Chemical buyers and suppliers work Green from different angles

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With new regulations and new business cases, the chemicals supply chain continues to adapt in an increasingly global market.

By David Hannon and Gordon Graff -- Purchasing, 12/13/2007

The environmental concerns of chemical buyers and chemical suppliers come in many shapes and sizes. From the purchasing side, there are the short-term concerns of finding supplies and suppliers that are compliant with a growing set of environmental regulations while also taking a longer-term view on how to marry environmental concerns with long-term business strategies. And from the supplier side, there are the challenges of complying with current restrictions and regulations while continuing to bring innovative long-term materials and solutions to their customers.

Supply side economics

In an effort to meet the needs of chemical buyers, the supply base is working furiously to create greener products and materials. Buyers may tend to equate that with higher cost, and in the short-term that is likely to be the case. But over time, some of the Green chemicals could become less costly than conventional chemicals, especially if petroleum prices keep climbing.

Continuously rising oil and petrochemical rates are a likely scenario for the foreseeable future, asserts Roger Shamel, president of Consulting Resources Corp., which could eventually make Green chemistry desirable not only from an environmental standpoint but also from an economic one, as Green chemicals usually come from nonpetroleum sources.

One solvent that buyers and suppliers are targeting in their Green efforts is propylene glycol. In a recent profile of the U.S. solvents industry, market researcher the Freedonia Group estimates that more than 50% of the Green solvents demand consists of propylene glycol and chemicals derived from it. Not only are propylene glycol solvents less toxic than ethylene glycol, with which they compete; they are also obtainable from glycerin, a byproduct of the growing biodiesel fuel industry. Ethylene glycol, by contrast, is made from ethylene, a petrochemical.

Today, glycerin, the source of propylene glycol,"is very, very inexpensive as a raw material," says John Urbanchuk, a consultant with LECG in Emeryville, Calif. As the biodiesel industry takes off and yields a flood of new glycerin, he notes, that economic advantage "should carry through to downstream products made from it," including propylene glycol (see story page 35).

Just how much the cost of naturally sourced chemicals will actually drop as the Green chemistry industry expands is hard to gauge. But early this year, economists at the University of Tennessee

made some estimates for several chemicals. For example, the cost of obtaining succinic acid from cellulosic feedstocks was about 45¢/lb in 2005, and will probably fall to around 40¢/lb by 2015, according to the study, led by Daniel de la Torre Ugarte and colleagues at Tennessee's Dept. of Agricultural Economics. Similarly, levulinic acid obtained from cellulose cost about 59¢/lb to produce in 2005, the report found, and will likely drop to around 26¢/lb by 2015. And lactic acid from cellulose was obtainable in 2005 at a cost of about 45¢/lb, a figure that will decline to about 40¢/lb by 2015.

Some Green chemicals are unlikely to become appreciably cheaper over the next decade. For example, it required about 46¢/lb to make 1,3-propanediol from corn starch in 2005, according to the Tennessee report, and this figure should remain essentially unchanged by 2015. Even corn starch-derived ethanol, a Green solvent as well as a fuel, won't budge in price, remaining at 52¢/gal between 2005 and 2015.

Proponents of Green chemistry are not discouraged and point out that even if prices of naturally sourced chemicals don't change—or even rise slightly—in the next few years, many of these products will still become cheaper than petroleum-based ones.

Buy side

Clearly, the regulation that has had the largest impact on the global chemicals industry has been the European Union's REACH regulation, which went into effect in June. It requires all manufacturers and importers in Europe to register and to disclose the chemical substances in their products before they can be sold in the EU.

Shondra Garrigus, vice president of purchasing at Seattle-based chemicals distributor TRI, says in some ways the regulation has changed the way TRI does business.

"For example, although we have always considered our relationships with suppliers of the utmost importance, we find the maintenance of lasting, open relationships with our suppliers increasingly vital to the success of our business under REACH," she says. "When you have to identify the end-user and provide application information, there really isn't anything you can do to avoid being cut out of the business so now, more than ever, you need to thoroughly trust your suppliers as well as your customers."

Most chemical buyers and suppliers say REACH should not be thought of as a European regulation, because in today's global economy, a marketplace the size of the European Union cannot be avoided. So for the time being, REACH has set the bar for environmental regulation in the chemicals industry, as RoHS did for the electronics industry.

Garrigus believes "we are at least a few years away from enacting laws that regulate the U.S. chemical industry in the same way that REACH currently regulates the European chemical industry. However, any wise U.S. chemical company is going to start looking into these matters now in order to prepare themselves for that eventuality."

But while a U.S. standard may be on the horizon, there are some immediate concerns to buyers.

"Certain materials I used to buy have been discontinued due to government regulations and as a result we've had to reformulate some of our blends," says Jeff Marcella, corporate senior buyer at Canadian General Tower in Cambridge, Ont. Specifically, he says in April of this year, the State of California's Office of Environmental Health Hazard Assessment elected to list di-isodecyl phthalate as a hazardous substance. And because his company does business in California, Marcella has had to find a substitute material.

Case Study: Dow Corning sees a Green opportunity

Ask Keith Huckle about the latest environmental regulations and initiatives impacting the chemicals industry and you don't hear words like "restriction" and "hindrance" much. Rather, when you ask the global chief product steward and risk manager at Midland, Mich.-based Dow Corning about going Green, he uses terms like "business opportunity" and "eco branding." In fact, Huckle's title—or more specifically the order of his title—conveys Dow Corning's sustainability philosophy well: product steward and risk manager.

Huckle's primary advice to companies looking for an approach to Green buying is twofold: approach it globally and apply it as a business strategy, rather than just handing it off to the compliance organization.

"That's not to be disrespectful to those people in compliance because they play a critical role, but there are many opportunities in this from a business perspective and leveraging a cross-functional team will let you both mitigate challenges and find the opportunities," he says.

Dow Corning applied that cross-functional approach to its REACH Readiness Team, which was created from a charter from the CEO two years ago to help Dow Corning ensure its supply chain was in compliance with the European REACH regulation that went into effect in June. The team included representatives from the scientific/R&D organization, supply chain and procurement, compliance, legal, IT and the product line managers.

While the team focused on REACH compliance, it was also on the lookout for business improvement opportunities that could come from going Green. For example, as part of its work in these areas, the team focused on developing a systematic process of supply chain mapping. This revealed just how complex some of Dow Corning's supply chains are and provided a chance to simplify them while achieving REACH readiness.

On the supplier management front, Dow Corning's increased communication and data sharing with suppliers to determine their level of REACH readiness also showed some surprises.

"You might expect that suppliers based in Europe were better prepared than those outside Europe but that didn't necessarily follow," says Huckle. "You might assume that the larger companies are in better shape than the smaller ones, but that doesn't necessarily follow."

At the same time, the team at Dow Corning uses trend analysis to determine the direction its customers will be going in areas of sustainability. Huckle says the company uses long-term, mid-term and short-term forecasts because "not all regulations turn out the way you would expect."

But he insists that getting involved early helps influence their direction and understand their parameters, so Dow Corning can align its supply chain in the most effective way.

But beyond compliance to regulatory issues, Dow Corning is working with suppliers to incorporate more green thinking and product stewardship at the design phase of its products. "Benign by design" is a phrase often used to sum up the strategy, but there is clearly a cost-focused business strategy at work.

"We're looking to design out whatever might be an area of concern—toxic chemicals, unnecessary use of energy, or areas where we can cut costs out of the process," Huckle says of the company's "eco design" strategy. "And we make that process increasingly clear to our suppliers in the hope that they will know better how to serve us and what points are of particular importance to us."

CLICK HERE to see Dow Corning's REACH page

Case Study: Texas Instruments paints its supply base Green

When you think of Texas Instruments, you may not think of chemicals. But the procurement organization at the Dallas-based electronics giant certainly thinks of chemicals—a lot. And much of that thinking involves how the chemicals TI uses will impact the environment.

The semiconductor and electronic component manufacturing process requires the use of a variety of wet chemicals and alcohols, photoresists and hydrogen peroxide. TI currently has four procurement staffers dedicated to managing its sizeable chemicals spend. But as Bryan Vonfeldt, manager for chemicals and gas procurement for TI worldwide, is quick to point out, his team spends a lot of time collaborating with TI's Environmental Safety and Health organization to continuously paint its chemicals spend a darker shade of green.

To start with, TI has a list of banned chemical substances that cannot—and will not—be sourced by TI's procurement team. Tim Yeakley, manger of process and product strategy in the worldwide Environmental Safety and Health (ESH) organization, explains there are several ways a substance will get on the list, the most common being regulatory compliance or customer requirements.

If a substance is added to the banned list (or it looks like it may be soon), the sourcing team at TI will first consult the incumbent supplier to see if they can provide an adequate substitute. "Usually, the supplier knows this is coming before we do and is working on it and has an option for us," Yeakley says. And Vonfeldt points out that TI's continuous improvement processes in these areas focus on suppliers designing out any banned substances as early as possible.

The ESH organization at TI has long maintained a Horizon Review process where potential regulations around the world are tracked and customer input is considered. The ESH team also solicits input from various internal organizations, including procurement, manufacturing, and engineering.

"We work with industry groups to gather information on coming regulations and also internally have a network of key personnel in TI who are responsible for reviewing the impact in their own business units," Yeakley says. "We will gather that information, feed that through for their evaluation and then decide if it needs a work team to promote a change in the rule or a change within TI."

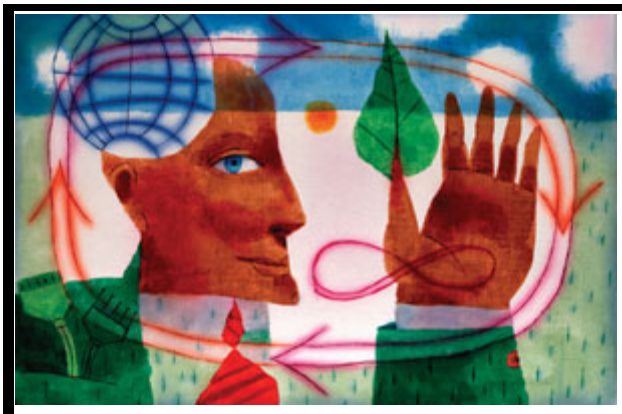
Yeakley says the company is working closely with its suppliers to ensure they are registered correctly in compliance with the REACH regulation in Europe. "If they don't we could have a supply-constraint issue," he says. But REACH is not just a European issue. TI considers it a global issue, as the company does not manufacture a different product for a different market.

In addition to regulatory mandates, the broader issue of environmental concerns is also a major consideration in chemicals supplier evaluation and selection. "We try to have a continuous improvement process with our suppliers to see if we can design out things that might be a concern later on," says Vonfeldt. Twice a year supplier reviews are conducted with chemical suppliers focusing on two major areas: technology and environmental concerns.

TI's procurement team focuses much of its efforts on reducing waste as part of its Green strategy—the part of the strategy that can impact the bottom line costs the most. Vonfeldt points out that his organization works with other internal teams cross-functionally to find ways to buy less and extend the life of some chemicals or otherwise make its supply chain more sustainable. And no idea is swept aside.

Four years ago, a very small (five people small) company came to TI with a product it claimed could save the company millions of dollars a year in natural gas costs. It was a catalyst that TI could add to its thermal oxidizers which would let the oxidizers function at a much lower temperature. Thermal oxidizers are used to burn off volatile organic compounds and have to be run at extremely high heat. The reduction in natural gas costs and wear on the oxidizers has proved extremely valuable.

CLICK HERE to visit Texas Instruments' Corporate Social Responsibility page



What it Means to Buyers:

- There are two reasons to go Green in your chemicals spend: Regulatory compliance and business strategy. Consider them both.
- Environmental strategies in the chemicals supply chain require truly cross-functional teams, but purchasing can be the hub.
- Green does not always mean more expensive. In fact there are examples of Green reducing costs.
- Leverage relationships with industry groups, peers and suppliers to keep abreast of current and potential chemicals regulations that could impact your sourcing strategies.

Green Drivers

Some of the issues that are driving companies like Dow Corning to make their supply chains more Green.

- Energy reduction
- Waste disposal
- Climate change
- Increasing cost of being "brown" instead of "Green"
- Competitive differentiation
- Shareholder and consumer pressure
- Regulatory compliance
- Eco-branding

Source: Dow Corning

Who else is going Green?

Appliance giant **Whirlpool** recently announced it was discontinuing the use of volatile organic compound (VOC) paints and eliminated emissions from its solvents. Whirlpool also reuses plastic foam that was previously sent to landfills; it's now ground up and made into consumer products.

Brazilian firm **Braskem** will build a new plant for polyethylene made from sugar cane ethanol, due to come online in 2009 at a capacity of 200,000 tons annually.

Eastman Chemical and Green Rock Energy will develop a $1.6 billion plant in Texas to produce chemicals from petroleum coke instead of natural gas. Eastman will split the cost of the facility with Green Rock.