

SUSTAINABILITY: *A Formula for Success in the Paint and Coatings Industry*



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Sustainable Development (SD), or "development which meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland, 1987), not only benefits the environment, but also can have positive influences on the community and most often results in improved financial performance. Raw material suppliers, paint manufacturers, and end users, through process improvements or new product/technology developments, are demonstrating the economic effectiveness of SD.

Presented in this article are a few selected examples that highlight some potential areas in the paint and coatings industry for implementing sustainable development initiatives and the results that can be achieved.

Suppliers have taken various approaches to improving the sustainability of the paint and coatings industry. Some have developed new additive formulations or technologies that help minimize the environmental impact of final paint formulations. Others are developing resin systems with unique properties, and many are also improving the efficiencies of their own operations while reducing waste production and energy consumption.

Biocides are critical components of paint and coatings formulations. Some protect the paint from attack by microbes before it is ever applied to a surface, while others help preserve the paint film once it has been established. International Specialty Products now offers a line of water-based, zero-, and nearly zero-VOC biocides including 3-iodo-2-propynyl butylcarbamate (IPBC) and 1,2-Benzisothiazol-3(2H)-one (BIT) as well as water-based multi-active blends and has improved the processes used to manufacture them.

For IPBC, organic solvents are replaced with a water wash in the purification step. Analytical test methods are non-destructive, eliminating waste generation in this step as well. Both of the IPBC and BIT solutions have no odor and a neutral pH so they are not corrosive. They have nearly zero VOC con-

tent and no flash point unlike solvent-based formulations. The active ingredients are also stable at 20% or higher concentrations.

ISP has also recently introduced other new products in its CleanGuard™ family of biocides, including unique water-based mixtures of actives under the trade names Nuosept® W and BMC-422 and Fungitrol® 930 and 940, which are new concentrations in water designed for easy drop-in replacement.

Unlike biocides, which usually come in liquid form, traditional pigments are solids that often require grinding and milling before dispersion into the paint formulation. This process consumes time and energy and often presents dust hazards. Evonik Industries (previously Degussa) recently launched its granular Inxel™ Pigment Preparations for solvent-based coatings that readily dissolve into a coating formulation. The short mixing time is ideal for smaller batches and does not require anything more than a Cowles blade. Inxel preparations are ideally suited for low-VOC formulations, as they are VOC and HAPS free.

Many other compounds enhance the performance of pigments as well as provide the desired flow characteristics of final paint formulations. As a producer of surfactants, coalescents, defoamers, and rheology modifiers for the coatings market, Cognis has focused for many years on developing products based on renewable resources and that are readily biodegradable. According to Cognis' NAFTA market manager Michael Hoppe, the company also takes into consideration issues such as waste generation and energy consumption and logistics, which itself impacts energy efficiency and emissions.

Currently, Cognis offers a couple of defoamer products in Europe that are based on renewable materials and is actively investigating the replacement of its petrochemical-based products with ones that are derived from natural raw materials. The company does offer VOC-free defoamers based on its proprietary Star Technology that enable the formulation of high gloss, multi-phase systems without compromising quality. This allows for consolidation of defoamer types and increased efficiency for paint manufacturers.

Cognis' Disponil® Green Surfactants, which are based on coconut oil, offer better dispersability, are APEO-free and biodegradable, and provide high performance. Two new coalescents serve as replacements for Texanol at lower use levels. EFC 100 is based on renewable raw materials, and EFC 200 meets Green Seal standards.

Two new coalescents from Cognis that are based on renewable raw materials and that can serve as replacements for traditional VOC-contributing coalescents are Loxanol® EFC 100 and EFC 300. These products show improved performance and efficiencies, according to Hoppe. Loxanol EFC 100 is designed for the North American market, and can be used by paint formulators to meet Green Seal requirements. Loxanol EFC 300 meets the VOC requirements of 1999/13/EU and 2004/42/EU regulations.

WHAT IS SUSTAINABLE DEVELOPMENT?

Sustainable Development means making a commitment to social, environmental, and financial responsibility, or the "triple bottom line," as coined by John Elkington, the founder of consulting firm SustainAbility. Companies first must understand the impact of their products and manufacturing processes on current and future populations and ecosystems. Successful implementation results in highly efficient use of energy and water, effective pollution prevention and waste minimization programs, a continuous effort to reduce its environmental footprint, and production of responsible products in conjunction with community involvement that has a measurable impact.

The key principles of sustainable development include transparency, accountability, and engagement. Companies committed to SD only withhold information from the public if there is a solid business rationale (such as privacy, legal issues, competitive intelligence, etc.) and ask for and consider seriously the opinions of various stakeholders. They also go beyond legal and regulatory requirements to ensure that their products are safe, their operations have a minimal impact on the environment, and social issues are addressed. As a result of those activities, these companies often find themselves better equipped to manage changing societal expectations and capture market opportunities.

Benefits of implementing sustainable development initiatives are numerous. Cost savings from more efficient operations and the consumption of less energy and raw materials may attract the most attention. But there are many others beyond improvement of profit margins. Reduced production of hazardous waste, reduced interaction with regulatory agencies and more flexibility to achieve compliance, healthier employees, and reduced legal concerns, and supportive communities are just a few. A keener awareness of market and consumer needs often enables development of emerging technologies and the launch of novel products in advance of competitors. Sustainability can benefit the environment and your company.

Rohm and Haas Company is another supplier to the paint and coatings industry that has made a very public commitment to sustainable development. In May 2007, the company announced that it would spend about half of its \$300 million R&D budget that year for sustainability efforts such as new product development, energy efficiency, and process improvements. New product development efforts directed at the coatings market included road/highway Fastrack™ marking paints and Avanse™ industrial coatings. "We see great potential to use our deep understanding of coatings technology to convert industrial applications to safer, water-based products," says Luis Fernandez, vice president and group director responsible for Rohm and Haas' Coatings Materials business.

Fastrack water-based systems using patented acrylic technologies represent an environmentally responsible, high-performance alternative to solvent-based paints for traffic markings. Recently, the company launched a new version of the product with quick-set technology that speeds drying time to just a few minutes after traffic markings are laid down, even at lower temperatures, extending the period of time during the year when highway striping can take place.

Structural steel and concrete surfaces typically are coated with solvent-based formulations. Avanse MV-100 from Rohm and Haas is a waterborne alternative developed specifically for this application. The new technology incorporates a chemical interaction between the binder and pigment, resulting in a much stronger film with better hiding power. Less paint is required to cover the same amount of surface and the performance properties are improved. According to Fernandez, it is ideal for primers, topcoats, and direct-to-metal finishes and can withstand harsh environments typically associated with industrial coating applications.

In addition to product development, the company has also made many commitments to the communities



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in which it operates. In Philadelphia, for example, Rohm and Haas recently sponsored its second Habitat for Humanity House, with many employees contributing their own time to do the physical work. In Mexico, employees have contributed funds for the education of children in the local community. Through its Paint Quality Institute, Rohm and Haas also works to educate consumers and contractors around the world about the benefits of using high quality, environmentally sound paints. Most recently, workshops were held in China to demonstrate the benefits of using water-based products.

With respect to process improvements, Rohm and Haas has reduced its overall energy consumption (in terms of bu/lb material produced) by 7% from 2005 to 2006 and its water consumption from 1-4% (lb of water per lb of material produced). Reductions continue each year. "While this amount may seem small, if we achieve this level of reduction year after year, it won't take long before we have made significant improvements," Fernandez remarks.

How significant? Already, Rohm and Haas has seen reductions in energy costs in the neighborhood of \$1 million a year; lower water usage will correspond to savings of approximately \$200,000 a year as targets are achieved.

The company is particularly proud of its newest water based acrylic emulsion polymer plant in Chennai, India. This "zero discharge" facility operates under Rohm and Haas' "21st Century Manufacturing" program. All wastewater is recycled through the plant so that only residual solids from wastewater go to the landfill.

Reduction of waste is a key aspect of many sustainability programs in the paint and coatings industry. In particular, reduction of emissions to the air has received attention by a number of suppliers, coatings producers, and coatings applicators.

The Frankfort, IN, facility of DSM NeoResins is an exemplary plant for the company. The plant has gone 20 years without a lost time accident and more than six years without any OSHA recordables. Following a recent energy audit, new lighting was installed, certain areas of the building sealed, and mechanical equipment serviced to improve efficiency. With regard to production processes, the site has one of the highest productivity rates globally within DSM.

Recently the plant applied for an updated air permit because they no longer emit VOCs and HAPs above the limits that trigger the necessity for an air permit. The ISO 14000 certified site uses an ultra-filtration system to recapture waste latex for use in other lower-end products that do not require the highest purity levels. Air emissions are currently sent to a thermal oxidizer. According to plant manager Stephen Dalton, a bio-

based treatment system has the potential to be a powerful alternative technology.

Emissions that are vented to the thermal oxidizer include VOCs and HAPs compounds including acrylate monomers such as methyl methacrylate, plus acrylonitrile and styrene. A scrubber is also required to remove odors.

"The thermal oxidizer burns a large quantity of natural gases, and in fact accounts for 70% of our total natural resource consumption," Dalton emphasizes. The DSM NeoResins plant has a capital plan in place to conduct trials during the upcoming winter in order to address concerns about activity levels at lower seasonal temperatures. "We are hopeful that the bio-remediation system will enable us to replace the thermal oxidizer, which could lead to both tremendous cost savings in conjunction with reduced energy consumption and reduction of greenhouse gas emissions."

BioReaction Industries (BRI) develops bio-treatment systems for managing air emissions. The company's bio-oxidation system (biofilter) is a biologically active unit (housing a biofilm of bacteria and fungi, sustainable because the biomass is self-replicating) comprised of a biotrickling filter and a bio-matrix chamber that accepts and treats air emissions from various industrial processes, wastewater treatment operations, food processing, and petrochemical facilities.

The volatile and aerosol emissions are biodegraded by the microbes producing H_2O and CO_2 and a small amount of heat. Destruction efficiency of >95% can be achieved for numerous organic and odor compounds. Small amounts of nutrients (nitrogen and phosphorus) are added to ensure optimum biofilm growth and maximum destruction of the air emissions.

"Conventional control devices like thermal oxidizers release up to 10 times more CO_2 than bio-oxidation systems treating equivalent volumes of emission air," notes BRI's senior scientist, Dr. Jim Boswell. "Additionally, the cost of operating thermal oxidizers is often more than 10 times the cost of operating a bio-oxidation system."

BRI custom designs each system to treat the airflow from a customer's specific process. Bio-oxidation systems will perform best on hydrophilic compounds such as alcohols and aldehydes. The BRI system has unique balled media and can also effectively biodegrade various alkynes, alkenes, and many aromatic compounds, according to Boswell. Alkanes, in general, and halogenated compounds are very difficult to biodegrade in any aerobic bio-oxidation system.

In addition to the cost savings and lower CO_2 emissions, bio-oxidation systems also provide other benefits over conventional thermal oxidizers. They require much less maintenance and also do not generate nox-

ious byproducts like carbon monoxide and nitrogen and sulfur oxides.

BRI has developed systems in a range of sizes depending on the needs of its customers. Smaller units are built offsite, while larger ones are constructed on location. Training is provided on how to manage the automated system and address anomalies that might occur.

Toyota North America is building a BRI unit for a wheel manufacturing facility in Canada, with operation scheduled to begin in the first quarter of 2008. "We have been interested in finding an alternative means of reducing VOC emissions, and bio-remediation appeared to be quite attractive," explains Tim Gurren, assistant manager of Corporate Environmental Affairs. "When we decided to expand our solvent-based wheel painting operation in Canada, it seemed an ideal opportunity to test the technology."

BRI conducted a three-month trial pilot unit and met its 70% VOC removal guarantee. Gurren found that 90% removal could be achieved if necessary by using longer retention times. He also calculated the payback on this investment to be less than one year.

The success has spurred Toyota to consider bio-oxidation for other plant sites in North America. A solvent line spray booth/drying oven operation at a plant in Indiana currently is vented through a carbon filter and then to a thermal oxidizer. Replacement of the thermal oxidizer with a bio-oxidation system could enable the plant to significantly reduce its energy consumption and reduce CO_2 production by about 1200 tons. The use of the carbon filter reduces the air flow of the vent gases to a level that is ideal for bio-treatment.

If initial tests prove successful and the project moves forward, cost recovery is expected in about 1.2 years, a timeframe virtually unheard of for environmental projects, according to Gurren. The company has an additional two or three plants with aging treatment systems that include carbon filters that must be refurbished or replaced soon. Gurren has his eye on these sites as additional opportunities for installing bio-oxidation systems.

While Toyota has been looking for ways to make its North American coating operations more sustainable through new emission control technology, other companies have developed novel technologies for improving various coating application processes.

In the automotive industry, for example, wet-on-wet painting systems eliminate the need for a baking cycle, reducing process time and energy consumption. DuPont's EcoConcept finishing system combines two coating steps into one waterborne basecoat, allowing for elimination of an entire spray booth and its associated drying equipment. BASF's "Integrated Process II" coating system consists of two color-matched waterborne base coats. It meets the requirements for au-

tomotive finishes with regard to appearance and functionality while shortening the coating process through elimination of the primer application section and oven.

Recently, Ford Motor Company announced that it has produced the first vehicle using a non-phosphate conversion coating process developed by Henkel. The new Bonderite® technology significantly reduces costs, streamlines paint pretreatment operations, and reduces the environmental impact of the process. The nano-ceramic paint pretreatment systems are formulated for use on steel, zinc, and aluminum surfaces and can be applied using immersion or spray techniques, providing an ultra-thin coating that replaces conventional iron and zinc phosphate, thereby reducing environmental impact while maintaining corrosion resistance on painted metal surfaces.

With both the Bonderite NT-1™ and NGC (New Generation Coating) processes, the post-treatment and surface conditioning stages can be eliminated, resulting in increased efficiencies and lower chemical costs. Unlike with conventional phosphate processes, no sludge is generated, eliminating waste management costs and the environmental concerns associated with disposal. The new technology operates at ambient temperature so energy costs for the process are also lower than the conventional methods.

Bonderite NT-1, which has replaced iron phosphate technologies, has been commercialized globally in over 200 facilities. The first installation of the Bonderite NGC process, which is targeted to replace zinc phosphates, occurred in November 2007, and Henkel expects two OEMs to begin operating processes before the end of 2007 and in the first quarter of 2008, respectively.

"This innovation is a result of Henkel's commitment to deliver revolutionary technologies to valued customers," notes Dan Wohletz, vice president of Henkel's North American Automotive business. The company is already working to improve the new technology, and also has research efforts in place to develop a new generation technology to replace pretreatment and e-coat processes all together.

"We are very excited about this new pretreatment technology," states business development manager Terry Giles. "It is a win-win situation for our customers and for Henkel. Developing and implementing sustainable processes is not only the right thing to do, but is also economically the sensible thing to do."

For those looking to coat plastics, glass, or textiles that are temperature sensitive or cannot be exposed to water or solvents, Dow Corning's new Atmospheric Pressure Plasma Liquid Deposition (APPLD) process could be a solution. APPLD is a very green alternative to conventional processes because it is energy efficient

and solvent-free and enables the application of super-functional, ultrathin coatings where conventional processes are not an option, according to Tim Pajk, Dow Corning applications engineer and technical services manager.

"Up to this point, the majority of people expressing interest in the process are looking for an option that will give them the performance they need on a substrate that is difficult to coat," adds Gary Lord, commercial manager, Dow Corning Plasma Solutions. "But, increasingly we are receiving inquiries from companies looking for alternatives to current processes that help address issues such as VOCs, energy consumption, and environmental compliance in general."

Two different APPLD platforms are available—one for roll-to-roll application and the other for treating three-dimensional rigid substrates. Dow Corning designs each system to meet the specific needs of the customer after visiting the customer site. The customer is integrated into the process and helps determine the coating or coating chemistry as well.

Unlike radiation-cured coatings (IR, UV, EB) that require special initiators and certain types of resins, the APPLD process is based on an atmospheric, low temperature plasma delivery system and can be used with many types of coating formulations. The process, which also involves liquid deposition, prepares the surface for adhesion and then helps graft the coating onto that surface. It does not require initiators or activators and will not degrade the monomers in the coating formulation, which can occur with vapor deposition technologies. "A key advantage of the technology is that a wide choice of chemistries can be used to achieve specific functionalities without fear of byproduct formation or raw material breakdowns," stresses Lord.

Because no solvent or water is used, the coating process reduces water consumption and waste generation. Textile coating processes, for example, can require as much as 100 lb of water per every 2 lb of textile coated. In addition, only about 20% of the energy used in a textile coating process is needed for the APPLD system.

The coatings applied with the APPLD process are nanometers in thickness, thus reducing the quantity of material consumed while still maintaining performance. "Often, coating thickness is determined by the limitations of the application technology and not the ability of the coating to perform," notes Pajk. "The very thin coatings obtained with the APPLD process often provide unexpected benefits because of their scale and low impact on the bulk properties of the substrate."

Energy efficiency is a common theme in many of the activities of the suppliers, coating formulators, and coating applicators mentioned so far. PPG is another company that has placed energy efficiency as a corpo-



Rohm and Haas updates the roof of its nine-story global headquarters in Philadelphia with an advanced polymer elastomeric roof coating. The new roof surface of the building, which is located adjacent to Independence Mall, reflects a broad spectrum of UV, visible, and infrared light and emits nearly 90% of any absorbed heat. It also protects against expansion and contraction cracks in the roof, which lead to roof deterioration and leaks. The result is a cooler and longer-lasting roof, lower air temperatures, and energy savings for the entire building. How much cooler? On hot summer days, it is common to see temperatures that are 50°F lower for a white roof than for a black roof. A typical summer temperature for a black roof during the daytime may very well exceed 160°F.

rate goal. The company recently announced that it has joined Energy Star, a joint program of the U.S. EPA and the U.S. Department of Energy aimed at helping to save money and protect the environment through energy-efficient products and practices. According to a company spokesperson, PPC believes that the company's financial performance will improve while at the same time it works to maintain a healthy world for future generations.

Akzo Nobel currently holds the top ranking as the chemical industry leader in the Dow Jones Sustainability Index and has been pursuing sustainable development initiatives for many years. The company's long-term goal is to strengthen its competitive position by using the concept of eco-efficiency to strive for 100% sustainable product portfolios. It will do so by pursuing market and customer driven efforts. The Akzo Nobel Eco-Efficiency Centre collects information necessary for conducting eco-efficiency analyses, performs studies, and provides decision support services.

Recent examples of eco-friendly products from Akzo Nobel include Intersleek 700, a silicone-based anti-fouling coating for marine vessels that does not use biocides. This coating can provide huge reductions in fuel consumption, providing shippers with significant cost savings and dramatically lowering CO₂ and other noxious fume emissions.

Rubbol XD, an Akzo Nobel Sikkens Brand paint, is based on new STAR (Styrene Acrylic Reinforced Alkyd Resin) binder technology and is designed for use in exterior applications where high gloss is desired. According to the company, the coating maintains its gloss up to 40% longer than other products on the market. It is backing this claim with a seven-year guarantee. It also complies with European VOC legislation that will take effect in 2010.

Radiance Attic Barrier e-0.25 from the Building Systems business of BASF Construction Chemicals,

LLC, creates an effective radiant barrier that can stop 75% of the potential radiant energy transfer into an attic when sprayed on the underside of roof decks. It provides the greatest economic impact in environments with prolonged cooling seasons, where savings can be achieved through reduced energy consumption and prolonged life of cooling units. When properly applied, according to the company, Radiance is more efficient than other similar solutions such as foil barriers.

Benjamin Moore has also introduced a new technology over the past year. In its new Aura paint, the pigments are microscopically bonded to the dry paint film, permanently locking in the color for enhanced durability and richer hues, according to the company. The new ColorLock technology is a four-part system that enhances the performance of a new water-based, 100% acrylic hybrid resin. Special coalescing agents and custom thickeners help improve the application performance of the paint. As a result, the ultra low-VOC coating provides much better hiding power and reduces the need for more than two coats, even for darker shades.

Not just the very largest paint manufacturers have taken an interest in developing sustainable products and processes. Dunn-Edwards Corporation, a regional paint formulator in the western U.S., has for decades prided itself on implementing sustainable initiatives throughout its existence. The company began limiting the use of hazardous raw materials as early as the 1950s and today has products that are as free of hazards as is technically possible at this time, according to Robert Wendoll, director of environmental affairs.

Dunn-Edwards is currently sponsoring scientific research on VOC issues as part of NARSTO, an international program to study the formation and control of ground-level ozone, a component of urban smog. The company is also sponsoring a study at the Environmental Research Institute at the University of California, Riverside, that involves a life cycle assessment of the im-

part of the paint industry, including effects on air and water quality, energy and raw material consumption, waste generation, and human health and safety.

"We hope to use this information to better define true eco-efficiency in coatings," Wendoll states. "Regulations currently focus on VOCs, but initial results suggest that performance of the coating is an equally important characteristic. Hopefully, the results of the study will change the industry's approach to sustainability and help adjust the regulatory focus to include all important factors. It is critical that sound scientific analysis of regulations affecting the formulation or use of paints and coatings takes place with the objective of achieving maximum environmental benefit at minimum cost to society," Wendoll explains.

With respect to its manufacturing operations, Dunn-Edwards has implemented several specific initiatives. The use of a custom slurry system for aqueous pigment suspensions to replace most dry powdered pigments has reduced fugitive dust emissions. For those pigments still used as powder, residual pigment dust is collected in an air filtration system and reused. Similar products are scheduled for sequential production to reduce wastewater generation. The company also maintains an "off-hours" distribution program in the Los Angeles metropolitan area to reduce traffic congestion and vehicular-based air pollution.

Process water and rinse solvents are also reused. Metal cans are crushed and sent to a smelter, and returnable semi-bulk plastic containers are used as much as possible. Overall, Dunn-Edwards recycles over 95% of its process waste stream.

As part of a cooperative venture with Amazon Environmental, Inc., a small paint recycling company, Dunn-Edwards has formulated and distributes a line of recycled latex paint products under the brand name "Recover." This provides a good quality, low-cost latex paint while conserving material and energy resources.

Before beginning this program, the quality of returned, unused paint from community collection sites first had to be evaluated. A study at California Polytechnic University, San Luis Obispo, determined that no increased levels of toxic, hazardous, or otherwise undesirable ingredients were found in samples of collected recyclable latex paint.

So far there remains considerable resistance from the consumer to recycled paint. It is available in a limited number of colors (white, off-white, tan, gray, etc.) and many still have the perception that it is a "waste" product, even though it basically is a mix of high quality paints. Most of the product is sold for government applications at this time.

Wendoll is hopeful that the establishment of a Green Seal standard for recycled paint will help create

more interest from contractors and homeowners. Dunn-Edwards is working with Amazon Environmental to get the Recover product certified. It is also part of the Paint Product Stewardship Initiative (PPSI), a project supported by 60 stakeholders including paint manufacturers, recyclers, retailers, painting contractors, and U.S. federal, state, and local governments with the aim of developing a nationally coordinated leftover paint management system. A demonstration program is scheduled for this month in Minnesota.

While Dunn-Edwards is hoping to see increased recycling of unused latex paint, KW Plastics/KW Container would like to see the paint manufacturers use recyclable plastic containers for their products. The company has developed closed-loop container production for several other industries and is hoping to apply this sustainable approach to the coatings industry.

For this idea to work, of course, the plastic containers must be appropriate for the storage and sale of paints. KW Container has spent nine years perfecting a resin compound that provides a superior performing container. The cans and pails made by KW are easier to fill and therefore increase line efficiencies. Unlike metal containers, plastic does not rust or dent. The KW design also offers better sealability. Products have a better appearance as well.

"What we are doing is challenging paint manufacturers to recognize the value of keeping container materials in circulation," states Mike Tapley, marketing director for KW Plastics/KW Container. "Our plastic containers are made of 100% recycled material and they are 100% recyclable. By implementing a closed-loop container system, paint manufacturers can keep man-made materials out of landfills and at the same time reduce the consumption of other resources."

The key to success of this program is the residual value inherent in plastic containers. While metal containers have none in a closed-loop container solution, plastic (typically high density polyethylene and polypropylene) has a high residual value. Tapley estimates that five-gallon containers have a residual value of \$1.00, while one-gallon containers are worth \$0.20.

There are approximately 300-400 million five-gallon buckets and another two million one-gallon buckets generated by the paint and coatings industry that end up in landfills each year, according to Tapley. The total value of these materials that are being thrown away is about \$500 million. And that number does not include the in-house scrap (buckets that contained raw materials, for example) that formulators discard.

"The residual value of plastic containers handled by a large coatings formulator probably approaches \$50 million annually. If it costs even half that much to get those containers into a closed-loop recycling system," Tapley notes, "the company would still save \$25 mil-

lion on a yearly basis and would be keeping material out of landfills."

KW provides all of the services necessary to take the material and reprocess it into new containers. It also pays for the plastic it uses to make new products. "What paint manufacturers need to do is form partnerships with their customers in order to establish collection sites," explains Tapley. KW has developed small footprint shredders for use at collection sites that grind up the buckets. "We will be happy to work with paint manufacturers to analyze their situation and give them recommendations for a custom-designed logistics solution."

Some states, according to Tapley, have begun to require that a certain percentage of recycled material be included in the production of plastic containers. "Unfortunately, the result is not necessarily containers that meet the needs of paint manufacturers. The coatings industry needs to be proactive now before government regulations set into place other systems that do not provide the high performing containers it requires," asserts Tapley.

"Paint manufacturers are dedicated to sustainability and environmental issues and will eventually see that recycling of plastic containers is the right approach to take," he adds. "Closed-loop recycling is a long-term opportunity with the potential to achieve significant cost savings on a regular basis while at the same time benefiting the environment." Consumers also relate to the idea of recycling and such programs will only be viewed in a positive light by the purchasing public.

Encouragement and support for the development of sustainable technologies comes from many different sources. Ecology Coatings chairman Richard Stromback formed the Stromback Foundation in January 2007 to do just that. The Foundation is a not-for-profit organization focused on fostering environmental sustainability that supports initiatives dedicated to the advancement, development, and application of sustainable technologies related to the improvement of global environmental and human health.

Stromback was honored with a 2007 Young Global Leader distinction by the World Economic Forum, and in 2006 Ecology Coatings was named a Technology Pioneer by the same group. The company develops nano-engineered, liquid 100% solids, UV-curable coatings with unique performance attributes for military, automotive, industrial, electronic, and medical applications.

Stromback was attracted to Ecology Coatings as an investment opportunity because he felt it held the potential to offer significant improvements at both ends of the lifecycle: coatings that eliminate one of the most en-



ergy-intensive, polluting steps in the manufacturing process as well as improving product durability for metals, plastics, paper, wood and more, an essential factor in extending product life and reducing resource waste.

Whether developing more environmentally friendly products, reducing energy consumption and carbon dioxide emissions, or recycling materials and reducing waste, companies that implement these programs understand that the benefits of sustainable initiatives are myriad. "The goals of sustainability and profitability are one in the same," states Cognis' Hoppe. "Sustainable operations have a positive impact on the environment and the bottom line and help companies to be more competitive."

For Luis Fernandez of Rohm and Haas, it is also important that people remember a key point about the industry. "Paint and coatings are used to protect and beautify various goods—from cars to homes to toys to electronics. Fundamentally, the industry affords a benefit to society by making things last longer and look attractive."

Beyond that, he notes that the vast majority of large and medium sized coatings companies, and a number of smaller ones, too, are strongly committed to sustainability as individual organizations and as part of an overall industry. "Actions are being taken around the world—not just in mature regions, but also in emerging countries too—to help communities reduce unnecessary consumption, improve health, and create economic growth," Fernandez says. "Without strong, functioning societies in which to operate, there is no place for any company to do business. We will continue to take steps to become a more sustainable industry on a daily basis—and as individual companies, as an industry, and as members of larger communities, we will realize the benefits in the years to come." □