Chemicals

Sector Report - 2nd in a series

Eurosif
European Social Investment Forum

*This Eurosif sector report has been compiled with research by EIRIS. It describes **five key social, ethical and environmental (SEE) challenges facing the European chemicals industry** and the associated risks and opportunities these pose for long-term returns. It is our view that European investors will increasingly expect European chemical companies to show strategic competence in the management of these challenges. Although considered a part of the chemicals industry, issues uniquely relevant to the pharmaceuticals and life sciences industries are not specifically addressed in this paper.*

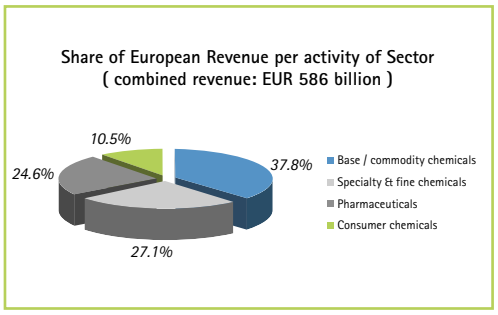
Chemical Features

In the last 20 years the chemical industry has made impressive gains in the management of safety, health and environmental issues through the Responsible Care programme[1]. Responsible Care is a global voluntary initiative under which chemical companies commit to continuously improving their health, safety and environmental performance, and to communicating with stakeholders about their products and processes.

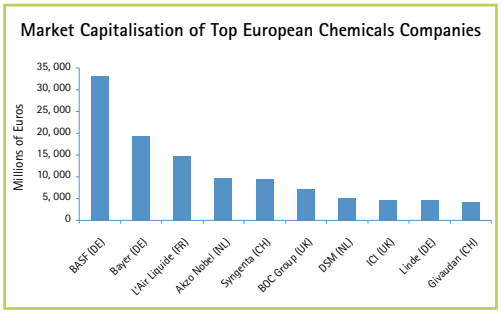
The chemical industry is Europe's third largest manufacturing industry. Multi-national companies account for approximately 70% of Europe's chemical production while representing only 4% of the total number of enterprises involved[2]. This is indicative of a highly consolidated industry.

The industry covers four broad product areas: base/commodity chemicals, specialty and fine chemicals, pharmaceuticals, and consumer chemicals. In 2004, world chemical sales were estimated at €1,736 billion, with revenues from the enlarged EU (25 member countries) totalling €586 billion.

Taken together, the EU 25, Asia and USA account for more than 85% of the world turnover[3]. In 2003, 16 of the 30 world chemicals majors had their headquarters in the EU 25, with a combined sales turnover of €366 billion.



Source: Cefic, 2005



Source: FTSE, 2005

Chemical Trends

Total global production of chemicals is expected to grow rapidly in the next 20 to 30 years. The OECD estimates that by 2020, global output from the chemical industry will be 85% higher than in 1995. It is also expected that fewer and larger multi-national companies will dominate the industry as consolidation continues[4].

There is some uncertainty over the future growth of capital investment in European chemical production due to several factors including: slow demand growth in Europe, high demand growth in Asia (especially China), increasing imports from Asia and the Middle East, relatively high production costs in Europe (labour, feedstock and energy costs), and the increasingly regulated nature of the European chemical industry. Notwithstanding, optimistic forecasts suggest that European chemical production may grow by as much as 3.3% per year over the next decade[5].

Due to these factors, the European chemical industry is moving towards higher added-value products and services and significantly improved environmental and health & safety performance[6]. Innovation and sustainability are becoming primary industry considerations, evidenced by the pre-eminence of the Responsible Care programme and the growing presence of corporate social responsibility and eco-efficiency concepts within many of Europe's leading chemical companies.

1 Source: Responsible Care Annual Report Europe 2003-2004.
2 Source: EU Strategy for a Future Chemicals Policy (2001).
3 Source: Cefic Facts and Figures: The European chemical industry in a worldwide perspective: July 2005.
4 Source: OECD Environmental Outlook for the Chemicals Industry (2001).
5 Source: Horizon 2015: Perspectives for the European Chemical Industry.
6 Reference: Vision for the sustainable production and use of chemicals. Report produced by Forum for the Future on behalf of the Chemistry Leadership Council (CLC).

Five Key Challenges

SEE Issues

SEE Risks & Opportunities

Climate Change

The chemical industry consumes over 79 million tonnes of oil (equivalent) in fuel and power annually. This is equivalent to roughly a quarter of the EU-15's total industrial energy consumption[7].

The European chemical industry has made noteworthy gains in energy efficiency over recent decades, as many old plants have been replaced with larger, more efficient ones. In 2003, energy consumption per unit of production was 33% lower than in 1990 and 47% lower than in 1980[8]. These energy efficiency gains have helped stabilise total greenhouse gas (GHG) emissions while production levels have increased.

However, recent projections suggest that the EU 15 as a whole is unlikely to meet its Kyoto targets without extensive use of market-based mechanisms and more ambitious programmes to cut greenhouse gas emissions[9]. The EU GHG Emission Trading Scheme (the EU ETS), launched in January 2005, is thus a crucial part of Europe's strategy to achieve the necessary reductions in line with its Kyoto commitments. A number of chemical manufacturing sites are included in the scheme, which encompasses a range of energy producing and industrial facilities including cogeneration/combined heat and power (CHP) installations. Europe's GHG strategy will also rely heavily on a range of domestic policies and measures to reduce GHG emissions including the promotion of biofuels in transport.

EU ETS registered sites are likely to face tougher restrictions on industrial GHG emissions as the scheme enters its second phase[10] and beyond.

As power generators in Europe face tougher carbon constraints, higher electricity prices are expected (especially in the context of already higher natural gas and oil prices). Electricity constitutes a significant proportion of the chemical industry's overall energy spend and roughly 40% of all energy consumed. Energy efficient technology is thus likely to become a significant source of competitive advantage for companies that are able to pass on energy savings to their downstream customers.

Significant revenue growth for specialty chemical firms may also be derived from the development and marketing of chemical products which help to reduce energy consumption (e.g. advanced catalysts, insulation materials and light weight materials for vehicles), as well as materials for new energy technology (e.g. solar photovoltaic cells and fuel cells).

Most chemical plants are located next to large water sources. As global warming intensifies, industrial installations positioned in low lying or flood prone areas, may face severe damage from extreme weather events associated with climate change.

Resource Use

The chemical industry is heavily dependent on oil and natural gas as the key product feedstock. The European chemical industry consumes over 75 million tonnes of oil (equivalent) in gaseous and liquid hydrocarbon feedstock annually, slightly less than the amount of oil and gas consumed to meet its energy requirements[11]. Large customers of this sector that are likely to differentiate their product or brand on the basis of environmental considerations, will no doubt also demand less fossil fuel based chemicals in favour of more renewable, bio-derived ones. Currently few commercially viable bio-routes to producing common industrial chemicals exist. However, in a high-energy price environment, research into new biotechnology for chemical production may become increasingly attractive and common.

Innovation and moves toward sustainability within the sector will also mean greater focus on resource efficiency issues, as companies try to achieve more with less. Novel catalysts, process improvements and advanced materials (including nano-based materials) have been identified as areas of strategic emphasis in this regard[12].

The chemical industry is likely to become increasingly vulnerable to price fluctuations and security of supply concerns as production of non-renewable fossil fuels peaks. The development of alternatives to fossil fuels as a primary input factor to production will be a key feature of moves toward sustainability across all sectors. This is a potential source of competitive advantage for chemical companies that are able to make this transition themselves, or facilitate transition in other related industries by advancing new technology.

Modern industrial biotechnology is likely to play an important role in any move away from fossil fuel based chemical synthesis and energy production. Leaders in this area will be well positioned to benefit from investment and market opportunities in bio-derived products (e.g. biodiesel) at the expense of laggards, provided stakeholder concerns about GMOs can be addressed and required quantities of bio-feedstock can be reliably sourced.

As eco-modernisation trends increase demand for the integration of resource efficiency and recycling considerations into all aspects of product life cycles, major consumers of chemical products will become increasingly reliant on their 1st tier suppliers of specialty chemicals to provide novel and innovative solutions for their business needs. Manufacturers will increasingly look to form B2B partnerships with specialty chemical suppliers to develop such alternatives.

Chemicals of Concern in Products

There is growing scientific research into, and public concern over, the environmental and health risks associated with wide-spread use of certain synthetic chemicals[13]. Concern is greatest over chemicals which are toxic, highly persistent, long-range, and which bioaccumulate in wildlife and humans (i.e. so-called persistent organic pollutants (POPs) and endocrine disrupting chemicals (EDCs), such as dioxins and furans, PCBs and phthalates[14]). These concerns have resulted in pressure from NGOs on consumer product retailers to adopt more responsible sourcing practices, and a growing trend amongst retailers of adopting 'green' chemical sourcing policies for their supply chains[15].

Although the use and disposal of such chemicals has been linked to a number of human health concerns such as various forms of cancer as well as reproductive and developmental effects, there are still relatively few data available on the health impacts of a large number of chemicals widely used in the European marketplace. The proposed EU Regulation and Authorisation of Chemicals (REACH) Directive, final adoption of which is expected in 2006, is geared at addressing this lack of information and in turn providing a basis for the establishment of better safeguards for public health. Estimates of the direct cost of REACH in terms of testing and registration over its 11-year phase-in period range from €1.4 billion to €12.8 billion, corresponding to a maximum of 0.3% of industry turnover[16]. These estimates vary widely, indicative of broad uncertainty about the true costs of the programme to the industry. However, the total benefits of REACH are expected to significantly outweigh the direct cost of implementation over a 30 year period, in the form of improved public health and reduced environmental hazards[17].

New legislation such as the REACH Directive, the Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive, and other significant EU legislation, are expected to drive product-detoxification trends within the consumer product industry for the foreseeable future. This will most likely increase demand for safer chemicals amongst consumer product manufacturers, creating both challenges and opportunities for their specialty chemical suppliers.

Over the next 5-10 years, 'green' chemical innovation could be a significant source of competitive advantage for companies manufacturing chemicals used in consumer products, particularly in markets where brand or product differentiation based on 'green' credentials is a key component of value for the final consumer.

Chemical Process Safety

The nature of the chemicals industry is one of high exposure to health risks and the threat of major pollution incidents. High profile accidents such as those at Flixborough, UK in 1974, Seveso, Italy in 1976, and Toulouse, France in 2001 have contributed to persistent societal unease about the safety of the industry as a whole.

The European chemical industry has in recent years stepped up efforts to improve process safety, which have resulted in reductions in lost time injury frequency rates (LTIRs) and occupational illness frequency rates (OIFRs) for the industry overall. From 1998 to 2002 LTIRs decreased by approximately 24%. Initiatives have also been introduced to improve transport safety through the development of best practice guidelines and systems, for example the Safety and Quality Assessment Systems (SQAS) developed by Cefic to evaluate the safety and quality performance of transport companies and other logistics service providers. Notwithstanding these efforts, the impact of chemical accidents remains high given the nature of the substances and processes involved[18].

Damage to local licences to operate could arise from another high profile chemical incident. Public perception of the industry as a whole could worsen as a result, off-setting the gains made by the industry in improving public confidence over the last 10 years.

Widespread adoption of strategies to systematically improve chemical process safety (e.g. by minimising the need to transport or store onsite large volumes of hazard materials, and designing inherently safer chemical processes) would help to improve the industry's image and goodwill amongst regulators and the wider public. This would also temper growing security concerns of terrorist threats at large chemical plants.

Marketplace Conduct

The competitiveness of the European chemicals market requires that large companies not abuse their dominant positions or engage in anti-competitive practices[19].

In a global and increasingly consolidated industry, the risk of firms engaging in anti-competitive behaviour is high. For example, in February 2005 the European Commission charged 18 chemical firms with conspiring to fix prices of hydrogen peroxide and derivatives of sodium perborate and sodium percarbonate between 1994 and 2001. Also, in January 2005, three companies (Akzo Nobel, the Hoechst unit of Sanofi-Aventis and Arkema) were fined a total of €217 million for operating a cartel in the market for monochloroacetic acid (MCAA). Fines totalling €66.34 million were similarly imposed in 2004 against Akzo Nobel, BASF and UCB for price fixing and market sharing in the choline chloride market[20]. Under EU law, the Commission may impose fines for anti-cartel violations of up to 10% of a firm's annual turnover.

The European Commission recently adopted major reforms to enhance the efficiency and effectiveness of detection and enforcement of competition rules, which entered into force in May 2004. These reforms allow greater involvement of national courts and national competition authorities in enforcement by making Articles 81 and 82 of the EC Treaty directly applicable in their entirety within member states. By the end of 2005, the European Commission intends to present a Green Paper outlining options to improve the current system of private enforcement against anti-competitive activity. Companies will thus need to enforce their codes of conduct more vigilantly or risk greater penalties for anti-competitive practices in the future.

7 Source: Cefic Facts and Figures. The European chemical industry in a worldwide perspective: July 2005.
8 Energy efficiency improvements quoted pertain to the chemical industry of the EU 15. (Source: Cefic Facts and Figures).
9 The EU is a signatory to the Kyoto Protocol to the United Nations Framework Convention on Climate Change, under which it has committed to collectively reduce GHG emissions by 8% from 1990 levels by 2008-2012.
10 The EU ETS is divided into phases. Phase I, is three years in length (2005–7), while Phase II, will run for five years (2008–12).
11 Source: Cefic Facts and Figures. The European chemical industry in a worldwide perspective: July 2005.
12 Reference: Crystal Faraday Partnership (2004). Green Chemical Technology 2004 roadmap.
13 Reference: Liroff, R (2005). Protecting Public Health, Increasing Profits And Promoting Innovation By Benchmarking Corporate Governance of Chemicals in Products.
14 Beyond the impact of chemicals in isolation, there are also concerns over the synergistic effects of exposure to so-called 'chemical cocktails', i.e. the combination of chemical substances present in our everyday environment, and their potential to reinforce negative health and environmental impacts.
15 The NGO Greenpeace has had recent success in convincing major consumer products manufacturers such as Puma, Nokia, Adidas, Unilever and Chicco to phase out from own-brand products certain chemicals or chemical groups on its list of hazardous substances. The list includes all synthetic musks, phthalates, alkylphenols and brominated flame retardants, as well as organotin compounds and PVC.
16 Source: Factsheet 1.04. Published by the International Chemical Secretariat, February 2004.
17 Source: Ackerman, F & Massey, R (2004). The True Costs of REACH. Global Development and Environment Institute, Tufts University. A study performed for the Nordic Council of Ministers.
18 Source: Responsible Care Annual Report Europe 2003–2004.
19 Source: An Industrial Competitiveness Policy for the European Chemical Industry, Communication from the Commission (1996).
20 Sources: EU Competition Commission: Annual Report on Competition Policy; in-Pharmatechnologist.com website.

BASF – Reducing CO_2 emissions worldwide

Rising living standards in many parts of the world offer greater scope for growth opportunities. But at the same time, they mean rising energy consumption and CO_2 emissions, while fossil fuel reserves are limited. BASF is actively addressing these challenges by using energy efficiently and developing technologies and products to reduce CO_2 emissions and conserve resources.

In order to supply their production sites with energy, BASF is increasingly using combined heat and power (CHP) plants to generate both heat and electricity. This type of cogeneration plant is the front-runner among energy conversion methods suitable for use on an industrial scale. BASF currently operates 11 of these plants worldwide, including three combined-cycle gas turbines (CCGT) that recently started operating in Nanjing, China.

The turbines will generate 3.5 times more electricity per metric ton of steam than a conventional cogeneration power plant. This will conserve resources and at the same time lower CO_2 emissions by more than 500,000 metric tons annually from 2006 onward. This type of plant should play an important role in reducing specific CO_2 emissions per metric ton of sales product by 10% by 2012.

In production processes, further improvements to catalysts have also resulted in significant energy savings. For example, continual improvements to the catalyst system have made it possible to increase acrylic acid yields significantly. BASF is one of the world's leading producers of acrylic acid, used mainly as an essential ingredient of coatings and paint, as well as raw material for the adhesives, paper, diapers, textile and leather industries. Since BASF has a total annual capacity of approximately 800,000 metric tons of acrylic acid, these energy improvements mean that emissions of carbon dioxide have been cut by about 230,000 metric tons. This is equivalent to the annual electricity needs of about 140,000 domestic households, in other words the size of a small to mid-sized city.

Source: BASF

Akzo Nobel involved in important forest industry development project in Brazil

Eka Chemicals, Akzo Nobel's pulp and paper chemicals business unit, has secured a 15-year supply agreement for the delivery of chemicals to the new Veracel pulp mill at Eunapolis in the state of Bahia, Brazil. The Veracel pulp mill is the largest and most advanced eucalyptus single pulp line in the world. Operating since May 2005, 900,000 tons of bleached eucalyptus pulp will be produced annually from sustainable forest plantations, harvested locally in the Mata Atlântica in the Atlantic Rain Forest.

Eka Chemicals has built and operates a "Chemical Island" adjacent to the pulp mill, which includes a chlorate and a chlorine dioxide plant with a 45 tons per day capacity and an oxygen production unit. Chlorine dioxide is the main active agent in elemental-chlorine-free (ECF) bleaching technology. Treated waste water from well-managed pulp mills using ECF bleaching, is virtually free of dioxin and other persistent, bioaccumulative and toxic substances.

This project shows Eka Chemicals' ambition to provide pulp mills with their whole range of pulp making chemicals "over the fence", eliminating the need for transportation of hazardous chemicals. The concept includes handling the generation of chlorine dioxide on site, a process that is usually managed by the mill. This allows both the pulp mill and the chemical supplier to focus on their core operations and enhances both efficiency and safety.

The Veracel Project, which employs 10,000 people directly or indirectly, spearheads an important economic development resource in the Bahia region, generating tax receipts, jobs and income; purchasing a multitude of services and products from local suppliers; and investing in social and environmental projects as well as improving the region's rural infrastructure.

Source: Akzo Nobel

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