

Sustainability in the Coatings Industry:

GOING BEYOND GREEN



Photo courtesy of AkzoNobel.

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Sustainability in the coatings industry has progressed through a number of stages and continues to evolve. Even after many years, though, there still is not one specific definition for sustainability beyond the general concept of producing for today without harming the opportunities for future generations. Most companies do agree, however, that adopting sustainable strategies is a necessity, and that involving all participants in the value chain and stakeholders in the business is essential.

Many have implemented comprehensive sustainability strategies to ensure that all aspects of their operations work to improve their performance. Sustainability is, in fact, a continuous process at Bayer MaterialScience LLC, according to Jim Thompson-Colón, head of the sustainability program in the Coatings, Adhesives & Sealants business. The com-

pany's Sustainability Community Council is made up of Bayer employees from a variety of market divisions who report on sustainability achievements and progress in their business units. Over 1000 employees spend time working with students and teachers using the company's Making Science Make Sense education outreach program. In addition, Bayer has participated in the development of the new ANSI green chemistry standard.

The Sustainability Council at Air Products is comprised of senior executives and subject matter experts across the company's businesses and functions. They steer the company's sustainability strategy, overseeing the process for measuring Air Products' footprint and setting and achieving reduction targets, according to Julie O'Brien, corporate sustainability manager. In 2010, Air Products appointed a corporate sustainability manager and

established a Sustainable Technologies Center to expand its lifecycle assessment capabilities and to explore new green chemistry opportunities.

Implementation of sustainability in all aspects of its business is seen as a journey at Cytec Industries. In 2010, this company focused on better understanding the value of sustainability throughout their operations and the complete value chain, from supplier relationships and manufacturing activities to meeting their customers' most challenging needs, according to global marketing manager for Architectural Coatings Audrey De Wulf. The company also aims to be a world leader in Safety, Health and Environment (SHE) performance and expand its portfolio of waterborne and radiation cure technologies.

Integration of sustainability strategies into the basic business values has also become an important mechanism for many firms. BASF has found that this approach enables promotion of sustainability principles throughout the organization, which leads to greater responsibility and the ability to strengthen the company's stakeholder trust in its sustainable development, according to Derek Fairclough, vice president for Dispersions & Pigments with BASF in North America.

Sherwin-Williams has had success with its company-wide EcoVision™ program. Introduced in 2008, the ongoing mission of the program is for employees to keep the environmental impact of their actions at the top of their minds and to develop products that work toward that goal. The intent is for sustainability to become part of the culture, just like safety. The key points, according to Steve Revnew, vice president of Product Innovation for Sherwin-Williams, include reducing waste and conserving energy at its manufacturing facilities, minimizing fuel consumption on distribution routes, implementing recycling programs at its facilities, and pioneering the use of sustainable raw materials in many of its paint formulations.

AkzoNobel has a fully integrated sustainable growth strategy that integrates sustainability into the fabric of the corporate structure, according to corporate director of Sustainability Andre Voneman.

The company has clear, objective targets for many aspects of sustainability implementation and achievement of these targets is discussed in all reviews. AkzoNobel has gone even further, and now bases 50% of the long-term incentive scheme of its executives on sustainability performance.

At The Dow Chemical Company, sustainability is viewed as a three-legged stool, with equal weight placed on economic, environmental, and social considerations, according to Guillermo Novo, business group vice president with Dow Coating Materials. Since 1994, Dow has reduced its energy intensity by 22% and its water intensity by 35%. Earlier this year, the company announced a five-year, \$10 million collaboration with The Nature Conservancy to help Dow and other companies recognize, value, and incorporate nature into global business goals. By 2015, the company pledges to earn 10% of its sales from products that are highly advantaged by sustainable chemistry.

JCT CoatingsTech spoke with several companies in the paint and coatings value chain to learn more about their views on sustainability efforts today, whether the economic turmoil of the last several years has had any impact on implementation of sustainability programs, how their day-to-day operations have been affected by sustainability initiatives, and what makes a company truly sustainable. Their responses are presented below.

Participants in the discussion included Julie O'Brien, corporate sustainability manager with Air Products; Andre Voneman, corporate director of sustainability with AkzoNobel; Derek Fairclough, senior vice president, Dispersions & Pigments for BASF in North America; Jim Thompson-Colón, head of the sustainability program for the Coatings, Adhesives & Sealants business of Bayer MaterialScience LLC; Jeffroy T. Spillane, senior product manager for Benjamin Moore & Co.; Bud Equi, marketing & business development and Audrey De Wulf, global marketing manager, Architectural Coatings, both with Cytec Industries' Coating Resins business; Guillermo Novo, business group vice president with Dow Coating Materials

(DCM); Steve Revnew, vice president of Product Development at Sherwin-Williams; and W. Brian Smith, VP-Supply Chain with Troy Corporation.

CT: Now that the idea of sustainability has been around for several years, is there any consensus within the coatings industry regarding the definition?

Derek Fairclough, BASF: From an industry perspective, the definition of sustainability is probably still evolving. This evolution is likely to continue as new environmental regulations go into effect that influence the industry's priorities. Many currently agree that this definition includes materials that are derived from renewable sources, require less energy to produce, or generate less waste in their production.

However, there are still a number of different viewpoints along the supply chain and according to the end product that is manufactured. For example, higher VOC technologies such as alkyd or nitrocellulose are derived from renewable resources—are these sustainable? Or higher performance technologies, such as 2K polyurethanes for longer-lasting coating systems—do these products fall into that category?

The industry is facing complex challenges. Sustainability is driving customer requirements, and consumers and politicians, customers, and the media are enthusiastic about companies that grow successfully by using limited environmental resources more efficiently than others and by introducing products and processes that combine quality of life and environmental efficiency.

Steve Revnew, Sherwin-Williams: In the coatings industry, most coating companies were focused on low VOCs, but now the industry is beginning to focus on durability as well. At Sherwin-Williams, we have always said that creating a durable and long-lasting coating is just as important as creating a low-VOC coating. It is our responsibility to provide our customers with the best value, which is performance for the price. If we provide coatings that offer better performance, then the service life



of the coating is increased and thus the contribution to sustainability improves.

Jim Thompson-Colón, Bayer: From a macro point of view, most agree: it's a development (not a state) in which we strive to meet the needs of the present without compromising the ability of our children and grandchildren (and so on) to meet their own needs. And when we talk about sustainability, we must include the environment, society, and economic needs. Things to consider in the coatings market related to sustainability are VOCs, emissions after the surface has been coated, bio-sourced raw materials like natural oil polyols, logistics, renewable content, quick return to service time, and durability, to name a few.

Sustainability in terms of "coatings as an enabler" is still an underappreciated subject, though. Looking at its ingredients alone, a coating might be more or less sustainable, but if a coating extends the life of a bridge or reduces the need for recoats, the coating overall has enabled sustainability. Sustainability all depends on how you look at it, what you are comparing it to, and in what context.

W. Brian Smith, Troy: Sustainability employs strategies such as stewardship, environmental responsibility, and resource management. This definition applies across many industries, and the coatings industry is no exception. Cleaner manufacturing processes, renewable resources, responsible waste management, streamlined logistics, and recyclable packaging are all important parts of a good sustainability program.

Sustainability also includes awareness of human contact risks throughout a product's lifecycle, as well as the

ultimate environmental fate of materials. Low- or zero-VOC, APE free, formaldehyde-free chemistries are becoming the hallmarks of sustainability in the coatings industry, as is reducing total chemical use.

Guillermo Novo, DCM: Across the coatings industry, we have consensus on many issues related to sustainability, such as the need for VOC reductions, but an overarching definition remains elusive and that's largely because sustainability is a moving target. We don't want to put a ceiling on how far technology can take us in our efforts to increase energy efficiency, decrease material waste, improve our ecosystems, and otherwise move the needle in critical areas affecting the sustainability of our planet. Instead of viewing sustainability as something to be defined, at Dow we see it more as a guiding business principle. It has and continues to shape literally every aspect of our business, from how we manufacture our products and technologies to the direction and emphasis of our research and development programs.

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Jeffrey Spillane, Benjamin Moore: Most within the coatings industry fully understand the importance of sustainability and some of the actions that must be taken to ensure continued success in the future. Benjamin Moore, like many responsible companies, publicly reports on its sustainability progress, covering product stewardship, safety performance, environmental management, energy consumption, and community responsibility.

One area that has not yet achieved consensus within the coatings industry is a definition of "green." While we know that low- or zero-VOC paint is an important part of the answer, there are also other aspects that must be identified for a better definition of green.

As a manufacturer of coatings, we strive to produce the greenest products on the market. With our proprietary Genriex Color Tinting Platform, our Green Promise product portfolio offers the highest performing zero- and low-VOC products on the market—paint that remains zero- or low-VOC in any color, post-tinting. And our Natura interior paint has the lowest emissions of any zero-VOC paint. These products exemplify how Benjamin Moore is trying to push the "green" envelope.

CT: How has the changing economic situation impacted the ability of players in the coatings industry—raw material suppliers and coating formulators alike—to implement sustainability programs?

Guillermo Novo, DCM: We haven't seen any real impact from the economy. Sustainability is a long-term, ongoing proposition and we are increasingly finding that what's good for the planet is also good for business. For example, our efforts in the area of energy conser-

vation have saved 1.8 quadrillion BTUs of energy since 1994—enough to power every home in California for 20 months. That not only represents a significant reduction in green house gas production, but a tremendous dollar savings in energy costs.

From a market-facing standpoint, we can only expect more environmental legislation and self regulation as we move down the supply chain. These requirements represent a growing opportunity for innovative technologies. In the additives space, for example, we have recently expanded our line of APEO-free surfactants and we are incorporating our ACID SUPPRESSION™ Technology into many thickener structures to give coatings developers more options for comply-

ing with VOC requirements while maintaining cost and product performance.

Bud Equi, Cytec: Provided that companies have integrated sustainability as a pillar of their strategy, the effort has been maintained through the crisis when it is impacting the bottom line. However, investments—including those related to sustainability—have been made more difficult to maintain. The challenging economic and business conditions have forced the industry to be very pragmatic in defining where sustainability will have an economic return. Companies will look longer term at sustainability and other initiatives as business conditions improve and will continue to look for business opportunities. Unfortunately, there is a lack of a common tool to “measure the level of sustainability” of a product which thus makes it difficult to clearly define and defend the “value proposition.”

Andre Veneman, AkzoNobel: With the growing worldwide population, globalization, and an increasing middle class in many emerging economies at a time when raw material and energy resources are limited and carbon footprint is an issue, there is no alternative but to be sustainable. Only those companies that can grow sustainably and offer sustainable products will be successful. Those companies have a long-term commitment to sustainability and are not affected by the changing economic conditions other than with respect to short-term projects.

Furthermore, in the emerging economies, growth continues and there are tremendous opportunities for companies that can be innovative and offer sustainable solutions. For example, for several of its major cities, China has set a goal of maintaining the current carbon footprint, even if a city doubles in size. That means that all new buildings will have to have half the carbon footprint of existing ones, and many existing structures will need to be retrofitted. And coatings can play an important role; heat reflective systems, self-cleaning and self-healing technologies, low-curing formulations, and antifoulant paints all can be a part of the solution. Retrofits in mature countries can also achieve significant energy savings.

Jeffrey Spillane, Benjamin Moore: Sustainability practices were adopted by most global suppliers well in advance of the economic downturn and remain in place. Consumers willingly pay slightly more for green products but they are looking for quality green products that also offer high performance and value.

Steve Revnew, Sherwin-Williams: Sherwin-Williams has continued to develop sustainable products and sustainability programs through the changing economic environment. We have found



the market for sustainable coatings has grown. The market growth has been focused on commercial spaces as a smaller percentage of consumers are willing to pay more for those sustainable coatings. However, we also have seen many consumers who are willing to pay more for longer lasting coatings that minimize the number of repaints in the future.

Jim Thompson-Colón, Bayer: Sustainability awareness is steadily increasing across the board. During the recent economic difficulties, I personally saw an increase in sustainability awareness, but I can't speak for others. One likely driver in this area is that consumers are more sensitive and educated now than in the past. Consumers read up on certain suspect chemicals and, either by community involvement or voting with their purchase, guide suppliers by demand.

Derek Fairclough, BASF: Experience suggests that both coatings manufacturers and consumers are unwilling to pay substantially more for sustainable products, especially if the sustainable product performs at a lower level than the technology it replaces. This situation puts pressure on ingredient suppliers such as BASF that are contending with raw material price volatility and rising metals prices to find ways to decrease raw material and energy inputs into their products and reduce emissions at manufacturing sites. An improving economic condition would help companies invest more in research and development, especially for sustainable technologies.

CT: Have you seen an overall shift by the coatings industry in the level of commitment to sustainability in the last couple of years?

Derek Fairclough, BASF: The “branding” of activities described as sustainable has increased, but the general effort to continuously improve processes and products has been in place for years. Less energy and waste, renewable raw materials, lower cost, higher performance, and general improvement on our impact on the environment has been and will continue to be a leading theme within our industry.

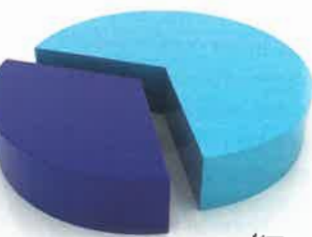
Steve Revnew, Sherwin-Williams: Five years ago, the only renewable raw materials that would make acceptable coatings were used in alkyds. The industry has created an opportunity to develop new chemistries and materials that offer renewable and sustainable sourcing. This trend definitely shows a commitment to sustainability for the entire coatings industry.

Jeffrey Spillane, Benjamin Moore: Having sustainability practices in place, monitoring and documenting them, and producing environmentally friendly products has become cost of entry for companies. Consumers, professional painting contractors, architects, designers, and specifiers have mandated it.

Audrey De Wulf, Cytec: There is a shift at many levels, but the apparent drivers are different. Companies higher

up in the value chain and closer to the end user/consumer are yielding to the "public sentiment for more sustainable products." For companies further removed from the end-user, sustainability programs tend to be driven by very tangible benefits mostly related to cost and efficiency (for example, loss waste, improved yield, less energy intensive processes, etc.).

Andre Veneman, AkzoNobel: The industry has gradually shifted in its approach to sustainability. First there was adoption of global principles and a more risk management-related approach followed. Global strategies and good product stewardship programs were implemented at this time, providing a strong foundation. In the second phase, companies were able to begin to make a business case for sustainability and realize the cost benefits. Today, sustainability is integrated into all aspects of the value chain and is driving innovation. At AkzoNobel, for example, two-thirds of our R&D budget is related to sustainable initiatives.



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Jim Thompson-Colón, Bayer: Like society, the coatings industry has embraced sustainability. More and more, it is part of the DNA of the coatings industry and how we do business. And both big and small companies are embracing sustainability, only in different manners. Bigger companies are making a larger investment and commitment to intensive R&D programs, whereas smaller companies are approaching sustainability in a way that suits their size, operations, and budget.

CT: What role has technology played in increasing the capability of coatings industry companies to implement sustainability-related programs?

Derek Fairclough, BASF: Technology plays an important role in the implementation of strategies and processes for proliferating sustainability within the industry. It is also critical for competitiveness as suppliers look for opportunities to achieve long-term sustainability goals and make investment decisions based on environmental and social aspects as well as economic performance.

High performance coatings are the result of proper selection of many ingredients. For example, additives may represent only a small portion of paint formulations, but they are essential for achieving high-performing paints that can carry pro-environmental labeling. Renewable-based coalescents can show superior properties compared to their petroleum-based counterparts. Highly efficient rheology modifiers that are VOC- and APEO-free and multi-functional enable paint formulators to produce sustainable aqueous paints with superior properties. Renewable dispersing-wetting agents are an economical alternative to inflexible polymeric and APEO-based universal dispersants.

Rud Equi, Cytec: Cost-effective, new technology is a critical element in implementing sustainability programs. Companies target new technology, process, and product development in areas where there are identified profitable growth opportunities. New processes with reduced energy demand, products with higher renewable resource content,

and products with very low or no chemicals of concern are all in development or in the market.

Guillermo Novo, DCM: Science and chemistry have historically been the great enablers for the coatings industry, and there has never been a greater opportunity for us to leverage those disciplines to convert problems and challenges into solutions and opportunities.

For example, Dow recently launched FASTRACK™ HE-5030 Acrylic Binder for traffic paint. This emulsion polymer for waterborne systems matches the drying speed, durability, hiding, and visibility performance of solventborne systems while releasing less VOC and using less latex and TiO₂. Traffic paints formulated with FASTRACK HE-2706 Acrylic Binder allow for VOC levels as low as 0.8 lb/gal. The bigger picture benefit, which will be very significant in rapidly urbanizing areas, is the ability to mark new roadways faster and with less traffic interruption.

Another example is our recent introduction of EVOQUE™ Pre-Composite Polymer Technology. This development for paints and coatings improves the particle distribution and light scattering efficiency of TiO₂, facilitating improvements in hiding efficiency and allowing for up to 20% less material consumption of TiO₂ in a given formulation. We believe this technology will help paint formulators minimize their carbon footprint and are currently validating this performance through third-party verification.

Steve Revnow, Sherwin-Williams: Technology plays a key role in improving coatings. Sherwin-Williams is always developing innovative new paint formu-

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lation. In fact, we recently developed a new formulation that utilizes soybean oil and recycled plastic bottles (PET) which substantially reduces the amount of volatile organic compounds. In June 2011, Sherwin-Williams was recognized with a Presidential Green Chemistry Challenge Award from the U.S. EPA in the Designing Greener Chemicals category for this new paint formulation.

Jeffrey Spillane, Benjamin Moore: New technology is critical to advancing the cause of sustainability. In creating the Gennex product platform mentioned earlier, Benjamin Moore developed new resins and challenged suppliers to develop new materials to support the platform. New technology in the form of improved photovoltaics and electronic controls also made it possible to economically install solar cells to offset energy usage at Benjamin Moore's Technical Center in Flanders, New Jersey.

Steve Revnew, Sherwin-Williams: The availability of new, nontraditional monomers and resin systems that are from renewable sources has given us new and novel coating opportunities. At first, the performance of coatings derived from these systems was less than satisfactory. It is now apparent that we have new coatings with much better durability and performance that actually extend the service lifetime of coatings.

CT: How has the sustainability movement affected the way your company operates on a daily basis?

W. Brian Smith, Troy: Troy sees the full product lifecycle as our sphere of consideration when we select ingredients for preferred formulations. We also realize our sphere of direct influence is somewhat smaller than the full product lifecycle. Therefore, in ways we can directly influence, we intend to help our suppliers, our customers, and their customers make and use products that are preferred for efficacy, economy, as well as human and environmental health. This focused effort will clearly define the relative role of hazard assessment, exposure estimation, and chemical risk

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characterization for users as they are incorporated into products sold by our customers.

To help achieve this goal, Troy has launched a Preferred Chemical Assessment/Ingredient Selection/Formulation Strategy initiative that is used to evaluate and rate our products. We have developed a set of principles that are scientifically defensible and provide a means of calculating a comparative score for each of our products according to various human health and environmental criteria. We consider the score of products and raw materials as part of the product development process and when reformulating existing products.

Steve Revnew, Sherwin-Williams: By making sustainability part of the culture, it is top of mind for each and every employee. Each employee has become empowered to make an impact on a day-to-day basis. As a result, everybody throughout the entire company has become part of our sustainability initiative, making contributions on a daily basis and thus allowing sustainability to be part of every day's operation. Call it sustainability, call it smart business: reduce, reuse, recycle has become a way of life.

Judie O'Brien, Air Products: Our focus on sustainability is very much aligned with our strategy serving energy, the environment, and emerging markets. Clearly, these opportunities are expanding, and our products and solutions are increasingly being used by customers to improve their sustainability performance, i.e., drive energy efficiency, increase throughput, enhance end product quality, and improve the environmental performance of their manufacturing operations and products.

From an investor perspective, we have seen increased interest from requests for information from socially responsible investment firms and remain in good standing on several prestigious indices, including the Dow Jones Sustainability Index, FTSE4Good, and Maplecroft.

A recent survey of Air Products employees had more than 90% of respondents saying sustainability is either "very important" or "somewhat important" to Air Products' reputation. We openly share our sustainability commitments and progress in our recruiting activities and communications, and sustainability and community outreach are integral components of our new-hire orientation program.

Building on the successful integration of sustainability into our annual budgeting and capital expenditure processes, a dedicated Process Integration team has been working this year to more fully integrate environmental sustainability considerations into other company processes, including product and process design, mergers and acquisitions, and sourcing.

Jeffrey Spillane, Benjamin Moore: We work very closely with all our vendors from the standpoint of the raw materials we purchase and the way they conduct their businesses.

In 2009, Benjamin Moore implemented two measures to reduce our fuel consumption and the carbon emissions associated with it. We retrofitted several

of our tractors with Auxiliary Power Units (APUs) to reduce idling time and, where feasible, to govern our tractors not to exceed 60 mph. This led to an improvement of 0.63 miles per gallon—from 6.14 mpg to 6.77 mpg—an overall savings of 93,050 gallons. We also implemented software that maximizes our truck loading capacity, and found further efficiency (without compromising safety) by using tandem trailers. These efforts will reduce our fuel use on interplant



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shipments by 6 to 8%—an additional savings of 25,000 gallons of diesel.

Audrey De Wulf, Cytec: Sustainability has definitely impacted the way we develop and produce our products. An increased focus on sustainability has helped us develop new capabilities, new collaboration modes through the value chain, and a culture that rewards long-term thinking. To support these approaches we have new activity measures, process design modeling, and financial analysis tools.

Guillermo Novo, DCM: We're forming new and different kinds of collaborations, focusing on new and different markets, and evaluating our products not only on the basis of performance, which continues to be critical, but also on the basis of environmental impact. In accordance with our 2015 Sustainability Goals, lifecycle analyses are being conducted to understand the expected environmental benefits and tradeoffs associated with a technology, and to guide product development and implementation. Examining products from a lifecycle perspective helps to ensure that anticipated sustainability benefits of Dow products can be achieved and to promote increased sustainability awareness among customers and manufacturers alike.

From an internal standpoint, our employees feel very good that they are working for an organization that is doing good business in the right way. There is also real fulfillment in knowing that you are helping to innovate in the right way. Having sustainability integrated into all aspects of company activities is of real value for retaining and attracting the best workers. The importance of such an impact really can't be overestimated.

Andre Veneman, AkzoNobel: Sustainability is driving innovation, but

neither can be achieved in a vacuum. In addition, there is significant opportunity to impact the footprint of the entire value chain, and that is where AkzoNobel is focusing its efforts. For example, reducing the cure temperature of a coating can dramatically reduce energy consumption by our customers. Removing solvents from coatings can reduce emissions. And products such as our Eco Premium heat reflecting coatings and Intersleek antifouling systems have a direct impact on energy savings.

On the other side, we have also changed how we work with many of our suppliers. Initially we had thousands of suppliers, many in emerging regions, and asked them to agree to our company principles. In the next phase, we conducted audits and inspections and narrowed our list of suppliers to about 300 companies with which we worked closely to improve health, safety, and environmental programs to the benefit of both. Today we are developing very close relationships with about 30 companies with which we collaborate on R&D initiatives and have key supplier agreements.

CT: Based on your company's experiences so far, what would you say are the critical aspects of a successful sustainability initiative? What should be avoided?

Jeffrey Spillane, Benjamin Moore: Sustainability is a roadmap for future success while offering solutions that will help restore the health of our planet. All aspects of a company's business need to be engaged in sustainable practices and appropriate investments must be made. The ROI on many of those investments will be realized in the longer term; they are not often

short term gains. And all solutions need to be pursued collectively—industries, governments, environmental organizations, advocacy groups, and individuals worldwide—each has a role to play to move us forward.

Steve Roychow, Sherwin-Williams: One critical aspect we've found is to ensure ways to engage employees in a shared vision. Through our EcoVision, we challenge every employee to look for and implement ways to reduce our impact on the environment. We communicated a clear mission and defined our principles related to EcoVision, encouraging every employee to get personally involved in the cause. Already, EcoVision has resulted in several employee-led initiatives.

Julie O'Brien, Air Products: We believe several aspects are critical to a company's success in its sustainability journey, including strong management commitment, alignment with strategy, well-defined programs, and processes with metrics and stakeholder engagement, all supported by ongoing communications.

An aspect that should be avoided is employing a concept of sustainability that is so broad that it dilutes the company's efforts. A company's sustainability approach should be aligned with its strategy; for Air Products, our focus on sustainability is aligned with our business strategy of serving energy, environment, and emerging markets.

Jim Thompson-Colón, Bayer: You need to be honest about sustainability. Your heart has to be in the right place. What is or is not sustainable is not cut and dried. It is very easy for someone to be skeptical about sustainability. If you are sincere and take steps in the right direction, people will respond to that.



Little things, like printing double-sided and using LED light bulbs, all add up. Everyone can take ownership in improving the Earth and doing their part.

What should be avoided is greenwashing. People do it, and it's having a negative impact on the positive aspects of the sustainability movement. That reinforces the need to be honest about your efforts and to have realistic expectations of what you can accomplish.

Andre Veneman, AkzoNobel: Always start with the business case. Identify the opportunities and then integrate the people and planet into the business case. That approach will enable sustainable growth. It is also very important to have the right level of support, and everyone must be involved.

Bud Equi, Cytec: First of all, integrating sustainability as a part of your company strategy is key; you need to have a shared definition and shared objectives throughout your company. Collaboration through the value chain—stakeholder sharing and cooperation—is another key criteria. The measures of a successful sustainability initiative vary significantly across companies—they should reflect the company's success in meeting an internal or external need that adds defined value. That value can be cost savings, the ability to produce products by expanding to more raw

material sources, reducing transport costs with lighter-weight packaging, or new products without chemicals of concern. These initial programs need to be validated by both customers and investors as creating value and improving the company's brand image. From this foundation there is leverage for adding projects that have less direct, short-term economic value but are the "right thing to do" for the longer term.

Guillermo Novo, DCM: It is critical that sustainability be incorporated into the business strategies such that it becomes part of day-to-day operations as well as the value building process with customers and other stakeholders. In addition, effective sustainability initiatives cannot be achieved in isolation; it is absolutely necessary to collaborate in areas such as idea exchange, sharing of information and best practices, and converting concepts into tangible results. **CT**