forces, a business can adapt to changes in economic, environmental and social conditions, and thus remain competitive over the long run. The overall objective is to create sustainability for the business. Dow is using different methodologies to obtain that ultimate objective. Dow and Ohio State University together have developed a resilience assessment system called SCRAM (Supply Chain Resilience Assessment and Management). This system is delivering both qualitative and quantitative results. About 150 questions are addressing vulnerabilities and capabilities.

You want to know how strong your capabilities are to cope with

identified vulnerabilities. Increasing vulnerabilities will result in exposure to risk, and increasing capabilities will result in erosion of profits, so you want to create a zone of balanced resiliency. Resiliency is the capacity of a business to survive, adapt and grow in the face of turbulent change and complexity. It can be seen at different time scales: from short-term day-to-day business continuity to long-term strategic sustainability. Resiliency is particularly important for supply-chain management because of the pressures and uncertainties associated with global procurement, manufacturing and distribution.

Resiliency will enable supply chains to be inherently resistant to such factors. The process steps are: Identification and assessment, quantification and prioritization, mitigation plans and execution, continuity/recovery plans and learning. A heat map can be used to illustrate the effect versus probability of events/disruptions. The resilience tool kit consists of a questionnaire, the SCRAM

analysis and disruption simulation, with scenarios and strategic options. And for certain materials, meeting the criteria, we use a distribution risk review, including applying methodologies like Safety and Quality Assessment System (SQAS) and Chemical Distribution Institute (CDI) questionnaires/audits.

Competitive Supply Chain

Another important element of supply-chain design is customs and duties influence on sourcing — and to capture Harmonized Commodity Description and Coding System (HS) tariffs, exemptions, preferences and boycotts/restrictions. Dow has added this functionality to the optimization process. And last but not least, the increased emphasis on climate change is leading to exploring the ways to control the contributors, and CO₂ emission is one of them. Therefore a global project is launched on estimating carbon footprint for supply chains. CO₂ emission depends on distance, ton and mode of transport. The steps: calculate the distance between origin and destination for each shipment, calculate the tons x miles, and use an emission factor for each mode of transport to calculate CO₂ emissions. Now you can compare.

The total SC costs are made up by asset design, handling cost, freight cost, accessorial cost, customs and duties, and working capital. A final comment is that collaboration, vertical and horizontal, is becoming more important to cope with increasing cost and environmental pressure and stay competitive in a global market in the face of turbulent change and complexity. The described elements of SC design, for example, are applied in 11 steps for Sadara, the grassroots joint venture project in Saudi Arabia.

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Shell JV in Brazil Invests Heavily in Ethanol

Raízen, a joint venture of oil and petrochemicals group Shell with Brazil's Cosan, will spend nearly \$1 billion on building eight second generation bioethanol plants for the production of ethanol from sugarcane waste.

A recently completed plant built by the JV, Brazil's largest ethanol producer, has capacity to produce 40 million liters. Plans are to increase output by as much as 50% up to 2024. João Alberto Abreu, the company's agroindustrial director, told the London-based Financial Times newspaper.

With the completion of eight plants, Shell JV will be able to produce roughly 1 billion liters of biofuel annually.

While production of cellulosic ethanol is still more expensive than conventional ethanol, Abreu told the newspaper he expects costs to fall as

the enzymes needed in the production process become more widely available.

Many ethanol producers are said to be struggling to stay afloat following decades of research and failed attempts. In 2012, BP scrapped plans for a \$300 million cellulosic ethanol plant in Florida, but other companies, such as DuPont, have taken up the challenge.

In Brazil, Abreu said he believes domestic ethanol demand will continue rising, with export opportunities to Europe.

With crude oil prices tumbling 30% since June, analysts say Shell's upstream petrochemical business has seen its profit margins come under pressure and may soon be labeled by analysts as an underperforming asset. (dw)

Bayer MaterialScience Inaugurates New TDI Plant

Bayer MaterialScience (BMS) has inaugurated its new 300,000 t/y TDI plant at Dormagen, Germany, built at a cost of €250 million. The world-scale facility replaces a smaller production unit with a capacity of 60,000 t/y. Including infrastructure and supplier costs, BMS said its investment in Bayer's Chempark Dormagen totals more than €400 million.

The German site is planned to become the plastics producer's European hub for TDI, for which it expects demand to grow "steadily" in coming years. At the inauguration ceremony, Bayer MaterialScience CEO Patrick Thomas cited the gas-phase technology developed at Bayer as an example of the German group's innovative strength. The plant is claimed to be particularly energy and resource efficient.

"Compared with a conventional plant with the same capacity, the new

facility will reduce energy consumption by up to 60% and require as much as 80% less solvent," Thomas said, adding that "this also gives us an important competitive advantage."

Bayer's Dormagen TDI complex, where a plant for starting material TDA is already in place, is completely back-integrated. A CO pipeline to connect Dormagen to its sister site at Uerdingen is still being held up by safety concerns of residents along the route.

Commenting on the Bayer holding's plans to float its plastics subgroup on the stock market, Thomas said "BMS is ideally prepared for independence." The company, he added, "is superbly positioned worldwide and optimally prepared to operate independently. Our products are in demand, our customers value our innovative power, and we are leaders in our markets." (dw)

Evonik Starts Two New Plants for Crosslinking Activators

German chemical producer Evonik has started up two new plants for crosslinking activators at its multi-user site in Wesseling, Germany.

With the new production facility for its triallyl cyanurate (TAC) and triallyl isocyanurate (Taicros), the company now offers two high-quality crosslinking activators for use in plastics and rubber that allow it to meet customers' rising quality requirements as well as the growing demand worldwide, especially in the photovoltaics sector, said Matthias Hau, head of the Agrochemicals & Polymer Additives business line.

Evonik said Taicros is designed to enhance the quality of the EVA films that encase the sensitive silicon cells of solar panels — and thus the solar cell as a whole — to protect them from environmental influences.

The product is claimed to ensure better crosslinking and also protect films against long-term yellowing, which means the solar cells perform well on a sustained basis, said segment head Frank Kraushaar. It also speeds up crosslinking, which he said results in a quicker lamination process and the corresponding efficiency improvements for customers in the photovoltaics sector.

TAC is primarily used in high-quality rubber materials such as hoses and cable coatings in the automotive sector to increase aging resistance and, accordingly, the life expectancy of such items.

Through the backward-integrated production at Wesseling, the new units are connected to an existing cyanuric chloride plant, which provides feedstock. (dw)

The Challenge of Increasing Internationalization

Distribution of Pharmaceuticals Across Europe in the Fast Lane

Within the Eurotemp network, Trans-o-flex offers active temperature control solutions that dispense with thermally insulating packaging and ensure good distribution practice (GDP) compliance and all-over monitoring and documentation.



Christian Knoblich, Managing Director, Trans-o-flex Logistics Group

Whereas the concentration trend among the pharmaceutical companies has continued for years, and the development, procurement and production in the pharmaceutical sector were globalized long ago, the supply to pharmacies, wholesalers and hospitals used to be almost exclusively a national matter. However, this will change.

"We have noticed an increasing internationalization of logistic and distribution services," said Christian Knoblich, managing director with responsibility for the pharmaceutical business of the Trans-o-flex Logistics Group. "One of the reasons is that a centralized warehousing concept helps to reduce inventory costs because double stock can partially be avoided and unit costs for stock-keeping in a large warehouse are lower than in cases where the goods are stored in many small locations. You only have one overhead, and you only need one set of equipment, from scanners to the inventory management system and the warehouse."

Logistics systems, like the one developed by the Trans-o-flex Group, reflect exactly this development.

"However, you face the challenge then to combine the different national requirements in one logistic system, which, as it concerns pharmaceuticals, obviously also has to be GDP-compliant," Knoblich said.

Answer To Increasing Internationalization

"In order to meet these challenges and find an answer to the increasing internationalization, the Trans-o-flex



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Group has developed its Eurotemp solution, which, as the only international network, enables the actively temperature-controlled distribution of pharmaceuticals in Europe," Knoblich said. "We already ensure a blanket-coverage fine distribution with active temperature control in eight European countries. In addition to this, we also offer the actively temperature-controlled transportation of pharmaceuticals as less-than-truckload (LTL) or full-truckload (FTL) shipments in many other countries. Eurotemp reaches from Sweden to Italy, from Ireland to Bulgaria, from Poland to Portugal. We could design this international network so that we have the same offering all over Europe. However, we will not do this, because national practice and habits still play a major role, and we want to take this into consideration."

Customized Transport Of Pharmaceuticals

This is why the network initiated by the Trans-o-flex Group focuses on a gradual demand-oriented growth with partners, based on two main criteria. Knoblich: "The basic prerequisite is that all partners are able to transport pharmaceuticals in compli-

ance with the EU regulations for good distribution practice. Secondly, our partners offer exactly those services that are required by the industry in their specific countries. And it is precisely these requirements that have not yet been standardized in Europe."

The basic service in the Eurotemp network is always active temperature control. This helps the partners dispense with additional thermally insulating packaging and

tion of pallets as well as LTL and FTL shipments.

"In other countries, so far, we concentrate on LTL or FTL shipments because still there is not enough demand for an actively temperature-controlled fine distribution of parcels," Knoblich said.

There are also differences in the offered temperature ranges: "We partly focus on temperature control in the range between 2 and 8 de-

temperature-controlled transportation of pharmaceuticals in both temperature ranges and, with its subsidiary Transpharma Belgium, has been providing the same services in Belgium for almost a year. According to Eurotranspharma, the company, with a workforce of 800 employees, achieved a turnover of €72 million in 2013 and created 600 jobs in the last three years. The French network consists of two hubs and 14 depots, which organize 520 delivery routes.

Single Source Service

Compliance with the Eurotemp standards, such as constant temperature monitoring or all-over temperature documentation, is regularly audited in accordance with the GDP guidelines, not only by customers but also by the Trans-o-flex Group in its capacity as partner in the Eurotemp network. Knoblich: "Already today, Eurotemp offers pharmaceutical companies the possibility to receive an international transport service from one single source, which takes the individual countries' national specifics into consideration."

► www.trans-o-flex.com

You face the challenge to combine the different national requirements in one logistic system.

passive temperature control, which, especially during long transports, reduces efforts and costs. The all-over shipment monitoring and temperature documentation has to be ensured through the entire process. Apart from this, the offer can vary: In some countries, especially the European core countries such as Germany, Austria or the Benelux countries, Eurotemp offers the fine distribution of parcels, the distribu-

grees Celsius, he said. "At the same time, however, we also partly offer the temperature range between 15 and 25 degrees Celsius."

Complete Offer In France

An example of such a complete offer is the French Eurotemp partner Eurotranspharma. In France, this dynamically growing company offers an areawide network for the active

Safety in Explosion Protection Zone 2

Industrial trucks operating in explosion protection zone 2, ATEX category 3G (gas), require either appropriate safety modifications (complete protection) or must be fitted with a gas warning system, which constantly monitors the concentration of gas in the surrounding atmosphere and safely shuts down the truck if gas exceeds the limits.

The innovative, radio-controlled gas warning system from French specialists Centrexpert is now available as an option for Linde electric trucks with a load capacity of between 1.4 and 3.5 t destined for use in explosion protection zone 2.

The recently certified system includes functions such as access control, pre-shift checks, self-calibration and easy servicing. All safety-relevant data — such as gas concentration and the operating temperature of the engine — is shown on the display. Reporting, maintenance scheduling and a wireless

connection to stationary gas sensors complete the package.

The gas warning system from Centrexpert consists of a tablet PC with explosion protection, a sensor with a small tank for the test gas mixture and a relay box with controller. The wireless connection between the temperature sensors and the controller is provided via the highly resilient and secure ZigBee wireless protocol.

The entire gas detection unit is contained in a single housing the size of a drink can. Since the system calibrates itself and checks the functionality of the sensors every time the truck is started, it is much more user-friendly than comparable systems on the market. During operation, the system continuously shows the driver all operating conditions relevant to explosion protection, such as temperature or gas concentration in the air. The box with the sensor and test gas mixture needs replacing only once a

year, as part of routine maintenance carried out by a service engineer. The system can simultaneously be used for access control. Drivers, operations

managers and service engineers can all be assigned different PIN codes.

Once a driver has logged in, there is the option of presenting a brief



The radio-controlled gas warning system from French specialists Centrexpert is available as an option for Linde electric forklift trucks used in explosion-protection zone 2 with a load capacity of between 1.4 and 3.5 tons. Source: Linde Material Handling, Aschaffenburg, Germany

acknowledgement process before the truck starts, reminding the driver this is a specialized truck operating in explosion protection zone 2. During the shift, the system creates a continuous log of gas concentrations, regardless of whether or not the concentrations in the air exceeded the given limit. If the limit is exceeded, the truck is brought to a controlled stop and, if required, the system can send a notification via radio to the operations manager. As soon as the gas concentration drops back below the acceptable limit, the driver is notified on-screen. The truck can then be approved by a supervisor and put back into operation. Alternatively, the truck can be set up to allow the operator to restart the truck independently.

For operations managers, the integrated reporting functionality significantly increases transparency, as they are able to view all events, such as alarms, or the progression of the gas concentration in the reports.

"Using this monitoring system, an operations manager can check the existing operational safety concept frequently," says Herbert Kunkel, chief executive for Proplan, a subsidiary of Linde Material Handling. "The system will be of particular interest to operating companies, not least because of the connectivity options with other stationary or mobile monitoring, safety and reporting systems."

Used in this way, the system could prevent the truck from even entering an area in which the gas concentration already exceeds acceptable levels. In addition, trucks or fleets of trucks can be integrated into a cross-departmental safety concept for the entire plant, with daily documentation and monitoring of safety-related conditions.

► www.linde-mh.de
 ► www.centrexpert.com

PEOPLE

Michael D. (Mike) Varney has been appointed to lead research and early development at Roche's Genentech unit effective 1 January 2015. He has also become a member of Roche's executive committee. Varney is replacing **Richard Scheller** who has retired. Varney received his B.S. in Chemistry from the University of California, Los Angeles and PhD in Natural Product Synthesis from the California Institute of Technology. He completed postdoctoral research in Bioorganic Chemistry at Columbia University. In 1987, he joined Agouron Pharmaceuticals and served as its vice president of Research since 1997. After the acquisition of Agouron by Pfizer he became vice president of drug discovery before joining Genentech in 2005, which was then acquired by Roche in 2009. At Genentech, Varney served as vice president of small molecule drug discovery until recently.

Frank Wegener has joined International Chemical Investors Group (ICIG) as president of WeylChem on January 1, 2015. In addition, he will assume the responsibilities for the detergents business as head of Detergent Chemicals, succeeding **Manfred Trautmann** who will retire in 2015. Wegener holds a PhD in Chemistry and brings more than 20 years of experience in the chemical industry. Prior to joining ICIG, Wegener held various positions at Kemira between 1998 and 2014. He was head of the detergent chemicals division, president of ChemSolutions, president of the segment Municipal & Industrial, head of the Region EMEA and managing director for Germany, Austria and the Netherlands. Since 2012, he has been a member of Kemira's management board.

Oliver Stratmann will head the new group function Treasury & Investor Relations (TIR) at Lanxess that will be created through the merger of its group functions Treasury (TR) and Investor Relations (IR) with effect from April 1, 2015. Lanxess said **Christoph Koch**, head of Treasury since 2008, will leave the company „at his own request,“ effective March 31, 2015. With the appointment of Stratmann, who has led the IR team since 2008, CEO Matthias Zachert said Lanxess will be able to „efficiently merge our financial markets activities and communication under the leadership of a very experienced capital market specialist.“

Dr. Filipe Gaspar has been appointed as vice president of R&D at Hovione. Dr. Gaspar will lead teams based in Lisbon and New Jersey that serve clients' drug development projects. Reporting to Hovione's CEO, Guy Villax, he will also be defining long-term product development strategies and collaborations. Gaspar is a Chemical Engineer from Instituto Superior Técnico (Lisbon) and has a PhD in Chemical Engineering from the University of Birmingham. He joined Hovione in 2003 as a manufacturing engineer and later became responsible for the technical leadership of spray drying technology.

Jeff Vernimb has been appointed as General Manager for the US operations of Moberg Pharma and a member of Moberg's Management Team, effective from December 15, 2014. Vernimb brings more than 25 years of experience in consumer health products marketing and sales across multi-national and smaller entrepreneurial businesses. Prior to his position with Moberg, Vernimb was vice president of Sales and a member of the senior management team with Insight Pharmaceuticals. In addition to his position at Insight, he has held senior level positions at Dynova Laboratories, Cardinal Health, Novartis Consumer and Pfizer/Warner Lambert.

Matthew Ottaway has been appointed as EMEA Industry Director, Personal Care at Univar EMEA, an operating segment of chemical distributor Univar. In this role, he will be responsible for driving the development and execution of Univar's Personal Care industry strategy in Europe, the Middle East and Africa. In addition to previously serving as supplier director, Personal Care for Univar EMEA, he also held a number of leadership roles in sales, marketing, and product management at Avery Dennison, Eurofins, International Specialty Products, and Bayer HealthCare. Before joining Univar, he served as Commercial General Manager for Blagden Speciality Chemicals, a UK-based specialty chemical distributor. Ottaway earned a bachelor's degree in applied chemistry and a PhD in organic chemistry from Cardiff University.

Levent Yüksel (57) is the new head of site management at the BASF site in Düsseldorf-Holthausen, Germany. The postgraduate engineer has been in charge of BASF's fourth-largest site in Europe since September 2014. Before that, he was holding positions in process development and in the fields of environmental protection, safety and quality as well as business and operations management – first at Henkel and then later at Cognis, which was acquired by BASF in 2010. Most recently, Yüksel was head of BASF's European business management for primary surfactants and fatty alcohols. This position has been filled by **Michael Zens** (50), a business administration graduate who has been working for BASF for 25 years.

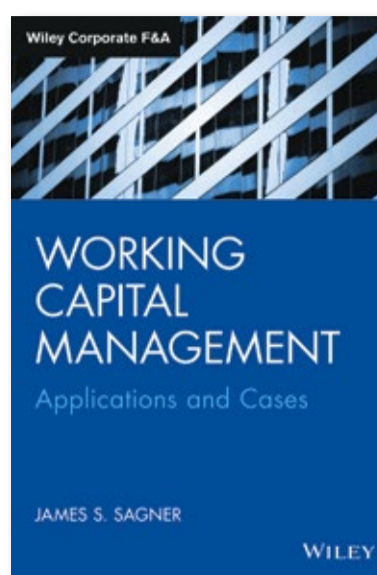
David Keung has been appointed to the newly created position of Asia Sales Manager at Emerald Kalama Chemical. He will be based out of the group's Hong Kong sales office. Keung has more than 12 years of experience in the specialty materials industry, serving in various technical, product development, business development and marketing roles. He joined Emerald after serving as commercial market manager at BASF East Asia Regional Headquarters. He also previously held roles at Chitwan International, 3M, Climate Coatings and ION Automotive. Keung holds an M.S. in polymer and coatings science and a Bachelor of Technology degree, both from the University of Auckland (New Zealand).

Barry Lassiter has been appointed as director of Environmental, Health, Safety and Security of MFG Chemical. With more than 42 years of experience in various leadership and management positions at DuPont and Invista, the new director has served since 2004 as Site Safety, Health and Security Manager for Invista's Chattanooga, Tennessee site.

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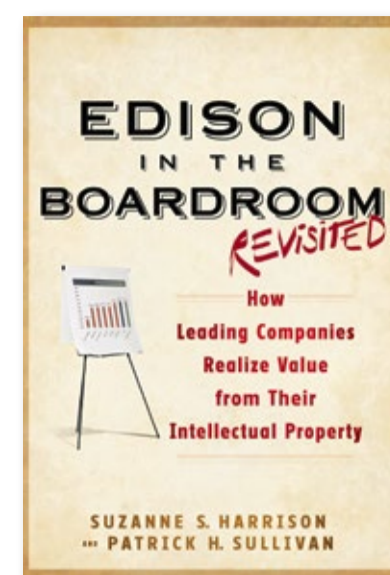


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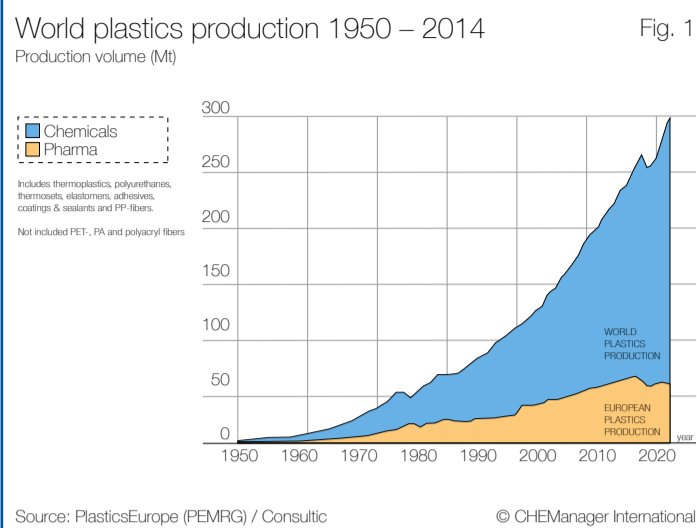
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Environment for European Plastics Industry Remains Competitive

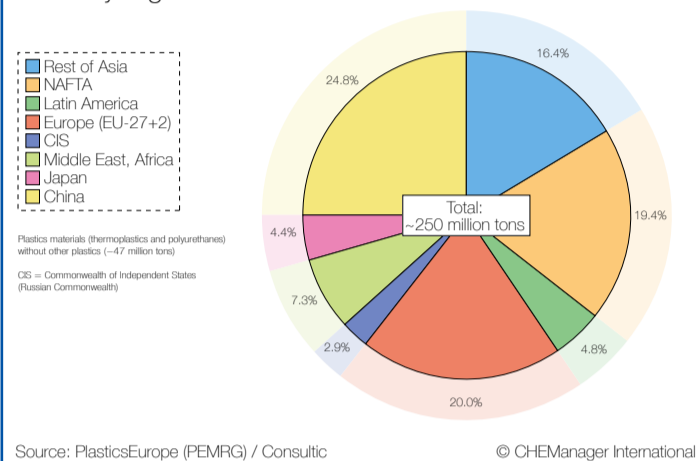


World plastics production

In the second half of the 20th century, plastics became one of the most universally-used and multi-purpose materials in global economy. Today, plastics are utilized in more and more applications and they have become essential to our modern economy. The plastics industry has benefited from 50 years of growth with a year on year expansion of 8.7% from 1950 to 2012. The effects of the economic crisis of 2008/2009 are clearly recognizable but in 2010 global production of plastics recovered and rose to 299 million tons in 2013 — a 3.9% increase compared to 2012. In Europe, the plastic production stabilized in 2013 after the 2009 turn-down. Actual levels are similar to those in 2002 (Fig. 1).

World plastics materials production 2014 by region

Fig. 2

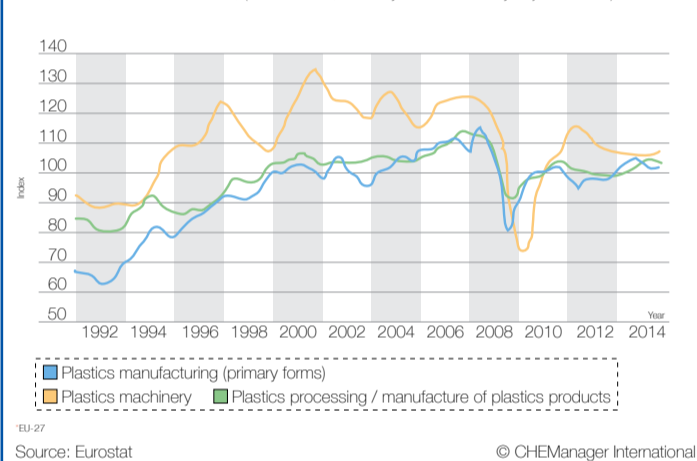


Plastics production by region

In terms of global plastics production, China surpassed Europe in 2010. In 2013, for the fourth year in a row, China remained the leading plastics producer in the world with 24.8% (Fig. 2). The gap with China plus the rest of Asian countries seems to be increasing year by year for the European plastics producers. In 2012, European production (EU-27+2) accounted for 20.0% of the world's total production. Apart from Europe, plastics production in almost each of the world's regions is sparked by competitive advantages such as lower energy or feedstock prices or by higher population and GDP growth.

European plastics industry production 1992 - 2014, Production index, (2010 = 100, trend cycle & seasonally adjusted data)

Fig. 3

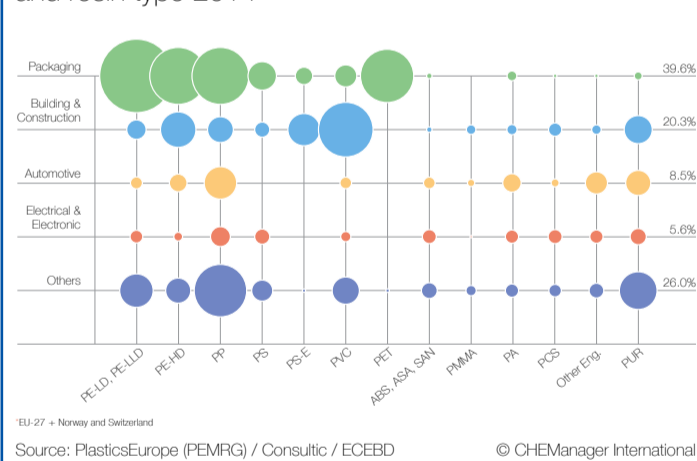


European plastics industry

The positive growth of the plastics industry in the EU-27 after the bounce back from the economic recession continued until the beginning of 2011 (Fig. 3). Since then, the plastics producing and converting sectors have showed a decreasing trend with plastics manufacturing and processing being able to recover slightly during 2012/2013, as opposed to the plastics machinery sector. The evolution of the different sectors of the plastics industry in Europe during 2013 and into 2014 indicates stabilization rather than growth, and the mixed development continued in 2014, thus making predictions for the development in 2015 difficult.

European* plastics demand by market and resin type 2014

Fig. 4



Plastics demand by market

There are various types of plastics featuring different properties. Packaging is by far the largest end-use market of plastic materials with a share of 39.6% followed by the Building & Construction, Automotive and Electrical & Electronic sectors (Fig. 4). Others end-use markets of plastic materials include consumer, household, appliances, furniture, agriculture, medical, etc. In 2012, compared to 2011, all markets showed a decrease, and in 2013 the development was mixed. However, due to their beneficial material properties that enable innovation in numerous applications, help reduce energy consumption, improve safety and inspire architects and designers, engineers and inventors, plastics will continue their success story in the future.

European Industrial Renaissance



Europe is at a disadvantage vis-à-vis other regions with regard to access to resources, according to Karl Falkenberg, Director General for Environment at the European Commission. At PolyTalk 2014, a two day conference organized by PlasticsEurope in Brussels on 4-5 November of last year, Falkenberg argued that: "we have to make our weakness our strength. The only way to maintain a competitive industry in Europe is if we can produce goods and services in a more energy and resource efficient manner and think in terms of the circular economy."

Under the heading "European Industrial Renaissance...Let's make it happen", the multi-stakeholder forum gathered more than 300 high-level representatives from the worlds of industry, politics, science, academia and media.

While there was general agreement on the objectives of the circular economy and a vision of a low carbon economy in the future, a number of speakers were concerned that they should not distract attention from the need for urgent measures to ensure the survival of European industry in the short-term. A recurring theme was that Europe cannot achieve its climate and environment goals without the effective support of a competitive manufacturing sector.

According to Ineos CEO Jim Ratcliffe, "We need to have a measured approach. We cannot sacrifice our industries while pursuing other goals. Europe has to develop competitive energy sources because the ramifications not doing so are huge. There are literally millions of jobs at stake."

Related topics under discussion at PolyTalk 2014 included: the prospects for shale gas exploitation in Europe; challenges and opportunities for plastics recycling; the potential benefits of regulatory convergence in a Transatlantic Trade and Investment Partnership (TTIP), and; helping universities equip graduates with the skills needed by business.

Many of the issues raised throughout the two days were captured in a "Manifesto for the Competitiveness of the European Plastics Industry" launched at the start of the conference as a joint initiative of PlasticsEurope and the European Plastics Convertors (EuPC).

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www.plasticseurope.org



Mimicking Nature – AkzoNobel has launched an additive for road salt which helps to protect against frost damage and makes driving safer. The researchers of the Dutch chemical company were able to tackle the repeated freeze-thaw cycles that affect asphalt mixtures. Water trapped inside asphalt expands by about 9% when it freezes, breaking up the road itself. Passing traffic then further accelerates the damage. The inspiration for the solution came from nature, where certain aquatic animals like frogs or insects survive extremely cold conditions by preventing the formation of hard ice in their bodies, a similar phenomenon occurs in soft ice cream. Inspired by this ability of animals to withstand cold, AkzoNobel's Ecosol asphalt protection additive is a fully biodegradable chemical for de-icing brine. It works by slowing the freezing process, resulting in soft, slushy ice, rather than hard, abrasive ice. Adding the product to normal winter road salt prevents the water trapped inside the asphalt pores from turning into hard ice. It encourages the formation of slushy ice, which is mechanically weaker than the asphalt and therefore substantially reduces the risk of damage.

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