

Winning Formula

There is a Role for Chemical Makers in Clean Technology



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By Kai Pflug

The trend towards clean technologies (cleantech) in China may at first glance be regarded as a threat to the chemical industry. A focus on emission controls, energy saving, and sustainability does indeed impose additional costs on chemical companies and thus may not be welcome. However, this perspective ignores the high importance that chemical materials have for the implementation in almost all areas of cleantech.

Chemicals in Cleantech

In fact, the major objectives of cleantech, such as low-emission power generation and pollution reduction, are almost impossible to achieve without the use of specific and often innovative chemical materials. This applies to a large number of industries. Their uses of chemicals are discussed here.

Conventional Power Generation

With China's energy consumption rising quickly, a large number of new coal-fired power plants are being built. In order to maintain, or even reduce, the emissions from these plants – despite increasing power production – strong efforts are required. Though these are to a large extent in the area of engineering and process control, they also have an effect on demand for products from chemical companies.

Controlling emissions from these plants requires nitrogen oxide catalysts that support the reaction of harmful nitric oxide with ammonia or urea into harmless nitrogen and water.

These catalysts consist of a carrier and active components, which can be metal oxides, precious metals, or zeolites. Companies such as BASF or Südchemie, producers of zeolite and other catalysts, stand to profit from this.

Solar Power Generation

China produces about half of the global capacity of solar panels. Up to now most have been for export, but the financial crisis has led to a slump in orders. However, the government has recently enacted policies to support the industry, including feed-in tariffs and direct subsidies.

As a result, a fast-growing market for polysilicon material has developed that is served by chemical multinationals such as Hemlock, MEMC, REC, Tokuyama, and Wacker. They have been joined by several Chinese companies that only recently started volume production. Polysilicon prices have dropped sharply as a result of the production capacity roughly doubling in 2009, while in the same period demand only increased by 30-40 per cent.

Over the long term these price decreases will lead to further growth of the market as they make solar energy more competitive with other energies, even after elimination of subsidies. Other companies that could see their markets increase are the producers of raw materials for polysilicon, e.g., the monosilane producer Evonik.

Wind Energy

Although the growth of wind energy in China will mostly benefit companies directly involved in the production of turbines, they depend on specific metal alloys in order to achieve the necessary precision of key parts. These are supplied by chemical companies such as HC Starck. In addition, as wind turbines have to resist strong natural forces, they require a broad range of high-performance adhesives, impact modifiers, resins, and additives. For example, Dow has launched a brand of epoxy resins specifically for use by the wind energy industry.

Cars

The motor vehicle is an area in which China is rapidly increasing its standards. In recent years, the time gap between the tightening of European Union (EU) emission standards and the enactment of equivalent Chinese standards has shrunk. Also, China has introduced end-of-life recycling regulations for new cars. A large number of chemical industry segments stand to profit from these developments. These include the producers of emission control catalysts.

For example, BASF supplied nitrogen oxide catalysts, which reduce nitrogen oxide emissions by more than 60 per cent, for more than 1,000 buses used in Beijing. In addition, the Chinese government strongly supports the development of electric cars. This increases the opportunities for battery makers such as the Chinese battery and car producer BYD and their respective suppliers (e.g., the producers of fluoropolymers for membranes). Finally, the global trend towards weight reduction in cars is also visible in China, where plastics will increase their share in the manufacturing of cars. Evonik recently opened a large methyl methacrylate production plant in Shanghai partly in anticipation of additional demand from the Chinese car industry.

Paints & Coatings

In the paints and coatings segment, a stronger shift towards water-based paints has long been anticipated by Western paint manufacturers active in China. So far, however, this shift has been slow to materialise, and local industry experts still do not think it will gain strength soon. Part of the reason is that water-based paints are thought to be inferior in some areas, and generally too costly. Furthermore, China lacks the incentive of a strong do-it-yourself demand for water-based paints as Chinese homeowners tend not to do their paintwork themselves, but hire temporary workers instead.

On the other hand, the government has enacted some regulations, e.g., reducing the content of aromatic solvents in paints and coatings used in the food industry. This has led to increased demand for alternative solvents such as butyl acetate, which have lately seen strong growth. Overall, however, the paints and coatings segment still lags substantially behind Western standards with regard to application of cleantech.

Construction Insulation

Energy saving in construction is another area in which China is substantially lagging behind. One reason is the low cost of

electricity compared to Western countries. Another crucial reason is the way apartments are being built in China's cities. Construction by developers is mass-manufactured and strongly cost-driven, leaving limited incentive to supply decent insulation.

As a result, energy consumption by China's buildings grew by an annual rate of ten per cent between 2000 and 2006 as they became more energy intensive, while China's floor space grew only six per cent annually.

The potentially huge market for chemical insulation materials such as polyurethane, polystyrene, and phenolic resins thus remains largely untapped. Unless the government enforces standards in this area, this is unlikely to change. Nevertheless, Western producers of these materials are lobbying for such regulation with the Chinese government and may get a push from China's commitment to reduce its carbon dioxide output. Major chemical producers of relevant materials such as polyurethane have already set up (or are planning to set up) energy-efficient model houses in China.

One area of movement for house insulation products might come from the retrofitting of existing housing with low-key solutions such as window films. This can be done by the individual owners of flats even after construction has been finished.

Water Treatment

Water treatment has been relatively neglected in China until recently. China uses much more water for production of paper or steel than the developed world, and wastewater often was not treated at all. In addition, the municipal water supply is not safe to drink in most areas.

Even so, the market for water treatment products has of late been expanding by about 14 per cent per year as the awareness of the issue has increased. Of this market, about 25-30 per cent is for chemical treatment, although the growth rate for this sub-segment is slightly slower than for non-chemical treatment. Nonetheless, it still offers promising prospects for producers of corrosion inhibitors, coagulants, defoamers, oxidisers, pH adjusters, and other water treatment chemicals.

Producers consist of many multinationals, including some that are fairly specialised in this segment (e.g., Calgon, Nalco, and Veolia) and more general producers of specialty chemicals (e.g., Ciba, Lanxess, Rohm&Haas/Dow). In addition, the engineering arms of chemical companies such as Bayer also see a substantial market for their process know-how.

Material Suppliers

An examination of the examples given above reveals that chemical companies are rarely the direct providers of cleantech. Rather, they are the suppliers of materials that are then used by other companies to enable these technologies. Often, these new technologies even lead to the replacement of old chemical materials. Thus, the effect of new technologies

on individual chemical companies depends on their portfolio, and even within a company the individual portfolio elements may be affected in different ways. Nevertheless, a few general conclusions can be drawn regarding the effect of cleantech on the chemical industry.

Selected chemical companies in China may profit from the trend towards cleantech despite the additional costs that enhanced environmental protection causes. In particular, companies focusing on specialty chemicals and companies with strong research and development (R&D) capabilities will find themselves at an advantage compared to their less innovative peers. Cleantech may therefore shift the balance within the industry towards larger companies that tend to have superior R&D. Multinational chemical companies may also benefit as their technological level, patent base, and investment in long-term R&D tend to be higher.

By contrast, the weaknesses of large Chinese companies are multiple. Their lack of focus, low technology content, and low degree of internationalisation lower their capability to profit from cleantech despite government efforts to create strong local champions. This holds particularly true as China still lacks a domestic specialty chemicals company that can compete with the biggest global players.

Given this state of affairs, it is probable that the government will pursue an age old strategy when building up domestic industrial capabilities: Buying out or partnering with an international major. Regardless of what it eventually decides upon, a second glance at the cleantech trend reveals that it presents not only risks but also opportunities for chemical companies. ■

Profile

Dr. Kai Pflug is the CEO of Management Consulting – Chemicals, a management consultancy specialising in the chemical industry in China. After obtaining a Ph.D. in chemistry and a master in economics, Dr. Pflug first worked as an R&D chemist for five years before moving into management consulting. In the last ten years, he has helped many major chemical companies while working for a number of consulting companies, including Arthur D. Little. For the last six years he has been based in Shanghai, first as the Chief Representative of a niche consultancy, and now as the head of his own company, Management Consulting – Chemicals. The company strives to offer a high level of experience in Chemicals, China, and Consulting, provided in a flexible and reasonably-priced way.



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