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How did the chemical industry fare in the first half of 2011?

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'A Complete System'

Sir William Wakeham on the Importance of Chemical Engineering



A Wide Range – From Reliance Industries' Mukesh Ambani and SABIC's Mohammed al-Mady to stand-up comedian and perpetual watermelon smasher Gallagher, chemical engineers can be found in almost every walk of life. (And if you have never heard of Gallagher, you can replace him with Dolph Lundgren, who forewent a career in chemical engineering when he found success as Ivan Drago in the movie Rocky IV)

engineers have a unique opportunity to bring scientists and other engineers together. Most of the big problems that the world is facing are a bit like that; people have to be brought together from different areas.



Sir William Wakeham, President of the Institution of Chemical Engineers (ICHEM)

that must be taken care of. And the more companies become concerned about sustainability, the more important this kind of approach becomes. If that line of thinking then gets replicated at every level within a company, it obviously becomes very important. The result is that more and more companies and institutions are being led by chemical engineers. Xi Jinping, who is likely to be appointed president of China next year, has a degree in chemical engineering. Also, Jerzy Buzek, an EU MEP, is also a chemical engineer. There are many strong chemical engineers in many walks of life, and I think that again reflects this ability to comprehend a complete system.

NEWSFLOW

M&A-News:

Merck Millipore buys **Amnis Corporation**, a Seattle-based company that designs, manufactures and markets high speed cell imaging instrumentation. The company had €10 million in sales in 2010.

Ashland has closed its \$3.2 billion acquisition of **International Specialty Products (ISP)**. The company will be integrated into Ashland's Aqualon Functional Ingredients business; the combined unit now operates under the name Ashland Specialty Ingredients.

More on page 6

Under Construction:

Solvay plans to form a 50/50 JV with the **Sadara Chemical Company** for the construction and operation of a hydrogen peroxide plant in Jubail, Saudi Arabia. The plant is scheduled to be up and running in the second half of 2015.

Lonza is investing CHF 5.8 million in a formulation plant for its Meta metaldehyde in Visp, Switzerland. The plant is expected to come online in the second half of 2012.

More on page 8

These days, chemical engineering is as diverse as the people who study it, covering areas from biotechnology to mineral processing, and its significance for the chemical industry is now more important than ever. Sir William Wakeham is currently president of the Institution of Chemical Engineers (ICHEM), a global professional membership organization for people who have an interest and relevant experience in chemical engineering. He spoke with Brandi Schuster on how the field has evolved, what ICHEM does to encourage students to study chemical engineering and the importance of having chemical engineers in all levels within chemical and pharmaceutical companies.

CHEManager Europe: Sir William, the term "chemical engineering" doesn't have quite the same meaning as 50 years ago. How the profession has evolved?

W. Wakeham: These days there is much more of a focus on the word "process engineering" rather than "chemical engineering." Often the processes involved are still chemical, but they now encompass many more things than we thought about 50 years ago. These days trained

chemical engineers work in many process applications that aren't necessarily within the traditional realm of the chemical industry. One example of that is within the pharmaceutical business, in formulation engineering. This consists of the construction of pills, which goes hand-in-hand with the drug formulations. That involves quite a lot of chemical engineering but wouldn't have been thought of as such 50 years ago. It's a similar situation within the water industry.

All in all, I think the term has been broadened quite a bit over the last several decades in order to include many more aspects and technologies. In fact, the term "chemical engineer" is probably being replaced by "process engineer."

Is the future of chemical engineering one with a very broad base?

W. Wakeham: Yes, and in my own experience, trained chemical or process engineers are the kinds of engineers who are most able to work with other disciplines, because they have already quite a breadth in their formation as engineers. That is not quite the same for, let's say, civil engineers whose chemistry training is quite limited. Process

What about diversity within the profession, particularly when it comes to women?

W. Wakeham: In the UK, total chemical engineering undergraduate numbers are the most positive for women's recruitment of any engineering discipline. In the UK, about 27% of chemical engineering students are women; this is certainly a step in the right direction.

What kind of activities does ICHEM have to encourage more people to study chemical engineering?

W. Wakeham: We have an enormous focus on bringing people into chemical engineering courses; this has, at least in the UK, pushed the numbers through the roof. We are particularly interested in attracting women, and one of the key elements of doing that is having women on the staff of chemical engineering departments who do the recruitment. Here in the UK, most departments have a substantial number of women on their faculty.

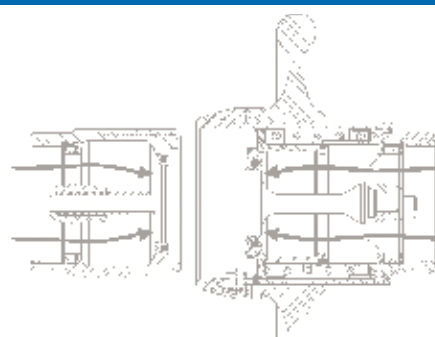
In other areas of the world, such as in the Middle East, there are some cultural issues that are additional difficulty. However, in Malaysia, where we are also active, there are a significant number of women studying chemical engineering now.

Apart from its European offices, ICHEM is also represented in Asia, Africa and Australasia. Do you work towards promoting chemical engineering for women in these parts of the world as well?

About Sir William Wakeham

Sir William was appointed as president of ICHEM in May. In 2009, he retired as vice chancellor at Southampton University following eight years in the post. He previously served at Imperial College London for over 30 years. Sir William was knighted in 2009 for services to chemical engineering and higher education.

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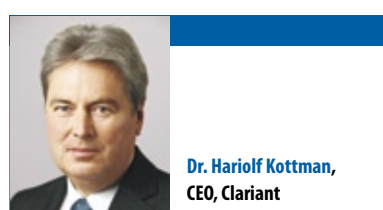
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Clariant Scales Back 2011 Sales and Margins Target

Clariant recently cut its full-year sales and margins target for 2011 due to the strong Swiss franc and a weakening of global demand.

The specialty chemicals maker said it expects sales in 2011 of 7-7.2 billion Swiss franc; its EBITDA margin is expected to fall between 12.8-13.2%. Clariant's previous EBITDA margin was forecast between 13.5-14.5%. The Swiss franc was up 16% against the € in July and August alone, pressuring the margins at many Swiss companies.



Dr. Hariolf Kottman,
CEO, Clariant

Chief Executive Hariolf Kottman confirmed Clariant's 2011 EBITDA margin before exceptional items of above 17% and said further savings and the continued integration of Süd-Chemie would help the group's performance in coming years.

Lanxess Raises Guidance After Record Q2

Lanxess has lifted its full-year guidance for 2011 after achieving record results in the second quarter. The specialty chemicals company now expects EBITDA pre exceptionals to grow about 20% year-on-year after previously forecasting a growth of 10-15%. EBITDA pre exceptionals in the second quarter rose 26% year-on-year to €339 million.

Sales increased by 23% year-on-year to €2.2 billion. Lanxess implemented price increases in all segments in order to fully pass on higher raw material costs. In addition, there was volume growth and positive portfolio effects from recent acquisitions, above all the EPDM rubber business DSM Elastomers. Sales grew despite negative currency effects at minus 7% mainly due to a weak US-dollar.



Dr. Axel Heitmann,
CEO, Lanxess

The EBITDA margin pre exceptionals rose to 15.1% in the second quarter from 14.7% a year earlier and the net profit increased 38% year-on-year to €181 million.

Net debt at the end of the second quarter rose 49% from the end of 2010 to about €1.4 billion mainly due to the acquisitions of the EPDM rubber business and Syngenta's material protection business. Operating cash-flow more than tripled to €212 million reflecting the strength of the company's operational business.

Merck Millipore Sees China As Strongest Growth Market

Merck KGaA said its laboratory specialists unit Millipore sees China as one of the strongest growth markets and expects to expand its drug-development technology and services business in the region.

Merck KGaA bought Massachusetts-based life science company for an aggregate purchase price including debt and cash of about \$7 billion in July last year. Merck Millipore has experienced a slowdown in sales of its lab equipment in the U.S. due to the economic downturn.

Bernd Reck, head of the chemicals business in the Dax Group stated, "Asia and especially China will in the coming years, becoming one of the strongest growth markets for Merck Millipore." Merck Millipore opened an office in Shanghai in May this year.

The company said its focus in Asia will clearly be on China and expects a double-digit growth from Asia in the coming years.

In the first six months, Merck Millipore revenues are expected to increase to €1.2 billion. For the full year, Merck aims the division's revenue to double to around €2.4 billion. The company said it is progressing well with the integration and continues to expect synergies of €75 million from the acquisition.

In July end, Merck reported a loss for the second quarter, compared to a profit last year, reflecting one-time charges. Meanwhile revenues increased 16%, boosted by the acquisition of the Millipore. The company also cut its full-year operating result forecast, citing one-time adjustments.

DSM, Sinochem Group Establish Anti-Infectives JV

DSM's Anti-Infectives business group and Sinochem have established a 50/50 global joint venture. All applicable regulatory approvals and customary clearances from competition authorities have been received. As part of the agreement to form the joint venture, Sinochem has taken a 50% equity interest in the business group for a total cash consideration of €210 million on a cash and debt-free basis with Jan. 1, 2011 as effective date. Sinochem and DSM share on a 50/50 basis the cash in- and outflow of DSM Anti-

Infectives as from that date. On balance DSM will report a book profit of approximately €45 million after tax as a result of this transaction in Q3 2011 as an exceptional item.

The joint venture will be headquartered in Hong Kong. Current DSM Anti-Infectives employees, in total around 2,000 people globally, are part of the new group, to be named DSM Sinochem Pharmaceuticals Limited. The joint venture includes all of the current DSM Anti-Infectives activities across the world.



SALES & PROFITS

Lanxess Posts €181 Million Q2 Net Income Lanxess posted second quarter net income of €181 million or €2.17 per share, up from €131 million or €1.57 per share last year. EBITDA pre exceptionals in the second quarter rose 26% year-over-year to €339 million. Sales grew to €2.24 billion from €1.83 billion in the prior-year quarter. The company reported volume growth and positive portfolio effects from recent acquisitions, above all the EPDM rubber business DSM Elastomers.

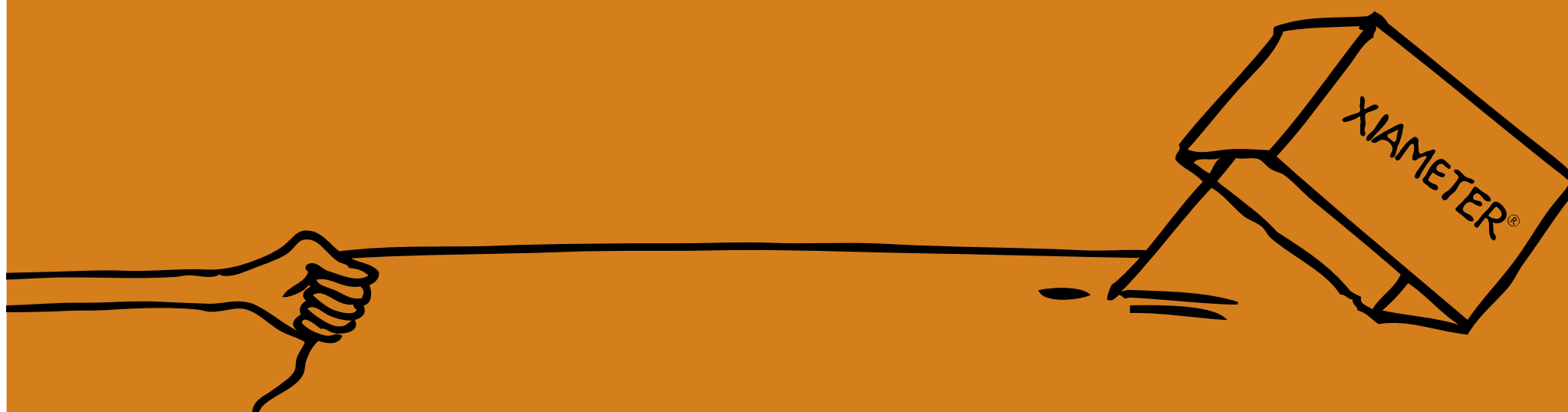
K+S Group Net Income Down K+S Group reported net income for the second quarter of €28.7 million, over €76.4 million last year. Earnings per share dropped to €0.15 from €0.40 a year ago. Earnings from continued operations rose to €126.2 million or €0.66 per share from €64.7 million or €0.34 per share in the prior year quarter. Adjusted earnings from continued operations were €126.8 million or €0.66 per share, compared to €85.9 million or €0.45 per share last year. Operating earnings before interest and taxes climbed 38% year-over-year to €191.9 million from €138.9 million a year ago.

Brenntag Q2 Profit up 74.4% Brenntag reported a sharp increase in second-quarter profit, helped by increased sales, with all regions contributing to the positive development. Second-quarter net profit was €67.6 million, up 74.7% from €38.7 million last year. Operating EBITDA increased by 9.6% to €167.7 million. Sales grew by 11.2% to €2.17 billion from €1.95 billion last year.

Symrise H1 Profit Decline Symrise reported a drop in its first-half net income to €77.4 million from €88.8 million last year. This corresponds to earnings per share of €0.65 for the recent period versus €0.75 a year earlier. However, in the first six months of the current financial year, Symrise posted an increase in group revenues of about 2% to €811.8 million from €797.5 million in the previous year. The sales increase was 2.6% at local currency. The company added that during the first half, Symrise's earnings picture was mainly affected by high raw material costs and currency effects.

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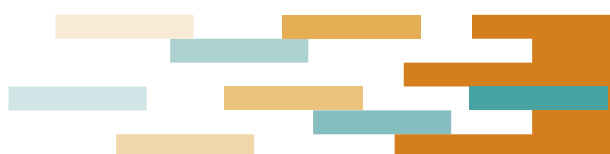


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Sustaining Development

C3X Survey Highlights Paths to Growth in the Chemical Industry

Turnaround – Since the Great Recession, the European chemical sector has experienced a major turnaround and significant volume growth. To sustain and accelerate this momentum, players set forth ambitious growth plans. So, how can these plans be implemented and which is the right path? How can sustainable growth be achieved in the light of continued global financial volatility and intensified competition from the Middle East or China? The most recent edition of the Chemical Customer Connectivity Index (C3X), published by A.T. Kearney, CHEManager Europe and Westfälische Wilhelms-Universität Münster (Institute of Business Administration at the Department of Chemistry and Pharmacy) provides answers.

Despite signs of a slowdown in economic growth, the European chemical industry is looking ahead with genuine optimism. This is supported by the latest Chemical Customer Connectivity Index (C3X), a top management study conducted by A.T.

Kearney in conjunction with CHEManager Europe and Westfälische Wilhelms-Universität Münster. More than 90% of the study's participants, both chemical manufacturers and their customers, expect demand for chemicals in Europe to continue to



Dr. Tobias Lewe,
Partner in the Chemicals
and Oil Practice,
A.T. Kearney

grow over the coming 12 months. However, half of them indicate that the pace of growth will slow down compared to what they have seen over the last year.

"The continuing optimistic demand outlook shows that the current upward trend is expected to last. Nevertheless, prospects are moderate, which suggests that chemical players are increasingly anxious about the economic upswing slowing down. The period of rapid growth that followed the Great Recession is over," said Dr. Tobias Lewe, partner in the Chemicals and Oil Practice at A.T. Kearney.

Over the last 12 months, the prices of chemical raw materials have followed the significant market upswing. Some strategic raw materials, such as titanium dioxide, butadiene or some rare earth minerals, have been running short in supply. In this context, more than half of all chemical manufacturers reported raw material price increases of 10% and more compared to a year ago. Almost every fifth participant in the study saw price increases upward of 30%.

A trend reversal is not expected by the study's participants: More than half of the chemical manufacturers expect raw material prices to continue to rise by up to 10% over the next 12 months; one third expects increases of up to 20% and more.

Mastering The Customer Interface

As in previous C3X study panels, manufacturers appear to fail to address customer needs to the extent expected of them: While 40% of manufacturers believe they have an expert knowledge of their customers' requirements, only 17% of the customers attest the same to their suppliers.

And even worse, while 70% of the manufacturers report that their customers' customers define the requirements of their products, only half of them regularly meet with customers of their direct customers. Inevitably, they are running the risk of failing to develop a comprehensive and more value-chain-oriented view.

In order to improve the interface with their direct customers, chemical manufacturers have focused their efforts on offering value-added services, improving pricing excellence, accelerating the innovation process and providing tailored services.

This corresponds only in part to what the customers would like to



Robert Renard,
Senior Consultant in
the Chemicals and
Oil Practice, A.T. Kearney

see addressed. What matters most to them is pricing excellence and accelerating the innovation process, followed by process excellence; new markets and customers; and tailored service offerings.

A major gap can be seen in value-added services: Many manufacturers engage in activities in this field, while they are perceived as value-added by only half of direct customers.

"The result reveals that chemical manufacturers have to focus their

alternative feedstock to grow in importance, i.e. feedstock such as unconventional gas or compounds from bio refining.

Compared to 2010, innovation is seen more as a need to maintain market leadership and extend product/application lifecycles than an activity to trigger growth. That is what chemical manufacturers report. New product features and being a leader in innovation are what most manufacturers (76% for each) consider to be important.

To help their customers become more sustainable, chemical manufacturers provide them primarily with technical services to help them improve their operational sustainability (63%) and focus on securing sustainability in their own supply chain (62%). Another key activity

Chinese companies, for instance, are playing an increasingly important role in the chemical industry – in terms of taking a growing share of global chemicals supplies and also as being more active in M&A.

On the manufacturers' side, quite a few say that a Chinese company is among the top three competitors in their industry. But there seem to be areas without Chinese competition as well: Half of the customers do not (yet) consider Chinese companies as real competitors, and neither do a quarter of the manufacturers.

If Chinese companies are present, it is predominately via a third party that they supply their products to Europe (66%). Those who operate with a sales force of their own are clearly in the minority (13%).

One point worth noting is that the survey suggests that Chinese companies behaved differently from other industry players during the crisis: When demand dropped, they defended their volume at the cost of lower prices. Defending prices and accepting lower volumes does not seem to have been an option for Chinese companies.

"While many companies still feel a sense of relief that the Great Recession is over, the latest developments suggest that we will all need to prepare for somewhat turbulent times ahead," Lewe said. "Manufacturers are increasingly being challenged by Middle Eastern and Far Eastern players and securing and maintaining competitive access to raw materials is becoming increasingly challenging. And on top of all this, the economic climate is taking a turn for the worse. To make sure European chemical companies can successfully differentiate themselves from their competitors, it is all the more important that they concentrate their energy on the interface with their customers and try to satisfy their customers' expectations to the highest degree. This is not only about addressing the right issues today, but also about working on what will help customers in the future – and ultimately help them grow."

resources and activities better, in a way that is truly valued by their customers – for example by improving support in new markets and for new customer segments," Lewe explained.

is the provision of alternative raw materials (47%).

"Gaining access to alternative raw material sources, continued volatility, an increase in raw material prices as well as European legislation to reduce carbon dioxide emissions are driving chemical manufacturers' interest in this area," Renard said.

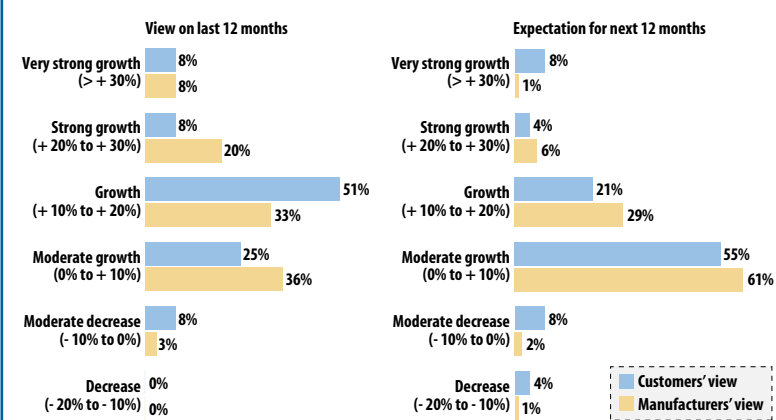
Strikingly though, chemical customers ranked their suppliers' support lower than a year ago in nearly all categories. "Given the increasing significance of sustainable industrial production, it appears that chemical manufacturers are missing out on growth opportunities in this field and have not yet generated an appetite for more comprehensive services in the area of sustainability," Renard said.

M&A: Consolidation Underway

Most chemicals players have launched initiatives to further optimize their market presence in terms of regional coverage, customer penetration or service and product portfolio. Only one out of five manufacturers sees growth happening through mergers and acquisitions.

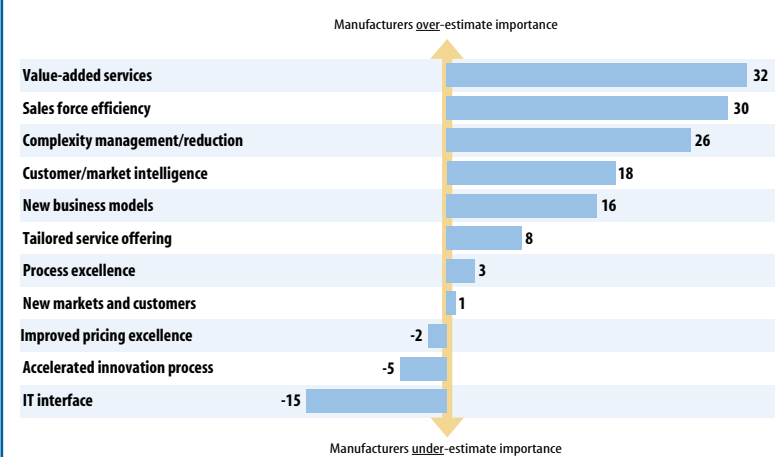
"This has come as a surprise to us, as we have seen M&A in the chemical sector picking up over the past 12 months," Renard said. EBITDA multiples paid for strategic acquisitions have been at an all-time high – a clear indication of the strategic attempt by some players, especially in Europe, to consolidate their market segments.

Chemical demand prospects for the next 12 months compared to actual development over the last 12 months Fig. 1



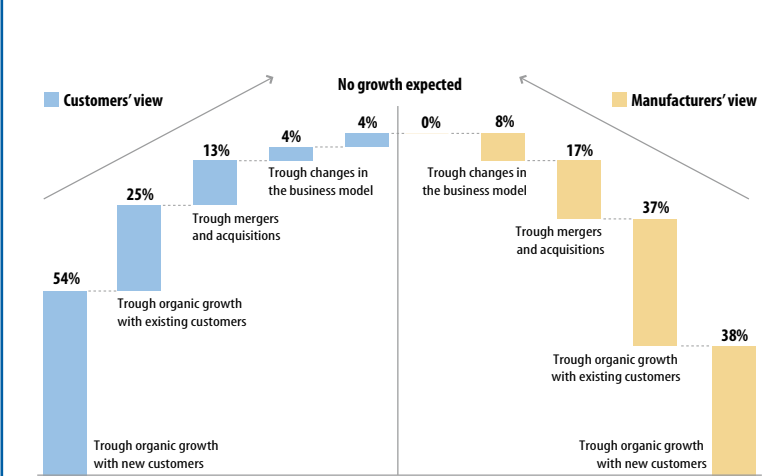
Source: Chemical Customer Connectivity (C3X) survey 2011, A.T. Kearney analysis © CHEManager Europe

Major areas addressed internally to improve supplier-customer interaction: difference between customers' view and manufacturers' view (% points) Fig. 2



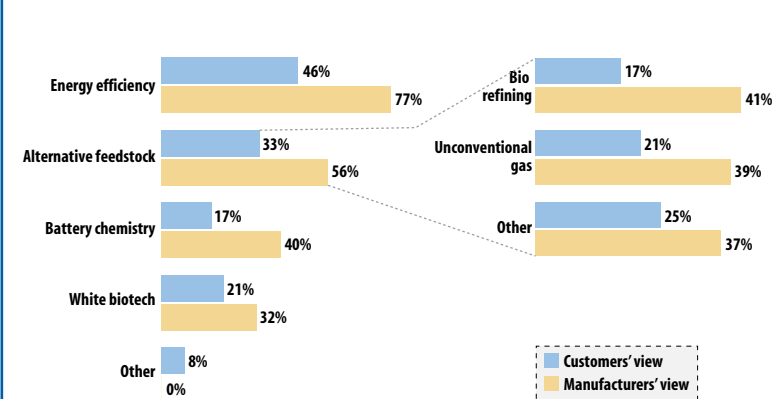
Source: Chemical Customer Connectivity (C3X) survey 2011, A.T. Kearney analysis © CHEManager Europe

How companies primarily expect growth to happen Fig. 3



Source: Chemical Customer Connectivity (C3X) survey 2011, A.T. Kearney analysis © CHEManager Europe

Role of emerging technologies (percentage of respondents who consider technology as important or very important) Fig. 4



Source: Chemical Customer Connectivity (C3X) survey 2011, A.T. Kearney analysis © CHEManager Europe

About C3X

C3X's objective is to analyze the chemical industry from the vantage points of chemical companies and their customers. The survey comprises the views of senior executives of leading European chemical companies and decision-makers in customer industries working at the interface to their suppliers. Participants in this fifth C3X survey, which was conducted in June and July 2011, included executives from more than 15 European countries, representing chemical firms and client companies, which translates into a total of more than 130 executives. The customer industries cover 14 different sectors, ranging from the automotive and food industries to the cosmetics sector.





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Merck Millipore Acquiring Amnis Merck Millipore has agreed to acquire Seattle-based Amnis Corporation. Amnis designs, manufactures and markets high speed cell imaging instrumentation. The technology is used in flow cytometry applications in academic, biotech and pharmaceutical cell analysis and research. Amnis has 40 employees and generated sales of \$14 million (€10 million) in 2010. The transaction is subject to regulatory approvals and closing is expected to take place in the fourth quarter of 2011. Terms of the transaction were not disclosed.

DSM to Divest Amino Resins Business to Ineos DSM and Ineos Melamines, a subsidiary of Switzerland-based Ineos Industries, have reached an agreement for DSM to sell its amino resins business to Ineos. The effective date of the transaction was Sept. 1. Financial details will not be disclosed. In a press release, DSM said the divestment is a logical step after it closed its amino resins production facility in the Netherlands in 2009. Ever since a supply agreement with Ineos Melamines for manufacturing melamine and benzoguanamine amino resins has been in place. Ineos will now market these amino resins directly. The divestment and transfer of marketing activities will have minimal to no impact on DSM's customers as the products will continue to be made according to the same process with the same specifications and in the same production facilities.

Univar Acquires Brazilian Distributor Arinos Univar has acquired Brazilian distributor Arinos Química for an undisclosed amount. Arinos Química Arinos is a leading chemical distributor in Brazil, providing both specialty and commodity chemicals as well as high-value services. The company delivers over 1,600 products to more than 6,500 customers in diverse end markets. Arinos has also developed over 20 branded products through its formulation business.

Ashland Closes ISP Acquisition for \$3.2 Billion Ashland has completed its acquisition of International Specialty Products or ISP, a privately owned specialty chemical manufacturer, for about \$3.2 billion in cash. ISP will be integrated into the Ashland Aqualon Functional Ingredients commercial unit. Effective immediately, the combined unit will be called Ashland Specialty Ingredients. Going forward, Ashland Specialty Ingredients is expected to contribute roughly half of Ashland's EBITDA. In addition, approximately half of Ashland's overall revenues will now be derived outside of North America, the company said.

Eastman Completes Sterling Acquisition Eastman Chemical said it has completed the acquisition of Sterling Chemicals for \$100 million in cash. Excluding costs and charges related to the acquisition, the acquired business is expected to be slightly accretive to 2011 earnings per share and accretive to 2012 earnings per share above the company's cost of capital, Eastman Chemical said.

The acquisition includes Sterling's plasticizer and acetic acid manufacturing assets in Texas City, Texas. Eastman plans to modify and restart the currently idled plasticizer manufacturing facility to produce non-phthalate plasticizers, including Eastman 168 non-phthalate plasticizers.

Braskem to Buy Dow's Polypropylene Business Braskem has agreed to buy Dow Chemical's global polypropylene business for \$323 million. The business has total annual polypropylene production capacity of 1.1 million tons with four industrial plants in the U.S. and Germany. The two plants located in the U.S., at Freeport and Seadrift, Texas, add up to 1.4 million tons, increasing Braskem's annual PP capacity by 50% in the region. The two plants located in Germany, at the petrochemical complexes of Wesseling and Schkopau, have annual capacity of 544,000 tons of PP. The transaction is expected to close by the third quarter 2011 pending regulatory approvals.

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Drivers Of Growth

Deloitte's Global Chemical Midyear Outlook

Shaping The Industry – The global chemicals sector was once again on solid ground as the first half of 2011 wrapped up. Revenue has been stronger due to higher prices, a result of chemical companies passing on the higher cost of raw materials, as well as increased growth rates in developing markets. Volume growth, particularly in the developed markets including the U.S. and Western Europe, has been more subdued. Overall, it is anticipated that the sector will continue to gain momentum with a compound annual growth rate (CAGR) of 7.9% over the near-term. Deloitte Touche Tohmatsu Limited (DTTL)'s Global Manufacturing Industry group convened an international panel of sector leaders from Deloitte member firms around the world to delve into the most pressing issues facing the chemical industry. This outlook captures perspectives from the panel discussions and focuses on a midyear view of the chemicals sector and key trends shaping the industry.

Regionally, the story is a familiar one. Led by China, demand for chemical products in the Asia-Pacific region is expected to grow at a CAGR of 12.1% over the near term. As a result of the market momentum over the past few years, China is expected to overtake the U.S. as the world's largest chemical market by the end of the year. This new market position for China is driven by increased demand from both domestic and international end markets, and the shift to produce more value-added products for higher profits.

While demand in the U.S. and Europe is expected to be modest in 2011, higher prices will likely translate into stronger revenues for chemical companies. The U.S. chemical market is projected to grow a CAGR of 3.5% for the near term, while its European counterpart will see a CAGR of 3.3% over the same period.

What End Markets Will Drive Growth in 2011?

In general, the more manufacturing-intensive end markets are expected to rebound from flat to moderate growth, however, not to pre-recessionary levels. One of the most significant end markets for the global chemicals sector is the automotive industry. Sales for the global automotive industry are expected to reach over 60 million units in 2011, a 5% increase from 2010 levels. These levels are a direct impact from a growing global economy.

In China, automotive sales in 2011 are expected to increase 10% from the previous year. In North America, there are signs of optimism for the automotive industry with 15 million vehicles expected to sell in 2011. In Europe, a 5% increase in sales is projected for 2011. The European automotive industry represents more than 20% of the chemicals sector's end customers, but GDP may have to improve further before the industry returns to pre-2007 levels. The sector is expected to benefit from the rising use of electric vehicles (EVs) and the development of more advanced batteries to power them. Battery innovation will continue to be revenue opportunity for the chemicals sector. The continuation of the strong growth of the automotive sector in key markets including China should also drive chemical industry growth in 2012 and beyond.

There are mixed signs ahead for construction and related industries. While the overall outlook looks positive, the growth in these industries



may be deferred into 2012 and beyond. Continued unemployment challenges in the U.S. have slowed the recovery of the housing market and the commercial market seems equally soft. In the U.S., completed housing units in March 2011 were approximately 500,000, which is about 20% less than rates in March 2010. In Europe, the euro has not weakened as speculated, enabling the housing and construction industry to remain strong in most markets. China's housing sector, on the other hand, is faced with high-vacancy rates, which may hamper growth over the next year. Over the longer term, the construction industry is expected to have a strong recovery as the global economic situation improves.

How are Chemical Companies Responding to Global Megatrends?

Not all companies are well positioned to respond in the same way to global megatrends that will likely create disruption and at the same time, opportunity for chemical companies over the next decade. Some future megatrends, including sustainable housing and agriculture, are among the areas that are prominently in play by chemical companies this year in an effort to gain a competitive advantage. Most companies, however, are looking to take advantage of megatrends in the near future as they become more important to the industry. Some companies are directing their entire portfolios toward the megatrends for future opportunities.

Chemical companies that are proactively looking to capitalize on megatrends now are focusing their long-term business strategies on solutions critical to society. They are increasing their efforts in innovation and their focus on efficiency in commercialization, plugging into global innovation networks, and emphasizing key technology areas in energy, health care and climate change.

While forward-thinking companies are meeting the challenges presented by the megatrends, others are slower to react. This is especially evident in the search for alternative energy solutions and the reduction of greenhouse gas emissions. These trends are currently being leveraged by some companies, but many are not taking full advantage of the available opportunities, which may create more of a competitive disadvantage for them leading into 2012. Another reason why some companies have been slower to embrace megatrends is that some, including alternative energy solutions, require government subsidies to make them economical. The concern is that these products will not gain full financial potential without perpetual government support.

How is the Industry Addressing Supply-chain Challenges?

One of the existing supply chain challenges in 2011 for chemical companies in the developed economies is the rationalization of facilities that are not strategically positioned to meet future global demand. This

mismatch is an issue that needs to be addressed to balance supply and demand. Many companies are making investments through ventures and other business opportunities in China and India, and that trend is likely to continue through the end of the year and beyond. Increasingly, it is important to site production near raw material sources to maximize the overall value. The volatility of raw material prices continues to challenge chemical companies today due to the large share of overall costs these materials represent. Companies use various tactics to mitigate the risk including long-term purchasing contracts and better procurement strategies such as more real-time procurement and real-time payment. Additionally, companies are seeking to link raw material procurement and product pricing strategies to mitigate the effects of cost volatility on profit margins.

Where is Industry Consolidation Going in 2011?

In 2010, the pace of M&A activity in the chemical industry picked up. The year also saw a return of private equity to the M&A arena. The global chemical industry is poised in the second half of 2011 to resume a more natural cycle of value-based buying and selling.

The total chemical industry M&A deal volume of approximately \$73.7 billion in 2010 came just short of the 2008 level of \$81.3 billion. Private-equity players in the chemical industry made an enthusiastic re-entry into the M&A arena with \$4.9 billion in deals – a level not seen since 2006. It is estimated for 2011 that the market for all global deals will crest at over 3,000 transactions for the first time since 2008, when there were 3,574 deals.

It is expected an increase in both deal volumes and deal value in 2011 will resume as economic activity increases. Total deal value in the first quarter of 2011 approached pre-crisis levels. Similar figures are anticipated for the end of 2011. Many companies have spent time focusing on efficiencies and disposing of non-core business units that have substantial stores of cash on their balance sheets. Combined with the limited capacity for organic growth, this will drive M&A activity, particularly in the developing countries in the near term. While chemicals and plastics have consistently been among the most global of industries, the current global dynamic (the strong recovery of demand in the developing markets and the lagging demand recovery in the developed countries) could have the effect of turbo charging the rate of M&A deals concluding 2011.

With organic growth limited, especially in the developed markets, companies now appear to consider structural change a more common and necessary lever to improving their fortunes. As growth in developed countries tapers to a new and lower norm, and as significant capacity is built in regions close to areas of expected growth and/or economical feedstocks, legacy assets

will be viewed in a brighter, harsher light. Asset sales and rationalizations are expected to continue for the next several years, until global and regional supply and demand are more balanced.

Conclusion

As the second half of 2011 begins, the global chemicals sector is expected to see a continuation in revenue growth, yet with more modest levels of volume growth. Leading into 2012, China is anticipated to dominate the global chemical scene with the highest revenue increases on a percent basis, with markets such as India, Brazil, and Korea not far behind. Although China's chemical industry still has some challenges to overcome, including low levels of industry concentration, limited capacity for innovation, and energy inefficiency, the Chinese government's 12th Five-Year Plan will play a vital role in advancing the country's chemical industry.

On a global basis M&A activity is a bright spot for the global chemicals sector with 2011 deal volumes and values likely to exceed pre-recession figures. Overall, the global chemical sector is well positioned for the remainder of 2011 to not only meet revenue forecasts, but also to create opportunities to meet future projections for growth in 2012 and beyond.

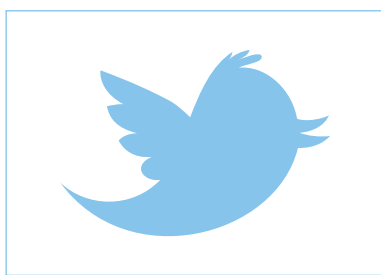
The global retail sales of the consumer electronics are projected to grow by 10% in 2011 to reach \$964 billion. It continues to be a solid area for growth and was somewhat shielded from the precipitous drop-offs that some other sectors experienced.

With respect to health care products, the pharmaceutical sector projects an average 8% annual boost in sales over the next few years. Nutrition and food are key growth markets for several reasons, including burgeoning demand for convenience foods and functional foods (nutraceuticals), and increased consumer interest in over-the-counter products.

The market growth in India is also gaining ground as the middle class expands and demand for chemical products grows. New oil and gas discoveries in Brazil have spurred growth in the local chemical industry, and investments in the sector are expected to reach \$26 billion over the next few years. These regional opportunities will likely impact the overall dynamics of the global chemicals sector, creating new players and products that will add to the growth in the closing of 2011.

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Chemicals

Bob Margevich on AkzoNobel's Boxing Oleochemicals buy.

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Reorganization In Europe

NNE Pharmaplan Extends International Business with a New Structure



Leading The Way – With sales of around €200 million in 2010, NNE Pharmaplan is one of the world's leading engineering and consulting companies for the pharmaceutical and biotechnology industries. Last year the group, whose headquarters are in Copenhagen, changed its organizational structure in order to improve its service to international customers and more consistently exploit opportunities for growth. The subsidiaries in Germany, Switzerland and France are part of the Central Europe region. The German headquarters is in Bad Homburg, near Frankfurt. Dr. Michael Reubold and Corinna Matz-Grund spoke to Stefan Berg, General Manager of the Central Europe region, about the current trends in the pharmaceutical market and the strategies with which the company intends to use these trends to achieve its growth targets.

"For pharmaceutical companies, outsourcing still provides enormous potential for rationalization."

Stefan Berg, General Manager Central Europe, NNE Pharmaplan



CHEManager Europe: Mr. Berg, NNE Pharmaplan has reorganized itself in Europe. What were the reasons for this organizational change?

S. Berg: The organization we previously had was a structure that focused on the headquarters in Copenhagen and – for historical reasons – was orientated to serving our owner and largest customer Novo Nordisk with an emphasis on Scandinavia. We wanted to change our business processes to cater for the present situation, as we now have a much broader and more international base than in the past, and employ 1,600 people in 25 offices all over the world. In addition, the new structure is intended to promote further growth.

Can you be more specific?

S. Berg: The group now has a regional organizational structure consisting of five regions. With this, the five sub-organizations are better able to adapt to the particular regional requirements of their customers. We belong to the Central Europe region. The four other regions are Nordic, North America, China as an independent region and emerging markets with India and Russia.

The Nordic region includes Scandinavia and is a good example to explain the opportunities for growth. The Scandinavian market is relatively small, and we have a market share of 80% there. On the basis of this situation, no further growth is possible. Things are completely different in the Central Europe region. We only have a small market share in this large market, although we are one of the world's leading providers of engineering services for the pharmaceutical, biotechnology and vaccine industries. Here we have two effects which enable further growth: On the one hand we can expand our special market share and on the other hand we can also participate in the general growth of the market.

Have you set any targets for this growth?

S. Berg: We have a very ambitious target: We want to double our market share in the Central Europe region by 2014.

What is the importance of Central Europe within the group?

S. Berg: At present, Central Europe includes our offices in Germany, Switzerland and France with about 215 employees. These are countries with major pharmaceutical industries – our core target group. However, our market is much larger than just these three countries. We are responsible for all European countries except for those in Scandinavia, the former Soviet Union, plus the French-speaking states of North Africa.

Can you serve this large area from three subsidiaries?

S. Berg: No. At present we are considering how we wish to develop this market in the future, and there will be additional subsidiaries in other pharmaceutical centers. For example, we are now specifically considering setting up a branch in Belgium. After Belgium, a further location in France is conceivable.

The dominant topic in the pharmaceutical industry is the expiry of patents for major medications, which in many cases are not compensated for by adequately filled development pipelines for new products. There are also expensive and time-consuming registration procedures. Because of this, the pharmaceutical industry is increasingly relying on small biotechnology companies in order to make its research more successful and more efficient. What effect do these factors have on your business?

S. Berg: Usually, any kind of change brings us a great deal of work, not just new products, but also merg-

ers of pharmaceutical companies. Restructuring of locations or the relocation of production, which automatically follow mergers, generate orders for the engineering sector.

What proportion of your business is due to new construction projects resulting from the relocation of production on the one hand or the modernization of production on the other?

S. Berg: I would say that both are more or less equal. The relationship depends on which market you are in. From Germany we also work for customers in Russia, where there are enormous new construction projects. On the other hand, here in Central Europe we have many old locations where there are either projects for a change of use or for conversions.

What trends do you see in the pharmaceutical industry?

S. Berg: For one thing, due to health service reforms in many EU states, there is an enormous price pressure on the pharmaceutical industry. In pharmaceutical companies this results in measures to reduce costs and increase efficiency. Another trend is that some pharmaceutical

companies utilize their own unused systems for contract manufacturing organization for other companies which means that other companies no longer invest in production, but rather set up their production plant with a custom manufacturing organization (CMO). These trends are also drivers for growth. We also profit from the growth of CMOs, as ultimately it is irrelevant for our business whether the investment is made by a pharmaceutical company or by a CMO.

The price pressure means that further activities, which do not belong to the core business, are outsourced to more efficient, external partners. This outsourcing affects e.g. special services in the field of production plant such as engineering, revalidation, maintenance and repair. We offer to take on such outsourced activities for our customers. I believe that there is still a gigantic potential for rationalization by pharmaceutical companies.

Your customers are global players. How do the various regional organizations within NNE Pharmaplan cooperate in international projects?

S. Berg: It is often the case that pharmaceutical companies in Central

Europe start an investment project which is to be implemented in other regions such as China, Russia or other emerging markets. Typically, the advance planning, as well as the basic design is carried out in Europe. This is why it is necessary to have a strong organization in Central Europe, in which investment is triggered, as well as a subsidiary which is as strong as possible in the region in which the investment is to be made. The pharmaceutical company demands that we manage the transfer of the project from Europe to Asia or Russia competently, smoothly and reliably. For this, if the early planning stage is in Europe, foreign colleagues are involved from the start. In the later phases the proportion changes. This international cooperation is also the most difficult form of project implementation and therefore you need international presence.

Let us turn from the growth drivers to the technological drivers. What trends do you see here?

S. Berg: The technological drivers are new developments by customers. Many new medications or active ingredients are produced by biotechnology methods. Here, the trend

is towards small-volume, highly adaptable biotechnology factories. After production the product must be filled under sterile conditions. From a global point of view there is still too little capacity for this.

Among the various forms of application, in spite of the growth in the use of liquid forms, solid forms such as tablets or capsules still prevail, especially for highly active substances. A very important trend concerns application aids, i.e. medical devices, with which the medication is administered. The best known examples of this are insulin pens and inhalers. At present, many companies are investing in innovative application aids, with which patients will be able to more easily administer medications themselves.

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Oil And Gas

The Energy we Love to Hate

Hunger For Energy – Oil and gas account for more than half of all primary energy consumed globally. The sheer volume of oil and gas consumed means that these fuels will continue to feed a large share of the world's hunger for energy for the foreseeable future. Assuring a reliable and dependable supply depends on the technologies used in their extraction. As ever-more challenging fields are commercialized, demands on technology are increasing to assure the economic, efficient and safe extraction of the fuel. Håvard Devold and Sandy Taylor of ABB take a look at the history of oil and its future challenges.



Sandy Taylor
Business Unit Manager,
ABB



Håvard Devold
Upstream Market Vertical
Manager, ABB



A significant shift occurred during the 1970s when, in the wake of the oil crisis and with oil becoming scarcer, new fields were being opened in more and more challenging locations, with technology progressing to meet the changing demands. During this decade, ABB started to provide micro-processor-based control systems, a technology that gradually began to replace mechanical and pneumatic hardwired single-loop controls. The company also broadened its base technologically, adding further offerings for the sector. In 1973 oil and gas production was 76Mboe/d (million barrels of oil equivalent per day), about 20% of which was from offshore fields in relatively shallow waters.

ABB soon established the rapidly growing offshore industry as its main market in the oil and gas sector, with many reference projects in the North Sea as well as huge offshore fields being developed in the Arabian Gulf. It was the age of large offshore field centers with gravity bases and fixed structure platforms. Today offshore accounts for more than 40% of all oil and gas production, and new offshore capacity is coming from fields in water depths of more than 500 meters.

Setting the Stage for the Years to Come

Combustion of fossil fuels – coal, oil and gas – are generally accepted to be the direct cause of much of the measured and forecasted global warming. Fossil fuels accounts for 81.3% of all energy consumed. Oil and gas make up 51%, with the balance coming from coal. Despite these dire consequences, there is presently no practical source or carrier of energy that can replace oil and gas on a large scale in its

application in transportation or as an industrial feedstock. Battery-powered electrical cars represent a promising potential with improving technology and range, but can currently only replace a few percentage points. Even if a revolutionary new source were to be identified, development of practical vehicles and distribution infrastructure would take well over a decade. Presently at 142Mboe/d, combined oil and gas production is almost double what it was in 1973. Despite progress in energy efficiency and the introduction of renewable sources such as biofuel, it is likely to grow further, reaching 180Mboe/d by 2030. In a few years, non-OECD consumption will surpass that of the OECD, and is predicted to grow by 120% by 2030. It will by then be double that of the OECD. The latter will fall slowly by about 12% over the same period due to increasing energy efficiency and limited population growth.

A typical field's production increases steeply to a maximum (plateau) and then slowly drops off (tail end). The world average production of oilfields in this phase declines at about 6% annually, if no upgrades take place. This means that in 2030, the gap between new demand and remaining tail capacity will be 70% of total consumption. This capacity must come from fields upgraded or developed between now and then, or from new unconventional sources. The gap is only slightly smaller than today's total production, placing high demands on exploration and production technology.

Different from the easy oil of yesterday, a significant fraction of this oil and gas must come from fields characterized by such adjectives as arctic, deepwater, cold, heavy, high in water content, high sulfur content, to name but a few. In addition, improved oil recovery (IOR) technologies can be used on existing reservoirs to extract additional oil that would otherwise not be extracted. In most cases, IOR features flow assist (such as pumping), heating, processing, water treatment, software models and similar technologies. IOR works: Whereas a recovery rate of 20 to 30% was considered acceptable half a century ago, many fields are now targeting 50%, with best practice surpassing 70%. For many fields, this means that recoverable reserves have more than doubled over their lifetime, and still continue to rise as even more sophisticated enhanced oil recovery (EOR) technologies are developed as a combination of 3D and 4D seismic modeling, fracturing and stimulation

of the reservoir, advanced modeling and other technologies.

As the oil price continues to rise and gas prices recover in the longer term, the focus is again returning to unconventional resources. There is a boom in unconventional gas (shale gas, coal bed methane) and also oil/tar sands. These sources are not only more difficult to produce from but also require more energy, which in turn implies more corresponding emissions, both directly and indirectly such as from produced water. Therefore, future production must be done with an increased focus on such topics as emissions, discharges, accidental spills and leakages as well as industrial accidents. As a result, relative capital expenditure will triple over the next decades, and suppliers will be required to supply new technology at acceptable cost.

Downstream

The refining business is constantly affected by crude-oil market fluctuations, high cost of energy, environmental regulations, and consumer needs. These factors all contribute to very tight margins. During such times, the need for innovative "value-added" applications increases greatly, as refiners seek to squeeze as much product out of a barrel of crude oil as possible, whilst optimizing energy costs, meeting environmental regulations and supplying the market with products to the required specification (Euro III and IV gasoline, and ultra-low sulfur diesel). ABB's recent major successes have come as a result of the upgrade and enhancement of the oil movements, storage and blending solution (RBC/ABC, regulatory blend control, advanced blend control). In 2010 ABB successfully implemented and commissioned blending solutions which significantly improved refiners' margins.

And Beyond ...

ABB meets the future challenges of oil and gas in two ways: Firstly, the company continuously develops its own core solutions in electrification, control, safety systems and instrumentation. Secondly, it has over the years been a partner for strategic customers and demonstrated the capability to develop unique enabling technologies such as subsea electrification, power from shore and integrated operations. These solutions would not have been possible without risk sharing, financing and real proof of concept/field trials. In particular, projects on the

Norwegian continental shelf and the long term commitment of companies such as Conoco Phillips, Shell, BP and Statoil to joint research and development projects with ABB and others in what has been referred to as "Laboratory North Sea."

Also partnerships and research and development agreements with such companies as Sonatrach, Dow, and Petrobras continue to enrich ABB's technology. The next step is increased focus on such partnerships in the Middle East, especially in Saudi Arabia, Qatar and UAE that would focus on sustainable and efficient solutions with particular relevance to this region. These projects will include themes such as IOR, water and water management and unmanned remote inspection and intervention.

Despite discovery and production becoming more complex, there is still enough conventional and unconventional hydrocarbon in the ground to last mankind through the next century. Reducing the environmental footprint will be the greater challenge than getting enough product. In an energy-hungry world where per capita energy consumption is almost synonymous with wealth, there still seems to be little choice despite how much we love to hate our dependence on oil and gas.

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UNDER CONSTRUCTION

Air Liquide to Build MTP Plant in Ningdong Air Liquide has signed a contract with the Shenhua Ningxia Coal Industry Group (SNCG) in China, one of the world's largest coal industrial, to build a 500,000 tons/year methanol-to-propylene (MTP) plant. The contract comprises the basic engineering, license and supply of proprietary equipment as well as services for procurement and technical advisory services at the site. The unit to be built in Ningdong, in the Chinese province of Ningxia. The engineering phase for the contract is to be completed within about eight months. Financial details were not disclosed.

Solvay Joins Sadara to Build Hydrogen Peroxide Plant in Jubail Solvay said it will form a 50/50 joint venture with Sadara Chemical Company for the construction and operation of a hydrogen peroxide plant in Jubail, Saudi Arabia. Scheduled to be operational in the second half of 2015, this new plant is intended to supply hydrogen peroxide as a raw material for the manufacture of propylene oxide by Sadara at its world-scale, fully integrated chemicals complex. Propylene oxide is used to produce propylene glycol, polyurethanes and glycol ethers. Solvay said it will use its proprietary, high-yield hydrogen peroxide technology for the world-scale plant.

Lonza to Build Formulation Plant in Visp Lonza said it will be investing CHF5.8 million in a formulation plant for its Meta metaldehyde in Visp, Switzerland. The company said the plant will enable it to supply its own formulations, allowing Lonza to serve the market with metaldehyde as an active substance, as well as with ready-made slug pellets. The plant is expected to come online in the second half of 2012.

Air Products Awarded Hydrogen Supply Deal by Shell Oil Air Products said it has entered into a long-term agreement with Shell for the supply of a significant portion of the hydrogen requirements at Shell's Deer Park refinery in Texas. The hydrogen supply will commence in mid-2013. The Deer Park facility will be connected to Air Products' Gulf Coast hydrogen pipeline supply network that serves multiple refinery and petrochemical companies in the region. Air Products said it is also working toward enhancing its hydrogen pipeline supply capability in the Gulf Coast to make it the world's largest hydrogen pipeline network. The new Gulf Coast hydrogen pipeline network is expected to be operational in 2012.

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Increasing Reliability And Sustainability

Total Petrochemicals Revamps Boilers with Honeywell

Case Study – At Total Petrochemicals polyethylene production plant in Antwerp, the facility wanted to find a way to increase its reliability and stability at the plant. At issue were two boilers equipped with single loop individual controllers. Unfortunately one boiler was not able to control the steam header pressure automatically without tripping on load upsets. As part of a boiler revamp project, Total Petrochemicals turned to Honeywell to help design a state-of-the-art boiler/combustion control system according to its latest standards and philosophy.



Total Petrochemicals Antwerpen meets operational, financial and environmental goals with boiler re-vamp project and advanced control solutions from Honeywell.

Background

In addition to new transmitters, valves, wiring, and a variable speed drive on the air fan, Total replaced the existing control system with a Honeywell Experion Process Knowledge System (PKS) controller and also installed a Honeywell SIL 3 Safety Management system for burner management and boiler/burner emergency shutdown.

After loop testing and commissioning the boiler control strategies were tuned within two days. Stress tests were performed in order to verify the load rejection capabilities and stability of the automation system and fire tube boiler unit successfully. Due to the increased stability, Total is now able to use the fire tube boiler as its preferred pressure controlling unit. Other benefits achieved with Honeywell's automation solutions:

- Increased steam production reliability and stability which has a positive impact on the chemical production quality and quantity
- Completed project on time and within budget
- Tight air flow control using a Variable Speed Drive and reduced excess air levels from (5-6 to 1.5 -2 vol %)

Total Petrochemicals, one of the world's leading petrochemicals companies, does business in Europe, the U.S., the Middle East and Asia. The company has its head office in Brussels (Belgium) and employs nearly 6,500 people worldwide. Its main product is polymers, which are used to make a host of plastic products that are indispensable to daily life in today's world.

Total Petrochemicals brings together all of the Total Group's petrochemical activities and helps to valorize hydrocarbon derivatives — naphtha, butane and distillates — mainly produced by the group's refineries. Located in Antwerp, Total Petrochemicals operates a high density polyethylene production plant with an overall capacity of 510,000 tons per year and is capable of producing a large number of polyethylene grades using a variety of systems and producing bimodal resins. This plant receives the bulk of its feedstock from the nearby Fina Antwerp Olefins facility.

Challenge

At Total Petrochemicals' Antwerpen facility, two boilers produce medium

pressure steam for process heating. The fire tube boilers are equipped with single loop individual controllers and one boiler did not withstand the test of time — not once in the last decade was it able to control the steam header pressure automatically without tripping on load upsets — costing the company both time and money.

As part of a project organization, Total Petrochemicals Antwerpen implemented a boiler revamp project which would involve new instruments to help make the facility more stable and reliable; thereby increasing both the quality and quantity of the products it produces.

"We had to look at this project in various ways and find a way to positively impact our organization in three key areas: operationally, financially and environmentally," said Bert Jacobs, Automation Project Manager, Total Petrochemicals.

Solution

Total Petrochemicals worked with Honeywell and selected its Experion controller and Safety Management System to help drive the boiler revamp. The project involved installing new transmitters, valves wiring, installation of a variable speed drive

on the air fan and replacing the existing controllers with a Honeywell Experion controller and a Honeywell SIL 3 Safety Management system for burner management and boiler/burner emergency shutdown.

"We selected to work with Honeywell based on their utility control capabilities and experience in this field," said Jacobs. "Honeywell developed and designed a state-of-the-art boiler and combustion control that met our latest standards and operating philosophy.

"The results were beyond our expectations as step wise load disturbances (60 % of MCR) were imposed on the unit upwards and downwards, resulting in a relative small header pressure change of only 0.4 bar," continued Jacobs.

"In the past the unit would have tripped trying to deal with such upsets," Jacobs said. Due to the increased stability of Total Petrochemicals fire tube boiler, the company is now using it as its preferred pressure controlling unit. The installation of the variable speed drive and reduction of excess air improved the efficiency of the unit.

"Working with Honeywell we were able to complete the project on time and improve our chemical production while still saving costs," Jacobs said. Currently Honeywell has provided the same excellent services for our new boiler project. Although the unit is more complex (burning three different fuels simultaneously in new low NOx burners) the results are "astounding" and significantly reducing the carbon footprint of the facility, Jacobs concluded.

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Evonik Begins Construction on HCDS Production Facility

Evonik Industries said it has begun building a second hexachlorodisilane (HCDS) production facility in Rheinfelden, Germany. Production is scheduled to begin in the second half of 2012. Hexachlorodisilane, a raw material containing silicon, is used by the semiconductor industry to manufacture inexpensively and efficiently, among other things, memory chips with extremely high storage densities. Known as "flash memory," these chips can be found in devices such as smart phones, digital cameras, MP3 players, or USB sticks. Solid state drives con-

sisting of flash memory chips instead of the standard hard drives are also increasingly used in computers.

Evonik said that the production methods for silicon compounds are one of its most important technology platforms as a specialty chemicals producer. The company itself developed the hexachlorodisilane production process and successfully implemented it in Rheinfelden in September 2010 as the first plant put into operation. The second, new production facility is larger and has a capacity of several tens of thousands of kilograms.

BASF to Invest in World Scale Acrylic Acid Complex In Brazil

BASF said it will invest in a world-scale production site for acrylic acid, butyl acrylate and superabsorbent polymers (SAP) in Camaçari, Bahia, Brazil. It will be the first acrylic acid and superabsorbents plant in South America. With an investment volume of more than €500 million, it is the largest investment in BASF's century-long history in South America.

In addition, BASF will start to produce 2-ethyl-hexyl acrylate, an important raw material for the adhesives and special coatings industries, in its existing chemical complex in Guaratinguetá, São Paulo. This will be the first plant for this product in South America.

According to the company, the Camaçari location is being chosen based on the availability of raw materials (propylene) and utilities provided by Braskem S.A., the major chemical company in Brazil and the strategic supplier for BASF in this project.

The construction of the new acrylic acid complex will start in 2011 employing about 1,000 individuals during construction. Production is expected to begin in the fourth quarter of 2014, generating 230 direct and 600 indirect jobs. The production for 2-ethyl-hexyl acrylate in Guaratinguetá is expected to start in 2015 on the basis of acrylic acid produced in Camaçari.

Dow Ups Glycidyl Methacrylate Capacity in Texas

Dow Chemical has announced a 10% increase in its glycidyl methacrylate (GMA) production at its Freeport, Texas, site. The company said the decision to up production came from a "successful debottlenecking initiative that addresses Dow's need to increase GMA capacity" Dow said in a statement.

"Through the GMA debottlenecking initiative, Dow made significant process and reliability improvements, which delivered a considerable increase in plant capacity in less than a year," said David Mongrue, global business manufacturing director for Performance Monomers.

SIMPLIFY PROCESSES



The best solutions are usually very simple.

Process automation is very much like other aspects in life. Complex systems are driven by astonishingly simple processes. Consider fieldbus. It offers straightforward communication from the control system to each field device. Control commands, closed loop control, and monitoring enable the management of the most complex processes.

FieldConnex® goes one step further. It simplifies the installation and the infrastructure, allowing you to design a fieldbus topology for your specific application. The High-Power Trunk, for example, transmits data and supplies power using only one cable and limits energy at the spur rather than the fieldbus trunk cable. Our Advanced Diagnostic Module in combination with a powerful commissioning wizard continuously monitors the fieldbus physical layer providing precise and detailed analysis. Intelligent components from the specialists who simply know what fieldbus is all about.

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PEPPERL+FUCHS
PROTECTING YOUR PROCESS

The Time Is Now

Why Fieldbus is Good for your Plant

No Risk, Lots of Fun – Most fieldbus novices feel edgy about their decision and understandably so. Getting a new technology to work right the first time is a task associated with perceived risk. Taking this risk out of the equation and getting the plant on the way requires change. A few concepts have proven true to get it right the first time.

Fieldbus systems are often employed in process plants, particularly where hazardous areas exist. Fieldbus is today's data highway for connecting the distributed control system (DCS) to the field instruments. Prevalent in today's process plants are Foundation fieldbus H1 and Profibus PA. Fieldbus systems are employed because they offer or enable:

- Remote access to field instrumentation for configuration and diagnostic information



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

- Digital and thus precise transmission of measurements unsusceptible to drift
- Long cable distances
- Explosion protection in hazardous areas up to Zone 0/Div. 1
- All-in-one instruments with multiple variables e.g.: for temperature, pressure, volume, or mass

Fieldbus is the operator's darling, as it leads to substantial savings in operating expenditure (OpEx) when applied properly. Fieldbus helps through:

- Precise measurements for exact and drift free control loops
- Remote fault diagnostics for pointed and planned action

- Reduced number of trips to the field for fault finding and maintenance

All the above lead to extended maintenance cycles at reduced costs. The main reason is that fieldbus instruments provide extensive diagnostic information. And now the fieldbus itself can be monitored for its quality at a reasonable cost. This allows plant operators to switch from reactive or scheduled maintenance to proactive and need-based plant upkeep:

Once, an operator running a batch process deliberately overrode the temperature warnings from a motor finishing and thus saving the batch worth €250,000 and burning up a motor costing €400. Maintenance teams were informed and prepared themselves. Replacement and repair work took place while the plant was reconfigured for the next batch. This is informed decision making – enabled through fieldbus.

Potential Savings of Capital Expenditure?

Cost of ownership is key to answering the question of productivity and return on invest with fieldbus. Because calculated savings are based on assumptions and are subject to individual assessment, it is important for every decision maker to get a sample calculation and seriously question the assumptions, modifying them for relevancy to the actual plant.

While fieldbus can have significant savings on actual wiring, this saving is often offset through higher costs for instruments and DCS interface cards. Today this is still largely a question of economies of scale. Currently, the number of instruments sold with 4...20mA interface is still significantly higher compared to fieldbus. In essence, the CapEx will be approximately the same.

Add to that the softer factors where fieldbus technology can help reduce CapEx:

Fieldbus instruments all have the same interface. This means that changing devices during commissioning requires zero hardware change in the DCS. To add an extra instrument, just find that open plug in a field junction box. Neither size nor function matter.

Multivariable instruments deliver more than one measurement. Pressure transmitters often deliver the temperature for free. Coriolis meters communicate volume and density measurements. It requires an extra look at the process design to reduce the number of instruments necessary.

It's Never The Cable

When all cables are installed, fieldbus delivers its biggest value: Au-



tomated testing reduces the pre-commissioning time before loop check commences. The following has proven in practice:

- Set address and tag each field instrument in the lab or on the desk
- Mount device in its proper place
- Connect the wiring
- Ensure shield is properly installed and cut back
- Close the installation box

Automated test procedures are run from the control room through physical layer diagnostics such as the FieldConnex Advanced Diagnostic Module (ADM). These diagnostics produce complete and ready-to-go documentation of the fieldbus itself in minutes. And most importantly, the wiring undisturbed. The documentation is "as built."

In a plant that would soon process chemicals with highly corrosive attributes, the head instrumentation engineer first utilized the traditional way of checking the fieldbus infrastructure: Walk the cable way – connect an instrument – take measurements – document manually – disconnect instrument – repeat with next. The ADM was used to double check. Once the ADM identified an installation fault that has been overlooked, the engineer gained trust and now testifies that it "takes more time to walk the cables than

to run the actual test and produce all documentation."

Instrumentation is always on the critical path towards the end of an installation project. The savings, such as the working hours saved through automated testing; and the loop check that commences on a solidly performing fieldbus infrastructure, are dwarfed by the impact on production schedule when a few weeks can be cut from commissioning adding to the company's revenue.

There are so many good reasons to get going and apply fieldbus in your process plant. Why spend more time in the hazardous area than actually necessary?

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

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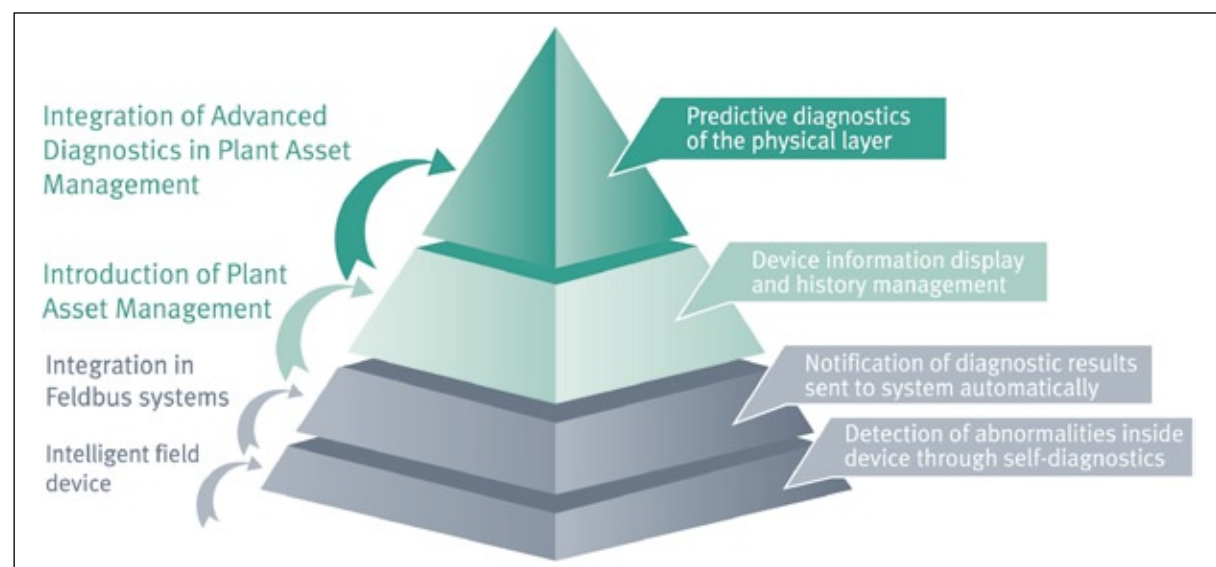


Fig. 1: Fieldbus enables informed decision making through integrated diagnostic functions.

From Feasibility Study to Production Plant

Glatt's Technology Center in Weimar Celebrates 20 Years

Innovation – Glatt's Technology Center in Weimar stands for innovative technologies for the production of granules and pellets from powders and/or solid-containing liquids. In the

last 12 months alone, more than 120 customers from 17 countries used the company's advanced equipment to develop new product forms by feasibility studies or to optimize the properties of

already established products for their production processes. Apparatuses and plants of different sizes are available for such studies – from a laboratory via a pilot up to a production scale.

Glatt Ingenieurtechnik, celebrating its 20th anniversary this year, sees itself as a full-service provider a partner for its customers from project initiation, development, implementation, commissioning up to the process engineering and technical service in a cross-sector and competent manner. Already established in 1991, the Weimar Technology Center was vastly extended and future-oriented equipped with advanced systems in 2009. After one year of successful operation under the new conditions, all expectations were exceeded.

At the heart of all process engineering activities are fluid and spouted bed technologies for the production of innovative products for all powder processing industries. The focus is on continuous processes, but also batch processes are offered. Engineers from Weimar were always one step ahead when it comes to the processing of powdery substances into attractive, dust-free, easy dosage and easily soluble granules and agglomerates for food, detergents, fertilizers, pesticides, pharmaceuticals and many other applications. Its combination from process diversity and advanced apparatuses has long since made the Glatt competence center to be an internationally recognized hub for the above processes and the schedule for application tests is booked up months in advance.



The equipment of Glatt's Weimar Technology Center ranges from latest fluid bed and spouted bed plants up to complementary apparatuses such as high-shear granulators, extruders, pelletizers and tablet presses. A certification as per ISO 2010:9001 and an established HAC-CP system for the contract manufacturing unit underline Glatt's quality standards.

The laboratory, which was also upgraded, uses a great variety of devices for the determination of product properties including digital microscopy, particle size and shape distribution (laser diffraction), ther-

moanalysis (TGA, DSC), sorption and desorption, abrasion, bulk density, humidity as well as fluid properties such as particle size or droplet distribution in suspensions or emulsions, fluid rheology, pH value and conductance.

Moreover, the Weimar technology site is networked with many renowned scientific institutions such as universities, colleges and research institutes at home and abroad. This is the basis for ongoing improvements. Glatt Ingenieurtechnik presently owns about 100 process and apparatus patents all over the world.

Dr. Michael Jacob, Head of Plant Engineering, Glatt Ingenieurtechnik

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www.glatt.com



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POWTECH NÜRNBERG
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Ultra-Clean

The new cGMP-drum

offers process reliability by validated cleaning procedures

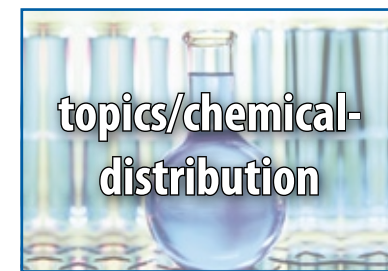
Details of the Ultra-Clean line:

- Sanitary welded edging
- Geometry of beads and bottom optimized for clean discharge of product and for drum cleaning
- Body, base and lid in stainless steel AISI 316
- FDA-approved silicone elastomer seal ring, USP Class VI
- Choose from a range of 20 different sizes
- Compliant with FDA and cGMP guidelines

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Chemicals



CHEManager Europe 9/2011

LEGISLATION • PROCESSES • TECHNOLOGIES

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Chemicals

Innovation platform: white biotech and the chemical industry

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Chemicals

Leveling the playing field for bio-based chemistry and materials

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Reach

Thought Reach was so 2010? Think again.

Pages 16-17



DuPont Files Patent Infringement Lawsuit Against Heraeus DuPont said that it filed a lawsuit against Heraeus Holding and Heraeus Materials Technology for allegedly infringing a DuPont patent related to its front-side metallization paste materials used in solar cell technology.

In its federal court filing, DuPont alleged that Heraeus has infringed DuPont U.S. Patent, by manufacturing solar cells and inducing its customers to manufacture solar cells, using Heraeus H94XX series and H92XX series front-side silver pastes. Heraeus has denied the charges.

Lanxess Invests €15 Million in Antwerp Glass Fiber Plant Lanxess is investing €15 million in its glass fiber plant in the Antwerp docklands. The specialty chemicals company said glass fibers are a key intermediate for the production of high-tech plastics. With the expansion, the actual annual capacity of 60,000 metric tons will increase by 10%. With the investment the glass fiber plant will replace both furnaces.

Just before summer an investment project of €35 million to expand the production of the plastic intermediate caprolactam at the site in the Antwerp docklands was finalized. The production capacity of 200,000 metric tons per year will be increased by another 10%.

Evonik Sells Dilavest Business To Paramelt Evonik Industries has agreed to see its Dilavest expansion wax business to Paramelt. Terms of the transaction were not disclosed. Paramelt takes over the business with immediate effect and will invest in a state-of-the-art plant for the production of the Dilavest product line. Evonik will remain producing the products until mid 2012. Dilavest expansion waxes are used in thermostatic control devices for automotive, marine and aerospace engines as well as building heating and cooling systems.

Ineos Licenses Innovent PP Process to Shaanxi Yanchang Ineos Technologies said it will license Innovent Polypropylene Process to the Shaanxi Yanchang Petroleum Yanan Energy and Chemical Company Limited in Shaanxi, China. Ineos Technologies has confirmed it has licensed its Innovent PP Process for the manufacture of homopolymers, random copolymers and impact copolymers to the Shaanxi Yanchang Petroleum Yanan Energy and Chemical Company Limited in Shaanxi, China. The 300 KTA Innovent PP plant will produce a wide range of polypropylene products to serve the growing demand in China.

Siam Cement Considers Indonesian Assets Thailand's Siam Cement said it will place a bid for two Indonesian petrochemical assets worth an estimated \$1.1 billion. According to a Reuters report, "the deals are set to be another indication of increasing foreign interest in Southeast Asia's biggest economy, which is attracting investors because of strong economic growth and a buoyant stock market." The two Indonesian companies in question are PT Sulfindo Adiusaha, a chemical producer, and Sulfindo Adiusaha, a chlor-alkali and vinyl producer.

"We are interested in both petrochemical firms in Indonesia...details of the deals cannot be disclosed at this point because they are quite big deals," Siam Cement Chief Executive Kan Trakulhoon told reporters.

Total To Merge Refinery and Petrochemicals French oil company Total is preparing a reorganization to merge its refinery and petrochemical activities, Reuters reported, citing the newspaper Les Echos. The reorganization, which includes making the distribution of petrol independent from refineries, is expected to be announced during the fall, the newspaper wrote.

Dow Awarded U.S. DOE Solar Grant The U.S. Department of Energy (DOE) has awarded Dow Solar, a Dow Chemical business unit, a \$12.8 million, three-year grant to fund a program to dramatically reduce the cost of building integrated (BIPV) solar products. The grant was awarded as a part of the U.S. DOE's SunShot initiative, a program that works ensure that solar power is a viable source for the nation's power needs and economic growth, and accelerate widespread solar adoption. Dow Solar's "Transformational Approach to Reducing the Total System Costs of Building Integrated Photovoltaics" program provides sustainable and innovative solutions that will develop new materials and designs to enable the integration of lightweight and robust BIPV shingles. Dow Solar calculates its BIPV system will significantly reduce the installed cost to meet the DOE target of \$2/watt without subsidies. The combination of enhanced affordability, aesthetics and reliability will drive consumer adoption of solar technology while also creating thousands of U.S. jobs, the company said in a statement.

A Chinese Footprint

AkzoNobel's Surface Chemistry Business Buys Boxing Oleochemicals



Demand for derivatives and amines in China is being driven by population growth, expanding middle class, increased focus on sustainability and the build-up of infrastructure.

First Step – Acquisitions are nothing unusual for multinationals in the chemical industry, but AkzoNobel's recent purchase of China's Boxing Oleochemicals (pronounced Bo-sching) marked a first for the Netherlands-based company: The acquisition is finally giving its Surface Chemistry business a much-needed manufacturing footprint in China. With the demand in Asia for amines and derivatives growing rapidly, Bob Margevich, managing director of AkzoNobel Surface Chemistry, said his business unit was looking for a way to enter the market quickly. "The demand for amines and derivatives is expected to increase significantly over the next few years, with a third of the Asian demand for amines coming from China alone," he said. Brandi Schuster spoke to him about the company's integration plans for the Chinese supplier of nitrile amines and derivatives. The transaction is expected to be finalized in the last quarter of 2011.

CHEManager Europe: What was the strategy behind the Boxing acquisition?

B. Margevich: AkzoNobel wants to grow its businesses in emerging markets, especially in China. Last year we inaugurated our €320 million multi-site in Ningbo, where our Functional Chemicals business unit produces chelates, ethylene amines and ethylene oxide, with organic peroxides to be added by the end of the year.

As far as our Surface Chemistry business unit is concerned, we didn't have a manufacturing footprint in China prior to the Boxing Oleochemicals acquisition. We really needed to create a manufacturing footprint in China, and Boxing is a perfect fit for our technology; the site provides us with a sound manufacturing platform.

What are your plans for integrating Boxing into the Surface Chemistry business unit?

B. Margevich: Over the course of the next three years, we expect to invest several million dollars in facility upgrades. We plan on increasing capacity – I

can't give details here, but we do have big plans as this is our first facility in China. We will also bring the facility up to par with AkzoNobel's health, safety and environmental standards.

What is driving the demand for amines and derivatives in China?

B. Margevich: Demand is being driven by population growth, expanding middle class, increased focus on sustainability and the build-up of infrastructure. Surfactants in Asia are growing at above-GDP levels, primarily because of the rapid industrialization and urbanization; the growing middle class has money to spend.

There is a substantial gap between emerging and mature markets when it comes to per capita consumption of consumer products such as shampoo, fabric softeners, cleaners, etc. The same goes for industrial applications, such as asphalt derivatives and additives used in oilfield applications, for example. As people in these emerging markets become more westernized, they become more and more interested in these kinds of products. A similar



Bob Margevich, Managing Director of AkzoNobel Surface Chemistry

growth pattern can be observed in the Chinese automobile industry.

Has this strong growth in Asia had a negative effect on manufacturing facilities elsewhere?

B. Margevich: AkzoNobel wants to grow its business, and where the growth is coming from is in emerging markets. This doesn't mean that mature markets in the western world are shrinking; we have a strong base of businesses in the U.S. and in Western Europe, but the growth for the future will definitely be coming from countries like China, Brazil, India, Southeast Asia, Eastern Europe, etc. We have capacity in those parts of the world for these kinds of products; but we have capacity in the U.S. and Western Europe. We're not going to take out capacity where we already have it, as we use it to supply regional customers. That's what's so great about the Boxing acquisition – we'll be able to supply our local customers from local production.

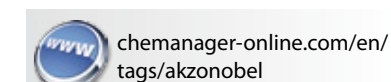
What is AkzoNobel Surface Chemistry's strategy when it comes to emerging markets? Is growth primarily achieved through acquisitions, or does the company also have locations in Asia?

B. Margevich: It's a combination of both. We wanted a footprint in China, and we wanted it quick. In the case of Boxing, it made more sense to do an acquisition. But we also need to build. It's part of our strategy to outgrow our markets, and that means we'll have to put steel and concrete in the ground. Many chemical industry plants today are sold out or nearly sold out, so it doesn't necessarily solve the problem of outgrowing the market. We're certainly looking at additional grassroots capacity. Our plants are typically designed that we can debottleneck them and increase capacity, but we've already done that at our plants in the U.S., Western Europe, and this year in Brazil.

Going forward, what is your strategy in the Surface Chemistry business?

B. Margevich: AkzoNobel has a company has been strongly focused on China; in the Surface Chemistry unit, we had to catch up a bit. Now that we have Boxing, the Functional Chemicals business will expand capacity in the Ningbo facility for some surfactants. We're also looking at expanding existing capacity in Brazil and at a project in India. Those are our main focus points right now.

Read the interview in Chinese: <http://ht.ly/6miLY>



Resources in a State of Flux

58th Sepawa Congress Addresses Global Issues

Preparing for the Future – The world is a rapidly changing place, and the global lack of resources is an important issue for all industries. This has put pressure on manufacturers of surfactants and other ingredients in cosmetics and detergents to look for sustainable resources to coincide with this growing trend. This and many other topics will be up for discussion at the 58th annual Sepawa Congress in Fulda, Germany, Oct. 12–14. The changing resource situation will be one of the most essential topics; Prof. Dr. Klaus-Peter Wittern, chairman of the Sepawa and director of R&D at Beiersdorf, talked to CHEManager Europe about how industry is going to prepare for it.

CHEManager Europe: At the age of 58, many people begin thinking about retirement; that's also how many times the Sepawa Congress has been held. Does that mean that things will settle and stay in the old rut?

Prof. Wittern: If you just retrace the trend of the recent 10 years, you will find the Sepawa vitally alive and innovative. After all, it moved twice in these 10 years – from Bad Dürkheim

to Würzburg, then from there to Fulda – and has expanded from year to year. We have been able to enlist the cooperation of further professional associations, such as the German Society for Scientific and Applied Cosmetics (DGK). This has helped to make the Sepawa Congress one of the most prestigious events in this field. If you just consider the content of the event, stagnation is simply not an option. All of the lecture sections

of the congress are oriented towards progress in R&D, and for many cosmetic products and in the perfume branch towards the most recent trends. Experience, of course gives reliable support to events of this order. Thus more than 1,600 visitors are expected for October. Since the beginning of 2011 the exhibition stands have been booked out by new record numbers of exhibitors.

Sepawa is posting increasing registration numbers, even though the CE-SIO World Surfactants Congress took place this year in Vienna. Is there any formula for success?

Prof. Wittern: As usual, there are various factors which contribute to success: With its close economic touch, the Sepawa Congress has always met the demands of the exhibitors and also those of small- and medium-sized enterprises. For example, the Forum for Innovations – where participants have the opportunity to

present their most recent innovations – was so successful in its first year that it had to be relocated during the event to accommodate all of those interested. It will be considerably extended this year. In the exhibition, it is easy to make contacts or to keep in touch with partners.

Also, the DGK, the German Society of Perfumers (DGP) and the EDC (Society of German Chemists, Division of Detergency and Formulations) will be hosting scientific lecture programs, which will provide high-level insight on the international activities within various branches of the industry.

In this year, it is striking that the attributes "bio" and "nature based" are often used in the program; is the branch going to align to new standards?

Prof. Wittern: These key themes show the approaches of the branch to the issue "sustainability" very clearly. The first discussion of the environmental behavior of surfactants dealt only with biodegradation; the following life cycle assessments revealed that petrochemical and oleochemical raw materials are of equal rank. In the present discussion we have achieved another, more comprehensive level. The global lack of resources concerns our branch, too. We consume water, energy and raw materials, that means we also should think about our ecological footprint. An important way is to improve the resource efficiency – how to get more wealth from one resource unit. We all are curious about the answers the keynote speaker of the Congress, Prof. Ernst Ulrich von Weizsäcker, will give from a global point of view.

Some specialist attempts have already been presented at the recent workshops in our special and national groups and also the international sections. The increase of efficiency, such as by intelligent combining known products belongs to these attempts as well as the development of novel high performance surfactants and the use of bi-



Prof. Dr. Klaus-Peter Wittern, Chairman of the Sepawa and Director of R&D at Beiersdorf

Prof. Wittern: Let's first take the bio-surfactants as an example. They are obtained biotechnologically by microorganisms at moderate temperatures so that the energy input is considerably lower. Some of these compounds have outstanding properties and are already commercially available. Sugar surfactants, which are obtained from renewable raw materials and are processed biocatalytically, come under the heading "green chemistry," as well as the substitution of ethylene oxide. More and more you will find polymers based on starch or various vegetable raw materials. At the Sepawa Congress, each of these developments will be highlighted by topical lectures.

Sepawa is continuously improving its international image. Will there be a trend towards particular regions?

Prof. Wittern: There are sections affiliated to the Sepawa in the European neighboring countries – Scandinavia, Benelux, Austria, Switzerland, and for a short time also Poland. In recent years we have been glad to welcome more and more visitors from India and the Middle East. Moreover, the global surfactants market is expected to grow 2.5–3% per annum for the next years, and presumably the BRIC-countries will participate in this growth disproportionately high. Thus, a coming challenge is arising which Sepawa will meet with great vigor.

Interview: Barbara Buller, wiss+pa, Potsdam

ologically degradable polymers. All this enables us to produce products with lower active matter contents and better ecological and toxicological properties.

The cultivation and the use of various oil plants for detergents and cleansers and also for cosmetic raw materials have been established now. What drives the further search for new raw materials?

Prof. Wittern: The situation on the market of renewables is changing rapidly at the moment; crude oil prices, which are steadily increasing and the more and more increasing production of nature based fuels and energy have intensified the competition for these resources. It is, therefore, necessary to extend the basis for raw materials. Surely, Klaus H. Nottinger from OleoConsult will reveal the backdrop of this problem in detail in his contribution.

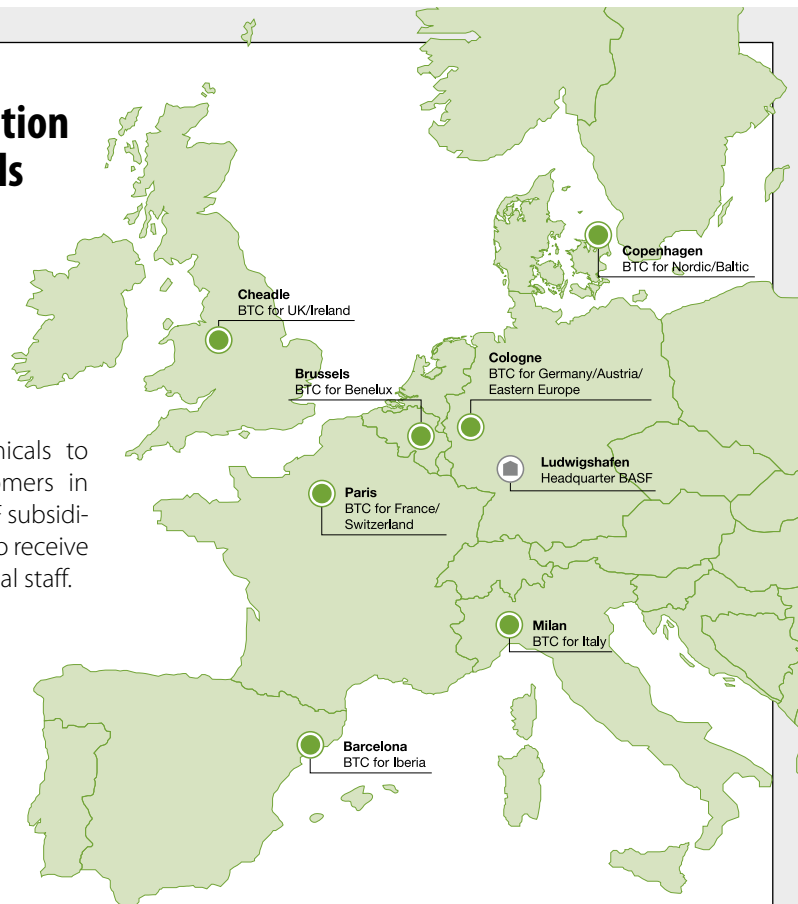
Without regard to the raw materials for surfactants in detergents and cleansers, which are produced in bulks, nature based raw materials like oils with special properties and scents are used in cosmetics.

Will the "green chemistry" be an important factor?

www.chemanager-online.com/en/tags/sepawa

Europe-wide distribution of speciality chemicals

BTC distributes speciality chemicals to small and medium-sized customers in Europe. A top priority for the BASF subsidiary is closeness to customers, who receive on-the-spot support from regional staff.



BTC has continuously expanded its business since the end of the sixties: the small German supplier of surfactants and complexing agents has developed into a European-wide distributor of speciality chemicals with regional branches for handling Benelux, Germany, Switzerland, North and Central Europe, Great Britain and Ireland, France, Italy, Spain and Portugal. Part of the BASF group, BTC supplies 15,000 small and medium-sized companies in Europe with more than 4,000 products. Its portfolio comprises finishing chemicals and polymers for numerous industries, including detergents and cleaning agents, paper, textiles, plastics, coatings and inks, road construction and adhesives.

A top priority at BTC is closeness to customers, who can rely on consistent support from their regular regional contacts. BTC staff know their customers, speak their language and are fully informed on how they use their products. And they are familiar with the local markets and industries. Direct contact with BASF and close relationships with research and development teams ensure that they are always technologically up to date. Customers are the first to benefit from this: at BTC, tailor-made, individual solutions are the order of the day: "BTC staff have very high technical know-how, which is backed by technical support from BASF," explains Thomas Greindl, Vice President, Regional Business Management Home Care Europe, BASF. "With its many years of market experience and its proximity to customers, BTC has proven a highly reliable distribution partner," he adds.

BTC's guiding principle is flexibility: If BASF cannot offer a product, BTC staff will procure it from other manufacturers. The company's aim is to provide customers with extensive product portfolios for their respective industries. "Our long-standing, highly satisfactory business relationship with BASF has contributed substantially to our success," says Guido Beckmann, Managing Director of EWABO Chemikalien GmbH & Co. KG in Wietmarschen. "We greatly appreciate the many years of close cooperation, based on mutual trust, with this exemplary and dependable supplier. We are sure that this relationship will continue for many years."

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BTC
Chemical Distribution

Henkel builds new adhesives factory in China

Henkel held a ground breaking ceremony to commemorate the start of construction for its 150,000 m² adhesives factory in Shanghai Chemical Industry Park. The new facility will be the main adhesives manufacturing base in China and the Asia-Pacific region. Upon completion, the new Henkel factory will be the largest adhesives factory in the world with an estimated annual production of 428,000 tons.

The construction of the new adhesives factory is part of the company's overall strategy to expand its capacities in the growth regions. Currently, Henkel realizes 42% of its total sales within the emerging markets, and 53% of its employees are now working in those markets. The new state-of-the-art adhesives facility, which is scheduled to begin production at the end of 2012, will enable Henkel to cope with the rapidly growing demand in China and the Asia-Pacific region for its industry leading adhesives. The new factory will require a total fixed asset investment of €50 million. Henkel also plans to hire 600 employees to operate the new facility.



A Productive Partnership

White Biotechnology as an Innovation Platform for the Chemical Industry

Key Platform – White biotechnology is establishing itself as a key technology platform for innovative and sustainable processes and products in the chemical industry. In cases where classical chemical routines find their limitation, biotechnological process steps can improve, sometimes even replace costly or not eco-efficient chemical processes, or allow access to new high-value products. The chemical industry is thus at the threshold of a hybrid between petrochemicals and biotechnology.

The drivers of the modern chemical industry are escalating energy demand, limited fossil resources and the need for sustainable economic growth, while protecting the environment and climate. One of the chemical industry's engines of innovation in recent years has become white biotechnology as a key platform for innovative and sustainable chemical processes and products.

Though biotechnology is growing in importance, the chemical industry is still largely dependent on petrochemicals. Over 90% of all industrially manufactured organic chemicals – almost all organic bulk chemicals and all base chemicals – are based on petroleum or natural gas. A sophisticated integrated modular system, in which byproducts from one synthesis are used as feedstocks for other syntheses, permits highly efficient, economical production of a wide range of substances.

Yet, there are limitations for the classical chemical routines, and this opens up room for biotechnical processes – especially when it's possible to combine chemistry and biotechnology and profit from this fruitful and productive partnership.

Complicated Molecules – a Domain of Biotechnology

If complex molecules have to be built up or chiral substances produced in an enantiomerically pure form, petrochemical processes are generally complicated and expensive. For such cases, white biotechnology has proven particularly successful. For example, proteins are solely accessible by biotech routes: The more complex the chemistry, the greater the opportunities for biotech production.

For this reason, fine and specialty chemicals are currently white biotech's biggest domains. For example, over two thirds of all enantioselective syntheses are currently performed with enzymes. Chemicals that are



Dr. Günter Wich,
Head of Biotechnology
at Corporate R&D,
Wacker Chemie

metabolites of microorganisms are increasingly being made by fermentation as an alternative to conventional, usually multistage chemical syntheses. Modern fermentation methods are always competitive for products other than cheap bulk chemicals, and if the market is large enough to support the high cost of R&D and process innovation.

The few bulk chemicals (annual production over 100,000 metric tons) currently produced by biotech means include ethanol (bioethanol), acrylamide, 1,3-propanediol (for the production of polytrimethylene terephthalate) and lactic acid (for the production of polylactide). Some 100 ethanol plants are already operating in the U.S., with a further 70 under construction.

Such first generation biorefineries process starch (in the U.S.: corn starch) or saccharose from sugar cane (in Brazil). But bioethanol also represents an interesting C₂ building block. In Brazil, bioethanol is cheaper than the comparable and important petrochemical C₂ building block ethylene. Experts calculate that sooner or later, rising oil prices may make it economically attractive to produce bioethanol, and thereby to synthesize simple C₂ building blocks by a biotech route.

Paradigm Shift

In recent years, it has become clear that we are reaching the limits of the exploitation of fossil resources as fuels and petrochemicals. Petroleum and natural gas reserves are limited; their use as energy sources leads to significant carbon emissions; some producer regions are politically unstable; and the oil price is constantly rising. On the other hand, there is industrial biotech, whose methods and potential have made massive strides since the 1980s. Now, it can not only expand the chemical industry's arsenal of techniques, but also make an important contribution to conserving resources and climate protection.

It is against this background that the chemical industry is working industriously on biotech methods that lead to bulk chemicals. It is also looking for routes to short-chain building blocks that are petroleum-independent and carbon-neutral. Experts are now talking of a paradigm shift – disproving the opinion that biotech methods are hopeless for the production of sim-



The biotech research center at Wacker's corporate R&D in Munich. Shown on the left, Dr. Günter Wich, head of biotech research at Wacker.

ple base chemicals. The example of bioethanol shows that the biotech production of commodity products from renewable raw materials is not only feasible but can also be competitive.

Innovation Fields

These developments give rise to a number of innovation fields. For example, optimized biorefinery concepts are necessary to maximize the value creation of the refineries. Work is progressing apace on developing second generation biorefineries that use lignocellulose as starting material for ethanol production and consume agricultural waste, such as straw or bagasse.

In a new research focus, the Wacker Group's corporate R&D is developing innovative ways of economically producing ethylene and acetic acid from renewable raw materials. These two base chemicals are of strategic importance for the company. One project, for example, is aimed at the chemoenzymatic digestion of lignocellulose with the aim of developing fermentation routes to C₂ and C₄ building blocks. Wacker is already running a pilot plant for the production of acetic acid via biotechnology and innovative downstream chemistry. In combination with ethen derived from bioethanol, this would allow the production of "green" VAM and polymers independent from petrochemical refineries.

Another current project examines processes to employ bacteria

to produce acetic acid from hydrogen and carbon dioxide. Other research projects of the biotech field are dedicated to improving production strains by genomic design and systems-biology methods.

Conclusion And Outlook

Biotechnology plays an important role in the utilization of renewable raw materials, and is therefore also a research topic of strategic importance for traditional chemical companies. It can be regarded as one of

the key technologies for developing economically and ecologically successful new processes and products, since it permits petroleum-independent, carbon-neutral production of many substances, and paves the way to "green chemistry."

From our point of view, an integrated chemistry based on renewable raw materials will develop in the medium term, and a hybrid biotech-petrochemistry will become established. Wacker's corporate research is already pursuing several projects on biogenic produc-

tion of strategically important bulk chemicals.

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A Bio-based Economy

Level Playing Field for Bio-based Chemistry and Materials

Realizing Potential – The production of bio-based chemicals and materials can create tens of thousands of new green jobs, increase resource efficiency and make a considerable contribution to climate protection and innovation. Despite these benefits, the investment in industrial biotechnology and biorefineries in Europe remains low. The political and economic framework in the EU does not support the industrial material use of biomass – this is in contrast to bioenergy and especially biofuels, which has expanded rapidly in the EU over the last 10 years. Michael Carus of the nova-Institute explains why the EU needs to establish a level playing field for bio-based chemistry and materials in order to realize the potential of greening its process industries.



Michael Carus,
Managing Director,
nova-Institute GmbH

renewable resources can only be achieved with bio-based materials (higher input/output efficiency than biofuels) and strengthened through “cascading utilization” (the sequential utilization of biogenic raw materials for material and energy uses). This starts with single or multiple uses (recycling economy) followed by energy use at the end of life. Material use first, then energy – you only burn it once!

Most lifecycle assessment studies show that the material use of biomass delivers greenhouse gas mitigation at least equal to first-generation biofuels (each based on the same acreage). Most deliver higher benefits, and the best are significantly higher than the benefits of second-generation biofuels.

The environmental assessment is even more favorable to material uses if the effects of longer-term carbon storage and the potential of cascading utilization are included. Also economies of scale in production and the technical optimization of processes also further improve the carbon balance. There is still a huge potential for innovation – involving thousands of small- and medium-sized enterprises as well as multinational companies.

While there are numerous options for the provision of renewable energy, such as solar and wind energy, hydropower and geothermal energy, the situation in the supply of raw materials to industry is precarious. The material use of biomass is a key technology to secure the supply of industrial raw materials, and its importance increases continuously. The use of biomass for material use is as essential as their use in food – if the oil price reaches new record levels. Especially the chemical industry depends on carbon-based materials in the production of organic com-

Making the Best Out of Limited Biomass!

The analysis of recent studies on the macroeconomic effects of the non-food uses of biomass show that the potential benefits of the material use in terms of employment and value added are significantly higher than those arising from the use of biomass for energy. Material uses can directly support five to 10 times more employment and four to nine times the value added compared

with energy uses. These comparisons relate to the same raw material or the same-farmed area, respectively. This is due to the significantly more complex and longer supply chains arising from material uses.

This is even true for traditional applications of wood: Using wood for particle boards or pulp and paper supports greater employment and value added compared to the production of energy pellets. High resource efficiency in the use of

pounds, and biomass is the only renewable source of carbon.

EU: Low Investment in Biorefineries and Industrial Biotechnology

Compared to America and Asia, Europe invests little in biorefineries and industrial biotechnology. For investment, companies need both secure sustainable renewable raw material supply for reasonable prices; and binding political framework for supporting the bio-based economy.

Bio-based materials are in competition for feedstock with energy. In contrast to bioenergy and biofuels, there is currently no similar European policy framework to support bio-based materials. Bioenergy and biofuels not only receive high support in R&D, pilot and demonstration plants, but also receive strong ongoing support during commercial production (quotas, tax incentives, green electricity regulations and more). Without comparable support, bio-based materials will suffer from underinvestment from the private sectors. The recent policy leads to a market distortion regarding feedstock availability and costs.

Even biorefineries that are producing energy and materials will not be able to truly overcome this problem. If the energy market is more attractive because of related incentives and support, biorefinery development will be disproportionately on energy as the main output – without realizing the huge potential of bio-based materials.

Market Distortion

In several EU member states, there is considerable support for bioenergy, but almost no support for the industrial material use. With the existing political framework, it is much more attractive to use biomass for energy – a misallocation of biomass in terms of resource efficiency?

Already today we see competition between both sectors in Europe. High subsidies for energy crops lead to high biomass and land prices that make industrial material use unattractive. In Germany for example, the financial support of bioenergy is between 20% (biodiesel) to 80% (bioethanol, small biogas) of the turnover.

Establishing a high-volume bio-based economy, including bio-based chemistry, bio-based plastics and composites, lubricants and others, feedstock shortages can be foreseen. A new political-economic framework is needed to rebalance the financial support for energy and industrial material use of biomass.

New Policy – Principle of Equal Treatment

In principle, the applied policy on bioenergy and especially biofuels was appropriate and a success story. But the global framework changed, biomass is now more limited than several years ago, and new technologies have been developed. For the future, we need a new policy to be able to use the potential of biomass most efficiently and most productively.

The EU needs a new agricultural raw material policy to rebalance the

support of bioenergy and biofuels versus industrial material use. This means to search, screen, develop and evaluate (new) political instruments, which could secure access to sustainable renewable feedstock, well-balanced between bioenergy and bio-based products. This new framework should cover all industrial applications and should be based on climate protection, resource efficiency, employment (“green jobs”) and innovation. A higher focus should be put on resource efficiency and climate protection regarding the use of land and the biomass flow. Cascading utilization could be one option for future support. Priority should be given to using biomass for bio-based materials, followed by recycling and later its use for biofuel and bioenergy.

Instruments that Could Provide a Level Playing Field for Bio-Based Products

Currently, mainly necessary-but-weak instruments like R&D support, standardization and information tools are discussed for bio-based chemistry and materials – whereas bioenergy receives a strong ongoing support during commercial production via quotas, tax incentives, green electricity regulations and more.

Bio-based chemicals and materials will only thrive if strong instruments are implemented in a new political framework to rebalance the support of energy and material use. Bio-based products need at least a level playing field in order to get started. During the last 10 years, no political instruments have been developed to support bio-based chemistry and materials during commercial production. This is strongly needed.

Outlook

The new policy framework for the EU has to be coordinated by European Commission, European Parliament, member states and regions – including all involved sectors like agricultural, enterprise, energy, environment and R&D – to find the most efficient instruments to support the industrial material use until a level playing field with bioenergy, particularly biofuels, is reached. The region in the world that optimizes and balances the support of the use of biomass for energy and material first will profit from a considerable growth, investments, green jobs, innovation, increased resource efficiency and additional climate protection.

Let Europe be the region to profit!

Michael Carus, et al.

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Bioplastics In The EU

Ongoing Commercialization and Strong Political Support

Rough Road Ahead – The climate is changing and competition around the world is increasing – Europe is in for some severe challenges. Concepts such as the bio-economy, focus on strengthening European competences to gain a leading position in e.g. research and development. Bioplastics are an important pillar of the bio-economy and a fast growing market with high value creation. If supported by the political framework, they can contribute to meet the challenges of climate change and secure European economies' global top-position.

European economies are confronted by several challenges at the start of the 21st century. In the face of increasing competition from around the world, prosperity, growth and employment have to be secured over the long term. At the same time, solutions must be found for urgent environmental problems such as climate change. The increasing scarcity of crude oil and other finite fossil raw materials calls for additional innovation efforts.

One way to meet these challenges is to strongly support the development of industry products that utilize renewable resources and to introduce them to the European and global market. The European Union takes account of this approach in its concept of the bio-economy. This concept includes supportive policies for a range of industry sectors working with renewable resources.

The Bioplastics Industry in Europe and Beyond

Bioplastics are an important pillar of the concept of bio-economy. A



Hasso von Pogrell,
Managing Director,
European Bioplastics

lot more materials on the basis of renewable resources than are commonly known are already available today. Bioplastics are part of the successful family of plastic materials. They drive the evolution of plastics with an eye on the environmental and economical challenges outlined.

According to European Bioplastics, bioplastics are bio-based, biodegradable or both. Bioplastics are not a single kind of polymer but rather a family of materials that can vary considerably from one another. These include three main groups:

- Bio-based or partly bio-based durable polymers such as PE, PET, and soon, PVC and PP (so-called drop-in solutions)
- New polymers that are bio-based and biodegradable, including PLA and PHA, and
- New polymers that are based on fossil resources and are biodegradable, such as, e.g., PBAT or PBS

Up to now, bioplastics still represent well under 1% of the annually produced global plastics volume of about 250 million tons. However, with an annual growth rate of around 20 percent, this share is to become more significant in the mid-to-long-term (fig. 1).

Bioplastics have long been used to manufacture a broad variety of short-lived materials and products, such as mulch films, catering products, packaging and waste bags. As technology develops, more and more durable applications such as

keyboard elements, mobile phone covers or certain components in cars are manufactured in larger quantities.

European Policy And Bioplastics

Europe offers great conditions for the market development of bioplastics:

- A highly developed economy and educated society
- Leading global companies in the chemical and plastics industries
- Industrial users focusing on sustainable development
- Consumers with a high degree of environmental awareness (high consumer acceptance for bioplastics)

The political and economical framework plays a central role in the market penetration of bioplastic products. For this reason, the EU Commission has intensively taken on the subject of bio-based products in the course of the Lead Markets Initiative. During this process, bio-based plastics were identified as one of the most important markets for potential growth (figs. 2-3). However, concrete political support is urgently needed, as a current trend becomes more and more visible that is well known from other innovative industry sectors: The EU remains one of the main target markets for bioplastic consumer goods. R&D work is happening in the U.S. and the EU. Commercial scale production, however, is built outside the EU – in Southeast Asia.

U.S. And Asia Ahead?

The exceptional opportunities of the bio-based economy are well-known throughout the world.

A set of supportive political measures is needed to get there.

Possible Supportive Measures

Market introduction of bioplastics products can be facilitated via several ways:

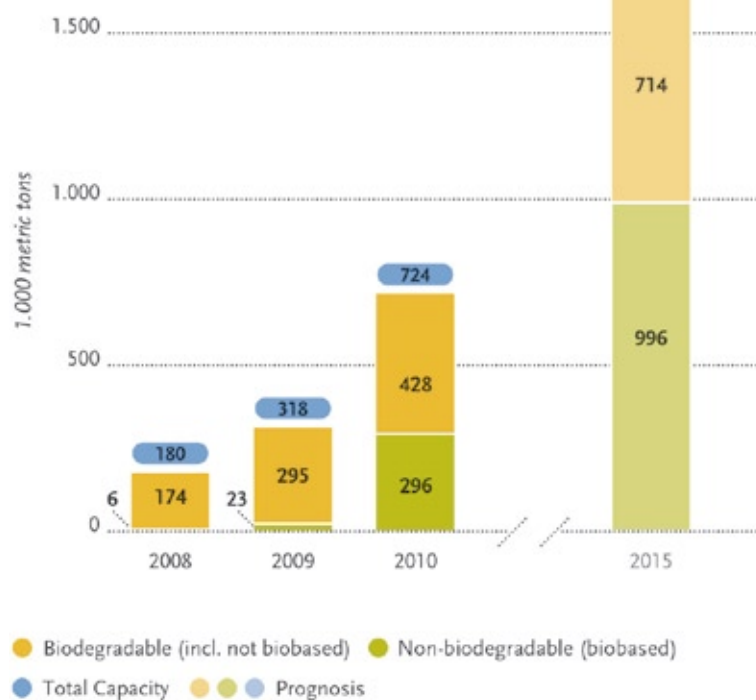
1. The European Union and the EU member states have to check how the market introduction of bio-based plastics can be supported through direct and indirect fiscal measures. European Bioplastics proposes the evaluation of tax deductions for R&D activities, as well as a reduced VAT rate for products made of bio-based plastics.
2. Furthermore, EU and industry have to inform the public about the benefits of bioplastics through public-private information campaigns and standardised product labels as well as via supportive marketing.
3. The EU should put bio-based and recycled plastic content at equal level in all measures promoting the increase of plastic recycling and use of recyclates.
4. The recovery and recycling of bio-based plastics in use cascades needs to be facilitated. Bio-based plastic should be allowed to enter all waste collection and recovery systems, including mechanical recycling and energetic recovery. Products certified compostable according to EN 13432 should gain unhindered access to organic recycling.
5. With regard to product legislation, flagship products should be selected. An example would be to impose a levy on plastic bags and exempt bio-based and compostable plastics to drive the bioplastics industry and support waste reduction targets.
6. Last but not least, it would be a decisive move to encourage green public procurement for bio-based plastics products within the EU.

All in all, European Bioplastics is striving for a political landscape that helps the bioplastics industry to live up to its potential as a central element of the European bio-economy.

Hasso von Pogrell, Managing Director, European Bioplastics

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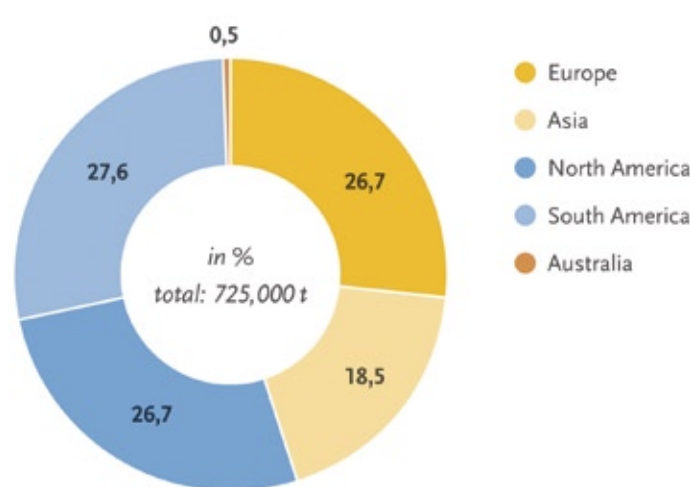
Global production capacity of bioplastics



Source: European Bioplastics | University of Applied Sciences and Arts Hanover (Status May 2011)

Fig. 1

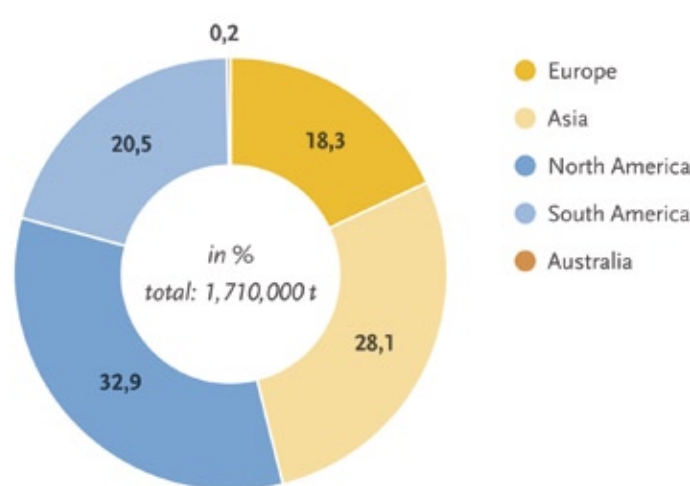
Production capacity of biopolymers in 2010 (by region)



Source: European Bioplastics | University of Applied Sciences and Arts Hanover

Fig. 2

Production capacity of biopolymers in 2015 (by region)



Source: European Bioplastics | University of Applied Sciences and Arts Hanover

Fig. 3

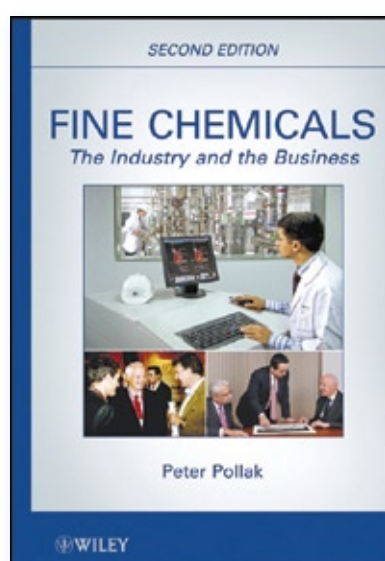


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Legislators in the U.S. and multiple Asian countries have already developed and implemented programmes to support the industrial usage of renewable resources. The U.S., for example, launched a public procurement program for bio-based products in 2002, the U.S Department of Agriculture's Biopreferred program.

Measures of EU member states, in comparison, have been selective and never reached full implementation, as an integrative political vision on EU level was missing up to now. But in 2010, the EU commission drafted the new strategy Europe 2020 to meet upcoming economical and ecological obstacles.

European Bioplastics calls for the explicit inclusion of bio-based plastics in this innovation strategy and in the EU's renewable targets for 2020 and 2030. This is a necessary and overdue step on Europe's part if a carbon-efficient closed loop economy is to become reality.



Peter Pollak

Fine Chemicals

The Industry and the Business (2nd edition)

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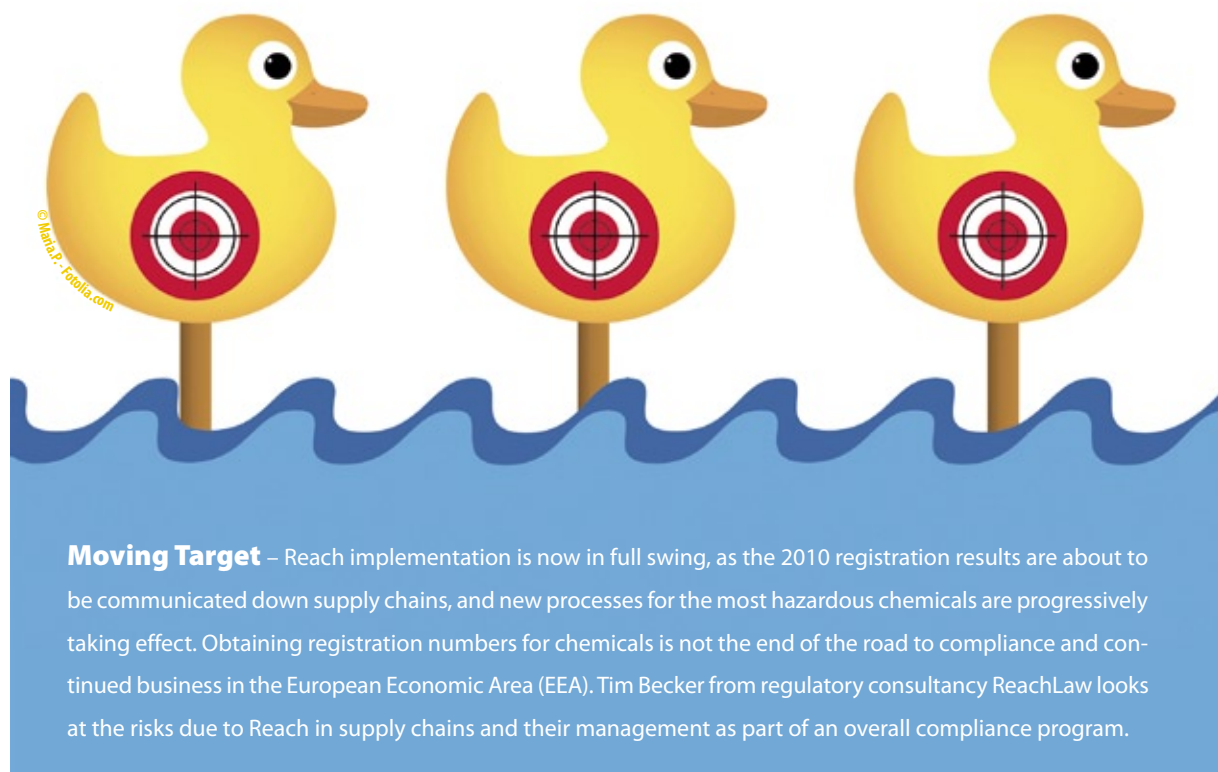
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Reach: Turning Risks into Opportunities

Warning Signs for Downstream Users and Strategic Responses



Moving Target – Reach implementation is now in full swing, as the 2010 registration results are about to be communicated down supply chains, and new processes for the most hazardous chemicals are progressively taking effect. Obtaining registration numbers for chemicals is not the end of the road to compliance and continued business in the European Economic Area (EEA). Tim Becker from regulatory consultancy ReachLaw looks at the risks due to Reach in supply chains and their management as part of an overall compliance program.

Looking back, the agenda in 2010 for industry was rather clear, though demanding. Manufacturers and importers to EEA had to Reach-register existing (“phase-in”) high volume substances exceeding 1,000 tons per year as well as certain very toxic substances of lower quantity by Nov. 30, 2010 with the European Chemicals Agency (ECHA) in Helsinki; in addition, they had to re-classify and re-label hazardous substances placed on the EEA market according to the new EU CLP Regulation by Dec. 1, 2010 and had to notify ECHA of it by Jan. 3, 2011.

From 2011 onwards, the situation is much more complex as a number of new duties arise under Reach, especially for downstream users (DU) of hazardous substances. DUs are in a delicate position, as they cannot

register in this capacity, but depend on the upstream manufacturer or importer to supply duly registered substances covering their actual uses. Otherwise DUs may have to take further action with a considerable impact on their business. Hence, risks due to Reach in supply chains are primarily occurring on the sourcing side.

What Are The Risks?

Legally, downstream actors may become themselves non-compliant because of insufficient action upstream. For example, if a formulator sells a mixture including a substance that hasn't been duly registered by his supplier, they may be in breach of Reach article 5 “no data, no market” and be subject to penalties under national laws. Further liabilities

can be triggered based on contracts with customers or under product liability aspects. Non-compliance becoming public may also have serious repercussions on a company's reputation and business. Apart from this, the main business risk pertains to the future non-availability of certain substances due to (too) burdensome registration or authorization requirements, resulting in changes of suppliers, costs, raw materials or own products.

Looking Out for Warning Signs

A number of warning signs can be identified that put the DU's own Reach compliance or future supply of chemicals to him at risk. They may relate to the chemical, the supplier or shortcomings of the registration.

Future availability of the chemical is particularly at stake if it is or contains a substance of very high concern (SVHC) included in the authorization list (Reach Annex XIV). Authorization is a complex and lengthy process aiming at eventual substitution of SVHC with safer alternatives. SVHC may in principle no longer be used after the so-called sunset date specified in Annex XIV, unless a successful application for authoriza-



tion of continued use is submitted to ECHA by a defined latest application date. Annex XIV was filled with the first six substances in February 2011 and is expected to grow steadily over the coming years.

Another reason to be worried is a supplier being a relatively small manufacturer or importer who responds poorly to Reach enquiries. They may lack Reach awareness, a proper strategy and resources to complete the registration and – if required – authorization covering downstream uses. This may lead him eventually to discontinue the supply of the chemical following the expiry of the applicable registration deadline or authorization sunset date.

Furthermore, if the chemical originates from outside EEA, the DU may find himself in the Reach role of an importer with own registration obligations, unless the non-EEA manufacturer has appointed a competent only representative. Similarly, if a trader has registered as an importer without being involved in the physical delivery of the chemical to EEA – and suitable contractual arrangements between the parties involved in the actual importation are not in place – there is a risk that the trader's importer status is not recognized by authorities, registrations are not valid and the “real” importer needs to register.

Importantly, DUs should not sit back only because they receive pre-registration or registration numbers for their raw materials from suppliers. Pre-registrations are only valid until the applicable registration deadline and frequently a later deadline has been mistakenly applied for toxic substances or due to incorrect volume calculation. If the supplier has already registered a hazardous substance and provided the updated “extended” safety data sheet, the DU is obliged to check whether his uses are cov-

ered. If this is not the case, he has to take further action within tight deadlines. If the substance has only been registered as intermediate under strictly controlled conditions – a very frequent case – the DU may not use the substance outside these limitations.

How to Manage the Risks?

Based on a sound and up-to-date knowledge of Reach and its implications, chemical companies are advised to define and implement processes to manage identified risks as part of an overall compliance program. On the sourcing side, check lists and procurement procedures and taking into account the substance hazard profile and registration status are helpful tools to audit the suppliers' Reach compliance (fig. 1). In addition, appropriate clauses in purchase contracts should clarify Reach responsibilities and liabilities of the parties. Good communication channels with suppliers, only representatives and customers are critical to ensure sufficient coverage of uses in registrations and to obtain any information requested by authorities rapidly. Furthermore, it is important that downstream actors understand their options to carry out certain compliance acts by themselves instead of relying on the upstream supplier (fig. 2). DUs of hazardous chemicals should also make efforts to anticipate the substances which may end up on the

Reach authorization list and decide if they want to continue using them. The Reach candidate list of SVHC for authorization with currently 53 substances and the registry of intentions on the ECHA website as well as the SIN list maintained by the NGO ChemSec including 378 substances fulfilling SVHC criteria may serve as early warning systems in this regard.

Conclusion

Detecting warning signs for non-compliance or future non-availability of substances in supply chains and setting up suitable processes to respond to these are pivotal for effective risk management under Reach. Companies have to invest significant resources and efforts continuously to meet this challenge, but will eventually be rewarded with a competitive edge through compliance.

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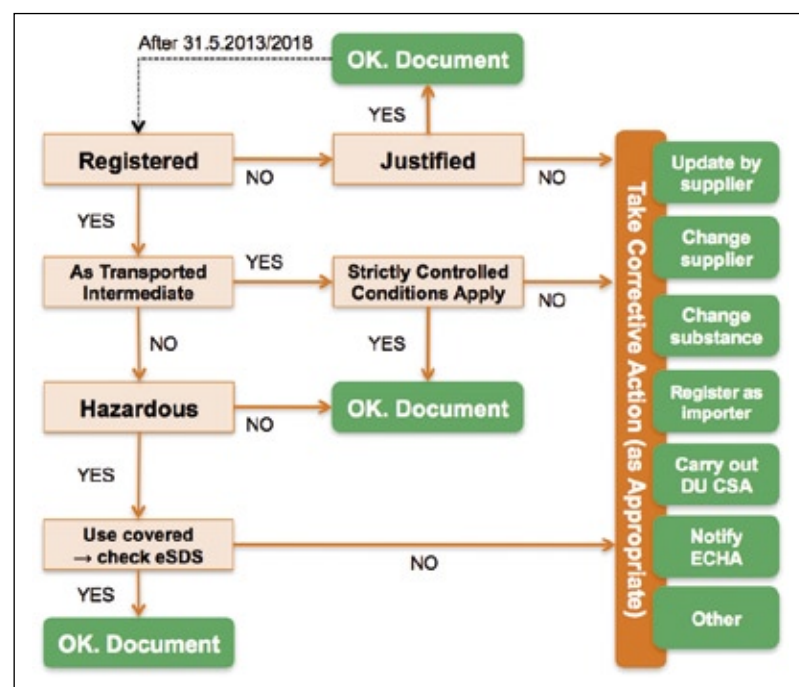


Fig. 1: Check list for purchasing registration-compliant substances

REACH compliance act	Scope*	Option 1: Reliance	Option 2: Self-Compliance
Registration	Substances ≥ 1 t/y	Upstream manufacturer, importer or OR registers	DU becomes importer and registers
Downstream use chemical safety assessment (CSA)	Registered substances requiring CSA	Upstream registrant performs CSA for DU uses	DU performs CSA for own uses and notifies ECHA
Authorisation	Substances in Annex XIV	Upstream manufacturer or importer applies for authorisation of DU uses; DU notifies ECHA	DU applies himself for authorisation of own uses

*Specific exemptions may apply.

Fig. 2: Downstream users (DU): Reliance or self-compliance?

Dow Chemical, Lehigh Collaborate on Tire Materials

Dow and Lehigh Technologies announced that they have partnered to conduct collaboration targeted at making tires more sustainable. Lehigh Technologies noted that Dow and Lehigh will combine pro-

proprietary technologies to modify the rubber particles. The program will combine Dow's expertise in polymer chemistry with Lehigh's expertise in sustainable rubber compound development and testing.

Linde Carbon Capture Project Receives U.S. DOE Grant

The U.S. Department of Energy has awarded \$15 million to Linde for the advancement of carbon capture technologies. Linde is building a pilot plant in Wilsonville, Ala., which will be operational by early 2014, the company said. The facility will test novel CO₂ scrubbing solutions to reduce the energy consumption and costs of advanced carbon capture and separation systems for coal-fired power plants.

The pilot plant will be designed to capture at least 90% of the CO₂

generated at an increase in the cost of electricity of no more than 35 percent. This would represent a significant improvement over existing technologies that can add as much as 80% to the cost of electricity, the company said.

The new plant will be based on the experience gained in a comparable project in Niederaussem, Germany. Since 2009, Linde has been testing new CO₂ scrubbing solvents in collaboration with electricity supplier RWE and BASF.

BASF to Increase Copper, Copper-Chrome Catalyst Capacity

BASF has announced a new round of capital investment projects to increase its production capacity and further enhance its global manufacturing operations for copper and copper-chrome catalysts. The company said the investments are aimed

at improving catalyst manufacturing efficiency to meet increased global demand. They follow an earlier round of process improvement and capacity enhancement projects for the copper-chrome product line that were completed earlier this year.

Praxair Distribution Acquires Weldco Assets

Praxair Distribution, a subsidiary of Praxair said that it has acquired the assets of Weldco Inc. Financial terms of the transaction were not disclosed. Weldco is an independent distributor of industrial and specialty gases and ancillary welding

equipment, supplies and services. The acquisition of Weldco complements several other recent acquisitions made in the first half of 2011 and those expected to be completed by year-end.

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Obligated To Oblige

Safety Data Sheets and Other Reach Information Responsibilities

Best Practice Solutions – After the enforcement of the Regulation (EC) No. 1907/2006 (Reach) in 2007, and now after the end of the first registration deadline in 2010, the industries have gathered lots of experience how to deal with the legislation. But there are left some tasks in the process where best practice solutions are still needed. One of those issues is how to provide supply information up and down the supply chain fully compliant to Reach.

Since Reach expects the exchange of substance information up- and downstream, companies have to face the challenging task of providing and requesting Reach-compliant information to their customers and suppliers. That information relates to the registration status; the substances properties and hazards; the safety and handling information; and the presence of substances of very high concern (SVHC) placed on the European Chemical Agency's (ECHA) candidate list or already listed in Reach Annex XIV as substances subjected to authorization.

Different Roles, Different Obligations

An EC resident legal entity may face very different information obligations. This is dependent on their individual Reach role as manufacturer or importer; downstream user or distributor of chemicals; only representative (OR); and/or producer or importer of article. It is also dependent on the Reach status of their products as substances or isolated intermediates, mixtures or articles.

These obligations for information in the supply chain specified by the Reach title IV with the Articles 31 to 36. The need for information is not only due to the individual obligations, but also for securing the future availability of substances. Thus the correct style to provide the required information also is very important. A graphic overview on the information obligations can be found on www.fit4reach.eu/files/sdb.pdf.

Manufacturers and importers of chemicals (substances, intermediates or mixtures) with residence in the EC have to pre-register and register all manufactured or imported substances – or cease their production or import. If manufacturers and importers are placing a hazardous substance or preparation on the EC market as suppliers, according to Reach Article 31 they shall provide the recipients of the chemicals with a safety data sheet (SDS), and this SDS shall be worked-out by a competent person.

The SDS must meet the structure required by Reach Annex II and should cover all information on the substance's properties and hazards; risk descriptions and measures sufficient for safe handling; the registration status and registration number; and also possible restrictions and administrations of the substance. The SDS can be submitted to the recipient on paper or electronically. The Annex II meanwhile was amended by the Regulation (EC) No. 453/2010.

After the executed registration of a hazardous substance, the SDS information must correspond to the information submitted in the registration process, especially to the information of the chemical safety report (CSR). At a market level of 10 tons or more per year, the SDS has to be supplemented with an annex containing the exposure scenarios

(ES) covering all identified uses of the substance.

Downstream users and distributors of chemicals are also obliged to provide their recipients with SDS according to Reach Article 31 and Annex II, but they usually depend on information from their upstream suppliers. If these upstream suppliers are not resident inside the EU, and the chemicals are subject of imports and thus the distributors become importers, then a double-burden of registration and information obligations may occur.

Only Representatives

Since Reach does not apply outside the EU, entities located abroad have no obligations. But according to Reach Article 8, a manufacturer of chemicals outside the EU may appoint a natural or legal person resident in the EU to act as only representative (OR). In place of the manufacturer outside the EU, the OR is enabled to perform registrations and other obligations of the title II of Reach, e.g. to submit information and notifications to the ECHA. The previous importers must be informed about this appointment, since within this appointment they are exempted from the registration obligations and become downstream users again.

The OR is not a supplier, distributor or importer of chemicals, and it does not place chemicals on the EC market. It is supposed to be a pure service provider and data manager, and it also has no trade relations with the EC importer. Thus, the obligation to provide the recipients of the chemicals with SDS according to Article 31 and Annex II still remains with the former importers who place the chemicals on the market. The OR may provide relevant information and may support or work-out a SDS, but it is not the responsible editor and supplier.

If the chemicals – substances and mixtures – placed on the market are not hazardous, and the mixtures are not hazardous and do not contain hazardous ingredients above specified concentrations, then neither safety data sheets (SDS) nor exposure scenarios (ES) on all identified uses are required. But according to Reach Article 32, the supplier shall provide the recipients with information on the registration, including the registration number; on the restriction or authorization status; use conditions; and risks and risk-management measures. This information can also be submitted to the recipient on paper or electronically.

SVHC

Moreover if articles, e.g. paper products or textiles, household plastics or toys, technical hardware or devices, contain substances of very high concern (SVHC) above 0.1% which are referred to the ECHA candidate list, according to Reach Article 33 the professional recipients (immediately) and the private consumers (on demand within 45 days) of the article must be provided with information on the identity of the SVHC, and also on the conditions of safe use.

In both the cases of non-hazardous chemicals and articles of course no legal obligation exists to submit a safety data sheet (SDS) according to Reach Article 31 and Reach Annex II. But it may be a very attractive option to fulfil the information obligation from Reach Article 32 for non-hazardous chemicals and from Reach Article 33 for SVHC-containing articles by issuing and submitting a product safety data sheet (PSDS) following the structure and content of the Reach Annex II, joining legal compliance with prac-

tise oriented design and marketing functionality.

Marc Kiener & Dr. Wolfgang Pahlmann - Fit4Reach Likedealers

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Saltigo at the BOS Forum

Broad Service Portfolio for Early Phases of Pharmaceutical Development

Saltigo, a wholly owned subsidiary of the specialty chemicals group Lanxess, is a "Silver Sponsor" of both these events. It uses the platform to proactively showcase itself and its API development and manufacturing services to a large number of both established big pharmaceutical companies as well as a much wider range of smaller Biotech companies.

Tony Jones, head of Marketing & Sales in Saltigo's Pharma business line, explains, "forums such as the BOS event in London provide Saltigo with a tremendous amount of valuable information regarding the ever changing dynamics of the pharmaceutical industry. From attending the presentations by industry experts to the many one-on-one meetings with our customers and other attendees, we are able to get a much better understanding of the future services these organizations will require to achieve their own business objectives. With a better understanding of our customer's needs, we can continue to evolve, expand and development our own service offering to ensure that both current and future service market requirements can be professionally provided by Saltigo."

Strategic investments totaling several million euros over the last three years has enabled Saltigo to expand its customer base both geo-

API Development – Changing demands and requirements in the design and implementation of work programs associated with both non-clinical and clinical phase development of novel APIs is one of the key topics to be covered in the BOS Forum on Sept. 20 at the Royal College of Physicians in London. This event follows the BOS cmc Forum held this year in June in Copenhagen and provides complementary information to cover the entire life cycle activities of API development.

graphically and to develop a more balanced product portfolio covering projects in each phase of development/commercialization. In the same time period the pharmaceutical industry has experienced an unprecedented level of change with consolidation through the mergers and acquisitions of several major pharmaceutical companies, offset by continued growth in the number of emerging pharmaceutical companies.

Jones adds, "over the past three years, the industry has changed dramatically and we have had to monitor these changes and decide how best to position Saltigo on a market basis or more importantly, on a customer by customer basis. Customizing our services to help our customers overcome their specific project challenges has been a key aspect of our success and one that also brings with it tremendous demands on the flexibility of our organization. Hence, good communication is a key factor for success and as a result our entire project teams now work much more closely with our customers and everyone has a

much clearer understanding of the importance of meeting timelines in full (OTIF) and the commercial requirements of each project in its own particular market area. Each project has different needs and has to be approached with this in mind. A clear specification of the needs of the project is essential for appropriate planning and successful execution of the project goals."

Dr. Christoph Schaffrath, one of Saltigo's Pharma business managers, further highlighted this diversity in his summary of Saltigo's meetings during the BOS cmc Forum held earlier this year in Copenhagen.

"Throughout the event I was able to talk with representatives from many different organizations and for more established Pharma companies these the discussions were in general geared towards Saltigo achieving clearly defined manufacturing activities for certain novel API projects. However, for some of the smaller organizations the discussions were on a more consultative basis in which Saltigo's own advice on project development plans should be structured and how we could as-

sist more actively in regulatory matters."

In summary, Jones concluded, "in our three years of sponsorship of the BOS events, we have seen a great deal of change in the needs of our customers. One common theme which runs throughout this period is the increased focus on predicting future cost of goods much earlier in product development activities. In the past, the potential efficacy of a novel drug was often the primary driving force behind the early clinical development of potential new APIs. Now, the funding of these early activities requires more closely monitoring cost issues both in terms of achieving key milestones and long term cost of goods. More and more we are being asked to provide innovative solutions to develop process chemistry to meet necessary price points for development of the final drug product. On this aspect, Saltigo has a considerable depth of experience and proven track record for cost improvement throughout all of its businesses. This is a fact which is positively received by both our customers and equally important their financial investors."

Contact:
Tony Jones
Head of Marketing & Sales Pharma
Saltigo GmbH
www.saltigo.com

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A tumbling dryer in an API unit in Leverkusen, Germany

Want more information?

To learn more about the BOS Forum, go to <http://ht.ly/6hpNe>

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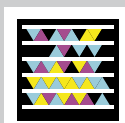
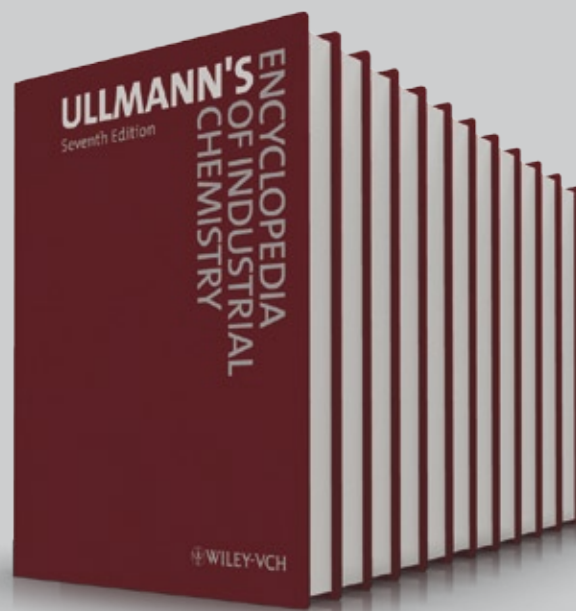
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Hikma Pharma, Vifor Pharma Enter into Licensing, Distribution Deal

Hikma Pharmaceuticals said that its wholly-owned subsidiary Hikma Pharmaceuticals Ltd. has entered into a licensing and distribution agreement with Vifor Pharma, a wholly-owned subsidiary of Galenica Group.

Under the agreement, Hikma will market Ferinject, Vifor Pharma's innovative treatment for iron deficiency, in the Middle East and

North African region or MENA. In addition the agreement will also leverage Hikma's local presence, regional marketing and regulatory expertise, allowing Hikma to maximize the potential of one of the world's fastest-growing markets for iron deficiency products. Hikma, with over 1,600 sales and marketing staff in the region, will get exclusive rights to market and

distribute a product that complements its portfolio of prescription pharmaceuticals.

The MENA pharmaceutical market is expected to grow at an annualized rate of around 11% over the next five years, offering excellent growth potential for high quality innovative pharmaceuticals such as Ferinject, the company added.

Carlyle in Talks to Buy Pharmaceutical Product Development

Private-equity Carlyle Group is in talks to acquire Pharmaceutical Product Development Inc., media reports said, quoting people familiar with the matter.

Carlyle Group edged out other private-equities such as Blackstone Group, KKR & Co., and Hellman & Friedman that evinced interest in the clinical research company. Most

bids were between \$33 and \$38 a share, or as much as \$4.3 billion.

Carlyle is also said to be in talks with other private-equity firms regarding involvement in the acquisition of North Carolina-based Pharmaceutical Product Development Inc.

For Carlyle, the purchase of Pharmaceutical Product Development Inc. would be its largest since an-

nouncing the \$3.9 billion wrap-up of CommScope in October. Separately, Carlyle today said it will sell Insight Communications Co. to Time Warner Cable for about \$3.0 billion.

Pharmaceutical Product Development Inc., a contract research organization, provides drug discovery, development, and lifecycle management services.

Johnson & Johnson Reaches Agreement on Risperdal Misdemeanor Charge

Healthcare giant Johnson & Johnson has reached an agreement to settle a single misdemeanor charge related to its antipsychotic treatment Risperdal, the company said in a recent regulatory filing.

"An agreement in principal on key issues relevant to a disposition of criminal charges pursuant to a single misdemeanor violation of the Food Drug and Cosmetic Act has been reached, but certain issues remain open before a settlement can be finalized," J&J said. The company added that it has adjusted the accrued amount in the second quarter

to cover the financial component of the proposed criminal settlement.

Sales practices for the drug have been under the scanner since 2004. J&J said its Janssen unit received a subpoena from the Office of the Inspector General of the United States Office of Personnel Management in that year seeking documents concerning sales and marketing of the drug from 1997 to 2002, among others.

Documents subsequent to 2002 were also requested by the Department of Justice. An additional subpoena seeking information about marketing of, and adverse reac-

tions to Risperdal was issued by the United States Attorney's Office for the Eastern District of Pennsylvania in November 2005.

J&J said the Department of Justice and the Attorney's Office for the Eastern District of Pennsylvania are continuing to actively pursue both criminal and civil actions. The company also noted that discussions have been going on with state and federal government representatives to resolve the separate civil claims related to the marketing of Risperdal and another drug Invega, including those under the False Claims Act.



PEOPLE



Dr. Hans-Josef Ritzert



Dr. Jean-Luc Herbeaux

Dr. Hans-Josef Ritzert to Head Evonik's Chinese Business Evonik has appointed Dr. Hans-Josef Ritzert as its regional president of greater China, effective Sept. 1. Ritzert currently heads the company's Exclusive Synthesis & Pharma Amino Acids business. Ritzert takes over the position from **Dr. Dahai Yu**, who was appointed to Evonik's executive board in April. **Dr. Jean-Luc Herbeaux** will head

the newly formed Health Care business line. Herbeaux, who has been leading the company's Pharma Polymers business since the beginning of 2009, joined Evonik Industries (then Degussa) in 2000.



Luke C. Kissam

Luke Kissam Elected CEO of Albemarle Albemarle has promoted Luke C. Kissam to CEO, effective Sept. 1. Kissam joined Albemarle in September 2003 as vice president, general counsel and corporate secretary. Prior to joining Albemarle, Kissam served as vice president, general counsel and secretary of Merisant, having previously served as associate general counsel of Monsanto. Current CEO Mark C. Rohr will continue as executive chairman of the Albemarle Board of directors.

Rich Wells Named VP and Site Director of Dow's Michigan Operations Dow Chemical has announced that Rich Wells, vice president, global government affairs and public policy has been named vice president and site director of Michigan Operations. He replaces **Earl Shipp**, who has been named vice president and site director for Texas Operations. He will join the manufacturing & engineering operating committee.

Richard DeLuca Named President of Merck Animal Health Merck & Co. has appointed **Richard DeLuca Jr.** as executive vice president and president, Merck Animal Health, effective Sept. 15. DeLuca will report to Kenneth Frazier, Merck's president and chief executive, and would serve on the company's executive committee. DeLuca is succeeding Raul Kohan, who has decided to retire from the company. DeLuca has served as chief financial officer of BD Biosciences since 2010.

EPCA Promotes Chemistry in Brussels and Berlin

The year 2011 has been declared by the United Nations as the International Year of Chemistry (IYC). The European Petrochemical Association (EPCA) has been an active supporter to the IYC by becoming a global partner with the UNESCO (United Nations Educational, Scientific and Cultural Organization) and IUPAC (International Union of Pure and Applied Chemistry). Jointly these three partners have made a film called "Chemistry: All About You" that is being distributed through their respective worldwide networks and via the social media YouTube, Twitter and Facebook.

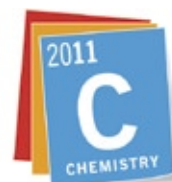
The year 2011 has been declared by the United Nations as the International Year of Chemistry (IYC).

In addition to the European Petrochemical Association EPCA's efforts to support the IYC and to mark its 45th anniversary, EPCA will run an outdoor campaign in Brussels and Berlin. The campaign will promote chemistry with the general public and will run from the second half of September until early October.

This initiative underlines EPCA's sustained efforts to promote chemistry as a provider of sustainable solutions for the world's global challenges. It helps to explain to everyone that the chemical industry helps to make the world a better, safer, more enjoyable place to be.

The campaign will use stills from the film Chemistry : All About You to underline the major contribution of chemistry to people's daily lives in areas such as access to drinkable water, food, health and health care, energy and efficiently friendly transportation and buildings, comfortable clothes, communication and leisure.

In Brussels, the campaign targets both EU policy makers as well as the general public and will run for the second half of September. The film will be shown on cubes in the train



International Year of CHEMISTRY 2011

stations of Luxemburg and Brussels Midi and in the metro station Schuman. In addition to these cubes, there will be a poster campaign in the said stations, as well as in metro stations Arts-Loi and Merode.

In Berlin, the outdoor campaign will take place on the occasion of the 45th EPCA Annual Meeting. From Oct. 1-5, the film will be shown on a giant screen in the Sony center, a business/commercial complex located at Potsdamer Platz and via the "Berliner Fenster" in the passenger coaches of the Berliner metro. A poster campaign identical to the one in Brussels will run from Sept. 27-Oct. 3 in the U29 network, via 300 City Light Poster boxes all over Berlin in places visited by tourists and young people under age 29. Mobile City Light posters will also be placed at the entrance of five hotels used by EPCA for its conference.

About EPCA

EPCA is a non-advocacy body bringing together more than 600 global companies working in or for the petrochemical industry. It serves as network, platform to meet, exchange information, transfer of learning and think tank for its member companies and stakeholders all over the world.

www.epca.eu



EVENTS

Pharma ChemOutsourcing, Sept. 12-15, Long Branch, New Jersey ChemOutsourcing is an annual pharmaceutical chemistry show. The conference features over 100 speakers, mostly chemists from pharma and biotech companies, and an exhibition for 100 chemistry service providers. Every year, increasing numbers of small molecule biotechnology company chemists are speakers and attendees at the show. The conference discussions center around chemistry sourcing/outsourcing, process R&D, chemical development, CMC, procurement, medicinal chemistry, drug discovery, and new chemical technologies.

www.chemoutsourcing.com

Pharma Outsourcing and Procurement, Sept. 26-27, Berlin The Pharma Outsourcing and Procurement Summit 2011 addresses the urgent need for pharma to identify and locate the best outsourcing partnerships and solutions to stay competitive in an uncertain climate whilst addressing heightened regulatory pressures and the need to maintain high quality standards.

www.outsourcingevent.com

EPCA Annual Meeting, Oct. 1-5, Berlin The European Petrochemical Association (EPCA) represents the top global petrochemical producers and their major international service providers, as well as their suppliers and customers from all over the world. This year's annual meeting business session program will focus on the chemical industry and how it stands for over 95% of the world around us. EPCA's approach will provide a holistic as well as a pragmatic view on key elements that can drive the business community forward.

www.epca.eu

Powtech and Technopharm, Oct. 11-13, Nuremberg, Germany Powtech is the international forum for the latest developments in the chemical industry and Europe's top get-together for process technicians, process engineers, production managers and scientists. All the relevant manufacturers of mechanical processing technologies present cutting edge powder, granule and bulk solids technologies at the leading exhibition.

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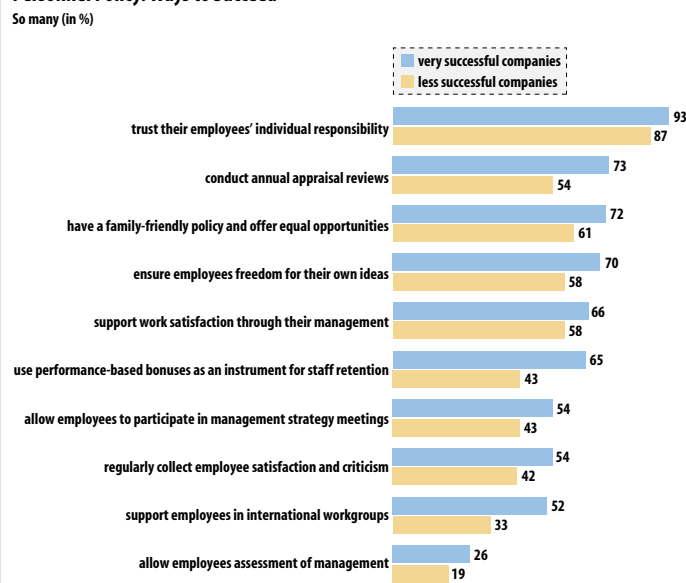
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Strategies For Employee Management

Personnel Policy: Ways to Succeed



In July-August 2010, 1,853 people with personnel responsibility were polled by the Cologne Institute for Economic Research. These numbers are based on turnover development from 2008-09, the employee development from 2007-09 as well as the expected turnover from 2009-2012.

Source: Cologne Institute for Economic Research

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Long gone are the days of hire and fire; now more than ever, companies have to utilize a two-pronged personnel strategy. According to a recent study conducted by the Cologne Institute for Economic Research, companies have to have flexibility to weather difficult times while keeping good personnel and developing their skills. The institute interviewed 1,853 personnel managers from companies of various sizes; the results showed that most companies rely equally on flexibility and a focus on employees. This makes it possible for them to absorb the shock of fluctuations in demand or a negative order situation through overtime reductions or the reduction of built-up time on timesheets.

Many companies are already feeling the hurt of a skills shortage, which is why one in two companies realizes that measures for staff retention are gaining in importance. In large companies, even three out of four personnel managers agree with this. But what does this really mean? High up on the list is having trust in employees' individual responsibility and annual appraisal reviews. Two thirds of all companies – and almost two thirds of all large companies – require their management teams to improve employee satisfaction.

Personnel Policy: Hot on the Trail



Multiple answers possible; 223 companies were asked from September-November 2009.

Source: Cologne Institute for Economic Research / FOM University of Applied Sciences for Economics and Management

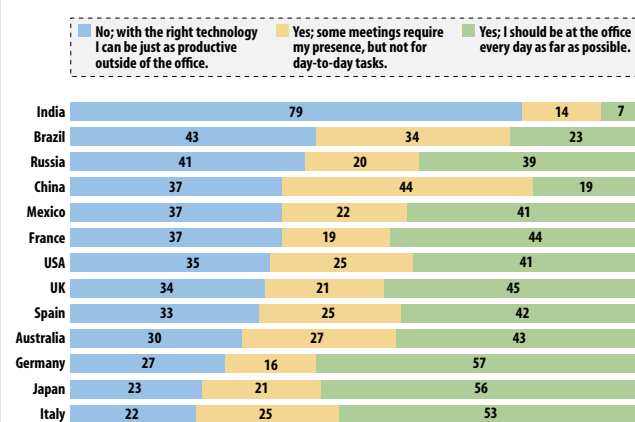
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Innovative and successful companies are the ones to first recognize the value of utilizing an employee-focused strategy. About 7 out of 10 of these companies employ a family friendly and equal-opportunity personnel strategy. The same amount allows their employees freedom to develop their own ideas that benefit the company. Over the half make it possible for their employees to participate in self-dependent learning.

Innovative and successful companies are also at the forefront when it comes to improving structures and processes. Half of them encourage employee participation in internal work groups. Only one third of the non-innovative and unsuccessful companies do this. More than half of the successful companies interview allow their employees to participate in the management's strategy meetings; this number is much lower within unsuccessful companies.

Telecommunication: India Leads the Way

When asked "Do you have to be physically present in the office in order to be productive," so many (in %) employees answered:



1,303 employees in companies with at least 10 workers were asked between August and September 2010.

Source: Cologne Institute for Economic Research / Cisco

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Another aspect that falls under progressive personnel management is the proliferation of telecommuting in companies. This is a point where the economy is become more and more active. In a survey conducted by the Cologne Institute for Economic Research for the German federal government, 22% of companies allowed telecommuting in 2009, which was three times as many in 2003. Most studies on this topic have the same tenor: Telecommuting is advantageous for both employees and employers. Competition between companies for the best personnel is in full force, which means it's in the employer's best interest to offer the best possible working conditions. Many companies also consider allowing telecommuting to be an environmental decision: It reduces the transportation between home and work.

Source: Cologne Institute for Economic Research



Elementally Creative – BASF's Visitor Center offers its guests a chance to get up close and personal with chemistry. With its interactive periodic table of elements in honor of the International Year of Chemistry, BASF offers its visitors the chance to learn more about the elements via cameras and displays.

In the exhibition, there is a glovebox with 103 chemical elements in 5x5cm acrylic cubes. All of the elements are in their pure form (except for the radioactive ones), which means they can be seen in their natural states of solid, liquid or gas. Visitors can reach into the glovebox even inspect the elements under a microscope to learn more about them, such as their discoverer, uses or typical characteristics.

The interactive system was awarded the red dot designer prize in the category of Communication Design in July. The price is seen as a worldwide accepted seal of quality for excellent design. This year, 6,468 works from 40 countries competed for a red dot award. Less than one tenth of all exhibits won an award. www.de.red-dot.org

Coming up in our October issue

Gear up for the CPhI in Frankfurt with these topics:

- Short interviews on what's moving the pharmaceutical ingredient industry from leaders from companies such as **Saltigo**; **AllessaChemie**; **Dottikon**; **Sumitomo Europe**; **BASF**; **Merck KGaA**; and many more!
- **Molly Bowman** and **Bob Kennedy** from Thomson Reuters ask if **India and China** the only future for API sourcing
- Our **China expert Kai Pflug** examines the world of specialty chemicals in **China**
- **Kristof Szent-Ivanyi** of **GlaxoSmithKlein** takes an in-depth look at the changing features of the **CMO-pharma relationship**
- **D Young & Co** associate **Connor McConchie** explains the importance of **patenting in specialty chemicals**
- **Chemical industry legend Peter Pollak** talks about the second edition of his book "Fine Chemicals and the Industry."
- And much more!

CHEManager Europe 10/2011 will be out on Oct. 20!

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