Paints and Coatings
In Step with the Green Building Movement

By Cynthia Challenge, CoatingsTech Contributing Writer

The concept of green building has been open to many different interpretations. Despite this—and even though coatings only count for a very small fraction of the materials used in any type of building construction—the green building movement has had a significant influence on the paint and coatings industry. Coatings formulators and their suppliers have developed products and processes designed to meet the standards of the many groups that certify construction materials and the buildings made with them. These specifications continue to develop, and have moved beyond the initial focus on volatile organic compounds (VOCs). This evolution is expected to continue, and the need to some constipation of the various certification requirements will occur as well.

A number of raw materials and coatings manufacturers spoke with ICT CoatingsTech about how the green building movement has influenced both the industry in general and their specific product development and manufacturing activities. Their thoughts follow.

CIB How is the green building movement affecting the coatings industry?

Dean (Valspar): The coating industry has been an integral part of the green building movement. "Green" coatings can be achieved by offering one or all of the following: (a) products with significantly lower VOC emissions; (b) products that provide barrier properties for reducing building energy consumption, either by reflecting sunlight off the exterior of the building or by insulating the interior surfaces to prevent energy loss; (c) coatings (or packaging) that are made with renewable resources; and (d) coatings prepared via manufacturing processes that have a lower carbon footprint (green chemistry processes, which are rarely discussed and hard to quantify). We have seen a proliferation of products in the coating industry.

Ruckle (Stiebel): The green building movement drives us to buildings with minimal impact on the environment. The largest of these impacts are expressed in terms of energy efficiency, water conservation, and waste generation; in other words, impacts that occur over the whole life of the building.

Hosatte (PPG): Green building standards aim at minimizing the environmental impact of buildings, and following the requirements can affect decorative paints. Specifically, they recognize and encourage the use of construction materials with a low environmental impact (including embodied carbon) over the full life cycle of the building and a healthy internal environment through the specification and installation of appropriate ventilation, equipment, and finishes.

Romano (Envirokote): Certifications specific to buildings are pushing coatings into new directions. Formulators and their suppliers are starting to really focus on the overall carbon footprint of their products, and as a result, life cycle analysis is becoming more prevalent.

Reinhardt (Bayer MaterialScience): The green building movement is creating certain preferred sustainability drivers leading to ever-lower VOC standards, lower solvent and odor thresholds, and higher durability expectations, which means longer service life for applied coatings. We see VOC as an environmental issue, low odor as more of a personnel issue, and longer service life as a carbon footprint issue. Together, they are driving the industry to create fewer but better coatings, and as a result, create less CO2 and waste.

Hummel (BASF): The attention on the environmental impact of materials has accelerated the speed of innovation for waterborne solutions and has created the need for higher-performance polymers to extend the life of the end coating. It has also increased the performance of methacrylates—for example, allowing higher filling levels or better asphalt bleed resistance in asphalts. The green building movement has created the need to focus on environmental issues, such as the heat island effect that white roof coating systems help to address in densely populated areas. The green building push, moreover, will lead to an increased demand for higher-performance fresh coats for EIFS (Exterior Insulating Finishing Systems) wall systems. All of these increase building insulation value and boost energy efficiencies.

Kaufman (Arkema): The impact of the green building movement is somewhat different from other environmental initiatives, especially those targeted at lowering VOC emissions. Because the green building initiative focuses, in part, on reducing energy consumption in commercial buildings, coatings formulators and raw material suppliers must look at products and technologies that help improve the energy performance of the building envelope. That is significantly different from simply lowering VOC.

Sweeney (Cytec): The green building movement is sometimes different from other environmental initiatives, especially those targeted at lowering VOC emissions. Because the green building initiative focuses, in part, on reducing energy consumption in commercial buildings, coatings formulators and raw material suppliers must look at products and technologies that help improve the energy performance of the building envelope. That is significantly different from simply lowering VOC.

PMG Industrys—Philippe Hosatte, global technical director for architectural coatings and Calum Munro, global technical director for industrial coatings

Sintechn—Robert Ruckle, global marketing and sales manager

Valtop Corporation—Robert Doty, global technical director for Consumer Business; James R. Hanes, technical director for the North American Wood Coatings Group; and Rick Aiton, global technical director

Participants

Air Products & Chemicals—Sophia Boujenah, marketing manager for Civil Engineering in Europe, the Middle East, and Africa

AkzoNobel—Fred Van Beuningen, corporate director of innovation

Arkema Coating Resins—Michael C. Kaufman, global coatings application development leader

Axalta Coating Systems—Frank De Cock, Architectural & Furniture segment leader, EMEA Powder Coatings business

BASF Corporation, North American Dispersions & Pigments Division—Andrew Stokes, product marketing manager for Architectural Coatings, and Chris Hammel, product marketing manager for Polymer Dispersions for Construction

Jenner MaterialScience LLC—Steven Reinhardt, construction marketing manager for Coatings and Sustainability Initiatives

Beih Process Corporation—Morgan Greenwood, environmental administrator, and Peter Gaeta, business development/sales

Benjamin Moore—Carl Mischew, vice president of Color Innovation & Design

Celanese Emulsions—Marty Sweeney, market development manager

DSM Resins & Functional Materials—Rainier Griesenbrugger, sustainability director

Evonik Coating Resins—Andy Romano, market manager

OMNOVA—Janey Gaston, senior applications engineer, Floor Care division

PPG Industrys—Philippe Hosatte, global technical director for architectural coatings and Calum Munro, global technical director for industrial coatings

Sintechn—Robert Ruckle, global marketing and sales manager

Valtop Corporation—Robert Doty, global technical director for Consumer Business; James R. Hanes, technical director for the North American Wood Coatings Group; and Rick Aiton, global technical director

Photo credit: Zach Benson Photography
Paints and Coatings

In Step with the Green Building Movement

By Cynthia Chalmers, CoatingsTech Contributing Writer

The concept of green building has been open to many different interpretations. Despite this—and even though coatings only count for a very small fraction of the materials used in any type of building construction—the green building movement has had a significant influence on the paint and coatings industry. Coatings formulators and their suppliers have developed products and processes designed to meet the standards of the many groups that certify construction materials and/or the buildings made with them. These specifications continue to develop, and have moved beyond the initial focus on volatile organic compounds (VOCs). This evolution is expected to continue, and the hope is some consolidation of the various certification requirements will occur as well.

A number of raw materials and coatings manufacturers spoke at ACT CoatingsTech about how the green building movement has influenced both the industry in general and their specific product development and manufacturing activities. Their thoughts follow.

How is the green building movement affecting the coating industry?

Duane (Valspar): The coating industry has been an integral part of the green building movement. "Green" coatings can be achieved by offering one or all of the following: (a) products with significantly lower VOC emissions; (b) products that provide barrier properties for reducing building energy consumption, either by reflecting sunlight off the exterior of the building or by insulating the interior surfaces to prevent energy loss; (c) coatings (or packaging) that are made with renewable resources; and (d) coatings prepared via manufacturing processes that have a lower carbon footprint (green chemistry processes, which are rarely discussed and hard to quantify). We have seen a proliferation of products in the coating industry.

Ruckle (Sikkens): The green building movement drives us to buildings with minimal impact on the environment. The largest of these impacts are expressed in terms of energy efficiency, water conservation, and waste generation; in other words, impacts that occur over the whole life of the building.

Hosatte (PPG): Green building standards aim at minimizing the environmental impact of buildings, and following the requirements can affect decorative paints. Specifically, they recognize and encourage the use of construction materials with a low environmental impact (including embodied carbon) over the full life cycle of the building and a healthy internal environment through the specification and installation of appropriate ventilation, equipment, and finishes.

Romano (Evonik): Certifications specific to buildings are putting coatings into new directions. Formulators and their suppliers are starting to really focus on the overall carbon footprint of their products, and as a result, life cycle analysis is becoming more prevalent.

Reinhardt (Bayer MaterialScience): The green building movement is creating certain preferred sustainability drivers leading to ever-lower VOC standards, lower solvent and odor thresholds, and higher durability expectations, which means longer service life for applied coatings. We see VOC as an environmental issue, low odor as more a personnel issue, and longer service life as a carbon footprint issue. Together, they are driving the industry to create fewer but better coatings, and as a result, create less CO2 and waste.

Hummel (BASF): The attention on the environmental impact of materials has accelerated the speed of innovation for waterborne solutions and has created the need for higher performance polymers to extend the life of the end coating. It has also increased the performance of materials—for example, allowing higher filling levels or better asphalt bleed resistance in asphaltic coatings. The green building movement has created the need to focus on environmental issues, such as the heat island effect that white roof coating systems help to address in densely populated areas. The green building push, moreover, will lead to an increased demand for higher-performance fresh coats for DIFs (Exterior Insulating Finishing Systems) wall systems. All of these increase the building insulation value and boost energy efficiencies.

Kaufman (Arkema): The impact of the green building movement is somewhat different from other environmental initiatives, especially those targeted at lowering VOC emissions. Because the green building initiative focuses, in part, on reducing energy consumption in commercial and institutional buildings, coatings formulators and raw material suppliers must look at products and technologies that help improve the energy performance of the building envelope. That is significantly different from simply lowering VOC.

Sweeney (Celanese): The green building movement has had a huge impact on every aspect of the built environment, in general, and certainly on the coatings industry. An ever-increasing consumer demand for measurable and substantial change has been the catalyst for coating manufacturers and raw material manufacturers alike to compete for share of mind in this space. The result has been nothing less than real and
meaningful change. What’s more, as the green building movement continues to evolve, it continues to drive innovation through an economic, social, and environmental lens. Why is this different than 10 years ago? Because rather than Industry vs. Environmentalist, it is Industry as Environmentalist.

Mirchew (Benjamin Moore): The coatings industry in general, with Benjamin Moore included, has always considered the kinds of materials used, the efficiency of operations, etc. With the green building movement, those efforts have become more organized and systematized. As a result, we see the green building movement as an evolution of where we were already headed.

Gaeta (Behr): On a larger scale, the entire building and building products industry—including coatings companies—is being impacted by a transition we’ve observed in recent years, as many of the voluntary green building programs are being adopted as—or integrated into—government-mandated building codes at both the state and local levels. Furthermore, the government has served as a driving force behind the adoption of green building certifications by preferring or requiring green building certification for a variety of government-owned building standards. Many of the criteria associated with the U.S. Green Building Council’s LEED credit categories are being woven into building codes all across the industry.

Gaston (OMNIVA): Trends towards third-party-certified floor finishes have increased as a result of the green building movement, and the largest increase has been in the past decade. In the floor polish sector, we have seen an increase in demand for products that meet LEED criteria.

Hazen (Valspar): With respect to the North American OEM wood coatings business, the green building movement has had a significant impact on our business, and we have seen an increase in demand for products that meet LEED criteria.

SSPC has also recently formed its Commercial Coatings Committee to develop high-performance standards that address the migration of industrial maintenance coatings into commercial/architectural applications.

Romano (EvoStik): A number of different green building ideas are being codified in the IGCC. We expect that in the U.S., these codes will soon go into state and local building codes. We will see Title 24 in California, the 100 Cool Cities Initiative in the U.S., and the Global Cool Cities Alliance as a representative of the trend requiring that new buildings incorporate roof technology (including coil coatings containing infrared-reflective pigments on metal roofing for sloped roofs and white elastomeric coatings on flat roofs) into their structures.

Afton (Valspar): In addition to California’s Title 24, there are several different certifications and other programs for coil roofs that are relevant in the U.S., including those from the Department of Energy (Energy Star), the Cool Roof Rating Council (CRRC), the American Society of Heating, Refrigeration and Air Conditioning (ASHRAE), LEED, and the International Energy Conservation Code (IECC).

Hazen (Valspar): The North American wood coatings business has itself seen OEMs needing Greenbuild indoor air quality certification or GreenGuard certification for indoor air quality (specific requirements for total VOCs, formaldehyde, and total aldehydes). In China, for wood coatings, there are regulations similar to those in Germany including GB T50378-2006, the Evaluation Standard for Green Buildings, and GB HJ/T 201-2005, Technical Requirements for Environmental Labeling of Products, in particular, water-based coatings.

De Cock (Axalta): For powder coatings, the Qualicoat system in Europe, ME, Africa, and Asia has had a significant impact on the adoption of powder coatings for the protection of aluminium-stud cladding over the last 15–20 years. Importantly, longer outdoor durability has become a requirement for Class II systems (similar to the American Architectural Manufacturers Association’s [AAMA] 2604 standard) that are now required to meet more demanding UV-resistance specifications. As a result, powder coatings are currently used on 90% of aluminum profiles in these regions, compared to only a few percent in the U.S. Qualicoate requires third-party verification that...
meaningful change. What's more, as the green building movement continues to evolve, it continues to drive innovation through an economic, social, and environmental lens. Why is this different than 30 years ago? Because rather than Industry vs. Environmentalist, it is Industry as Environmentalist.

Mirochew (Benjamin Moore): The coatings industry in general, with Benjamin Moore included, has always considered the types of materials used, the efficiency of operations, etc. With the green building movement, those efforts have become more organized and systematized. As a result, we see the green building movement as an evolution of where we were already headed.

Gaeta (Behr): On a larger scale, the entire building and building products industry—including coatings companies—is being impacted by a transition we've observed in recent years, as many of the voluntary green building programs are being adopted as—or integrated into—government-mandated building codes at both the state and local levels. Furthermore, the government has served as a driving force behind the adoption of green building certifications by requiring or requiring green building certification for a variety of government-owned building structures. Many of the criteria associated with the U.S. Green Building Council's LEED credit categories are being woven into building codes all across the country, with the biggest increase over the past decade in the floor polish sector has been in the area of finishes that offer an environmental claim.

Hazen (Valspar): With respect to the North American OEM wood coatings business, the green building movement had a stronger impact a few years ago on a broader base than it does now. We have actually seen some pull-back and less interest. The typically higher cost of green has not been well received, particularly in current business environments. What we have seen is very specialized areas continuing to adopt green technology, and not with regulations solely driving the change; these OEM end-use markets include office furniture, children's furniture, hospitality, and hospitals and schools. Architects working on commercial projects are also looking to green solutions. In the Chinese wood coatings market, however, interest remains strong, largely due to the hard push from the government to develop a green building focus (solar energy, water recycling, CO2 emissions reductions) that also includes the use of more environmentally sound building products. Mirochew (Behr): Coatings can play a key role in helping buildings to achieve accreditation. Valuable and respected international certifications such as BREEAM and LEED not only help raise-building standards, but can also be drivers for innovation. Labels that can provide relevant information concerning the environmental performance of a building are increasingly being paid attention by potential buyers and owners who recognize the influence that environmental certifications can have on the future value of the property.

Greenwood (Behr): There are several green building programs as LEEDs and for high-performance buildings (HPBs), the National Green Building Standard (NGBS), and the International Green Building Code (IGBC). Of these, LEED is the dominant green building program and offers a variety of certifications for different types of commercial and residential projects. Although LEED, CHIPS, and NGBS are project certifications—not product certifications—these green building programs have had a substantial impact on the coatings industry, as coatings companies have had to evolve to incorporate additional product qualities or certifications that are considered in project evaluations and specifications.

With factors such as minimized VOC levels, environmentally conscious materials, and resources and product certifications (such as GREENGUARD Certification Program and Green Seal) being considered during the LEED certification process, companies within the coatings industry have had to hold themselves to the same standards to remain competitive.

From a product certification standpoint, the standards issued by the Master Painters Institute (MPI), including Green Performance® 1 and 2 and MPI Extreme Green™ (“X-Green”), GreenGuard, and Green Seal are all nationally recognized. It is important to note that, for both product and project certification systems, we’re seeing a scope of green product expand from VOC content limited to include requirements for product emissions testing and performance.

Munro (PPG): The four main green building labels in the U.S. and Europe are: BREEAM (U.K., Germany, Netherlands, Spain, Sweden, Poland); LEED (U.S., France, Italy, Spain, Scandinavia, Poland, Russia; Turkey); HCE (France, International); and DGNB (Germany, Austria, Denmark, Poland, Hungary, Bulgaria, Switzerland). While LEED remains the primary green building certification system in the U.S., we are finding that the "Red List" or Living Building Challenge is becoming increasingly prevalent with architects, and that is presenting new challenges for the coatings industry. Nevertheless, the different certification systems have sufficient commonality that we can focus on creating the key features, benefits, and attributes that address the core opportunities to support our customers in meeting their sustainability goals within the varying regional frameworks and certification systems that exist. All provide welcome guidance.

Mirochew (Benjamin Moore): In addition to the more common programs such as LEED, GreenGuard, Green Seal, and MPI, there are others that are gaining attention and have very challenging requirements, such as the Pharos Project and Good Housekeeping Green Certification. With some of these various programs referring to one another, others are completely independent from the rest. In addition, many certification groups have lists of materials of concern. They don’t all agree, and in addition, some have specified quantities while others don’t. The industry is grappling with how to deal with this issue in a manner that will satisfy all stakeholders. Further complicating the situation is the fact that some standards focus only on what ingredients are in a formulation and at what level, and they aren’t concerned with what is emitted. Formulators look at what is emitted, not what is in the paint, and may or may not also consider performance. The result is a complex set of challenges with many different requirements.

Sweeney (Clearcoat): There is a labyrinth of green building certifications and only some of all that there equal weight would be invalid. With that said, credible, objective, and meaningful independent third-party certifications are a leading trend of the green building movement. Green building certifications like greenwashing, allow stakeholders to make informed decisions, and serve as important "innovation targets" for building materials.

Duan (Valspar): All of these various certification groups have, for the most part, been focused on reducing the VOC content in paint. Because applying for each label costs money, we make business decisions on which to apply for based on whether or not they can bring value to a given product.

Reinstadtler (Bayer MaterialsScience): MPI and SSPC are both creating new standards that address new sustainability targets. While the new standards dictate higher performance standards and lower acceptable VOC levels for coatings, they also acknowledge the greener-than-standard certifications that boast VOC levels already lower than disclosed by the new standards—for instance, the MPI Green Performance and Extreme Green Standards for certifications that not only meet the higher performance criteria, but also exceed VOC standards. These SSPC has also recently formed its Commercial Coatings Committee to develop high-performance standards that address the migration of industrial maintenance coatings into commercial/architectural applications.

Romano (EvoStik): A number of different green building ideas are being codified in the IGCC. We expect that in the U.S., these codes will soon go into state and local building codes. We also see Title 24 in California, the 100 Cool Cities Initiative in the U.S., and the Global Cool Cities Alliance as representative of the trend requiring that all new buildings incorporate cool roof technology (including cool coatings containing infrared-reflective pigments on metal roofing for sloped roofs and white elastomeric coatings on flat roofs) into their structures.

Afton (Valspar): In addition to California’s Title 24, there are several different certifications and other programs for cool roof coatings that are relevant in the U.S., including those from the Department of Energy (Energy Star), the Cool Roof Rating Council (CRRC), the American Society of Heating Refrigeration and Air Conditioning (ASHRAE), LEED, and the International Energy Conservation Code (IECC).

Hazen (Valspar): The North American wood coatings business has mainly seen OEMs needing GreenGuard indoor air quality certification or GreenGuard certification for indoor air quality (specific requirements for total VOCs, formaldehyde, and total aldehydes). In China, for wood coatings, there have regulations solely on reducing GB 71/50378-2006, the Evaluation Standard for Green Buildings, and GB/HJ/T 201-2005, Technical Requirements for Environmental Labeling of Products, in particular, water-based coatings.

De Cock (Axalta): For powder coatings, the Qualicoat system in Europe, ME, Africa, and Asia has had a significant impact on the adoption of powder coatings for the protection of aluminum-stud cladding over the last 15–20 years. Importantly, longer outdoor durability has become a requirement for Class II systems (similar to the American Architectural Manufacturers Association’s (AAMA) 2604 standard), that are now required to meet more demanding UV-resistance specifications. As a result, powder coatings are currently used on 90% of aluminum profiles in these regions, compared to only a few percent in the U.S. Qualicoate requires third-party verification that...
formulations meet both performance and environmental requirements. Architects and designers confidence in powder coatings for this application. In the U.S., the AAMA standards are voluntary specifications, and no third-party verification is involved. Thus, there is no as much custom awareness of the benefits of using powder coatings in these applications. It should be noted that, in addition to protection, powder coatings offer the advantage of much, much greater color choice, more texture options, and a wider range of gloss levels.

Other than VOC content, what properties of paints and coatings are considered (durability, renewable content, use of green chemistry processes, etc.)?

Griggenberg (DSM): The concept of a circular economy is increasingly receiving attention. Considering a product's life cycle from raw material sourcing through manufacturing and consumer use to recycling will be an important issue in the future. Coatings will need to be developed that not only have safer and renewable ingredients (such as waterborne alkyls) and help improve indoor air quality, but are also more durable, and that at the end of their useful life, do not interfere with the recyclability of the substrate.

Minchew (Benjamin Moore): In addition to the typical performance parameters and other raw material-related issues, we are also beginning to see requirements related to social concerns. For example, California has passed a law that requires companies to disclose whether or not they take any steps to ensure that materials they purchase are produced using fair labor practices. As a result of this law, many manufacturers that do business in the state are taking a closer look at this aspect of the production process.

Sweeney (Oleene): Each category of building material provides a balance of benefits to the built environment with its impact on people and natural resources. In paint and coatings begins with raw material extraction, innovative green and sustainable chemistry, durability, and VOC emissions, which need to be considered during both application and occupancy.

McConkey (PPG): PPG considers seven environmental categories when assessing the impact of its coatings offerings on the sustainability goals of customers and end-use markets. These categories pertain to our building materials, but apply equally across our entire offering, and include energy, natural resources, emissions and waste, useful lifetime, toxicity and health, and the welfare of people and the planet.

Energy covers energy use, recovered energy, and renewable energy. With natural resources, we look at the reduction of the use of materials, particularly those resources that are not rapidly renewable, as well as the increased use of rapidly renewable and recycled content. Emissions and waste can be viewed on multiple levels, with the obvious VOC content reduction, but active exterior coatings can help transform harmful pollutants into less toxic compounds are notable as well. The durability of a coating is considered in terms of its ability to extend the lifetime of a building (protecting underlying building materials) and to extend the desired decorative appeal of a structure. Toxicity and health clearly relate to appropriate choice of ingredients with minimum impact. Our consideration of risk goes beyond flammmability to include a variety of personal and national risk mitigation.

Another (Valpar): Properties that are now considered for green building applications include the biorenewable content, green chemistries, such as higher solids and water-based systems, solar reflective pigmentation for improved energy usage, reduction and elimination of heavy metal pigments where possible, and the resulting effect on durability and overall performance.

Guests (Behr): The all-encompassing standards imposed by the building industry today have helped to push the coatings industry to go beyond minimized VOC levels by evaluating the entire life cycle of coatings—which is where product performance really comes into play. At Behr, we’ve worked to integrate the same standards into each step of a product development—from the raw materials state all the way through disposal. We’ve collaborated with our suppliers to come up with materials and solutions that will better meet green and performance expectations. Raw material selection will become increasingly important for all coatings manufacturers as other features such as biodegradable, biodegradable, water-soluble, and recycled content become preferred. From a performance perspective, coatings that demonstrate extreme durability and excellent coverage (used need for additional coats) optimize material efficiency and offer a “do more with less” solution to customers.

Greenwood (Behr): The move toward green building and product development has also garnered more transparency from manufacturers to end of life, including transport. We realize, as part of the life cycle, we may be asked to share a variety of information from raw material sourcing to location to provide. In order to improve end-of-life management, the American Coatings Association (ACA) has involved the entire industry in its efforts to make waste paint drop-off more efficient by allowing both contractors and customers in certain states to drop unused coatings at various depots through its PaintCare® program. After being dropped off, the waste is re-used, recycled, or put through a process that allows for energy recovery.

Van Beurigen (AkzoNobel): Low-emitting paints and embedded energy are important elements of eco product offerings. Increasingly, coatings are making a positive contribution to energy use reduction, protection of materials and durability, and a healthy indoor climate. Moreover, the aesthetic elements of paints contribute to an element of green design and can promote well-being. While not all of these attributes are recognized by the green labels, they are nevertheless important to architects and specifiers.

Reinstadler (Bayer MaterialScience): Interestingly, the industry is starting to recognize that there is a difference between odor and VOC content. For instance, a zero-VOC coating can still have high odor due to the presence of VOC exempt solvents or additives. Therefore, multiple points in the value chain are demanding low VOC and low odor.

Stokes (BASF): Carbon footprint is becoming a concern. BASF has developed polymers that enable customers to reduce TiO₂ consumption by up to 25% of traditional formulated paints, which greatly reduces the carbon footprint, because production of TiO₂ is a very energy-intensive process.

Dean (Valpar): Durability—lasting longer—is certainly an important feature, particularly for exterior coatings.

In many parts of Asia, the dirt-pickup (DPU) resistance is a very important coating property in building, because the buildings are surrounded by heavy traffic and other industrial pollutants. In Australia and New Zealand, a coating’s ability to withstand harsh sunlight (UV) exposure is very important. Coatings in cold regions need for additional coats and additional cost also minimize material efficiency and offer a “do more with less” solution to customers.

Kaufman (Arkema): Looking at the exterior of a building, none of the most important properties is dirt-pickup resistance. For example, elastomeric roof and wall coatings that are designed to reflect heat from the building’s exterior surfaces need to stay white to provide maximum efficiency and to contribute to the energy efficiency of the building. Coatings that have enhanced dirt-pickup resistance alongside aesthetic performance over time.

Hummel (BASF): In the flexible roof coating market, BASF is working with customers in several areas, including higher-performance polymers, to extend the life of the coating, reduce asphalt bleed-through to help maintain reflectivity performance, provide more effective and earlier rain resistance, and widen the application window to lower temperatures and higher-humidity situations. In EIFS, BASF has developed polymers that reduce wash-off concerns in high-humidity areas and reduce dirt-pickup in urban or high traffic areas. Both of these products help builders and building owners enjoy lower installation and reduced upkeep costs.

Hazem (Valpar): In the North American wood coatings market, other components that are considered include formaldehyde, heavy metals, and phthalates. Durability must be equal to or better than current conventional systems. Renewable content is starting to see some movement, but interest remains minimal at the present. OEM flooring, kitchen cabinet, and some building product manufacturers are beginning to ask questions about renewable content in the entire coating process, from raw material selection through shipment. Meanwhile, in the Chinese coatings market, exterior wood coatings are typically waterborne systems with good durability, and recyclability is an issue. With decorative coatings, the use of vegetable oils and other natural oils is increasing.

Boujenah (Air Products): From an Air Products perspective, we see durability as a key component. In flooring systems, floor longevity is also important when considering substrates for systems. Floor longevity can be achieved through improved resistance to chemical, mechanical, and thermal exposures.

Gaston (OMNOVA): In floor polishes, removal of chemical odorants about the belief that the use of other ingredients, such as surfactants, that are readily biodegradable are important factors. Each ingredient used in the manufacture of a green coating is evaluated, and if there is a more environmentally sound alternative, the formulator should show that this material cannot be substituted. There are instances where an ingredient may not have the best environmental profile, but is of critical importance to the performance of the final product. In this case, this material may be accepted, but it is flagged so that if an alternative ever presents itself in the market, this new material can be substituted.

What influence does the green building movement have on the development of raw materials and formulated products?

Gaston (OMNOVA): The green movement now guides most development work at all levels. Formulators and marketers know that if they can offer a high-performance product that also has a green component, this type of product will be a premium because of the demand for new buildings and contractors to use green products. Reinstadler (Bayer MaterialScience): Architects and spec writers are the main drivers for introducing new
formulations meet both performance and environmental requirements. The end result is given architects and designers confidence in powder coatings for this application. In the U.S., the AAMA standards are voluntary specifications, and no third-party verification is involved. Thus, there is no as much discussion about the benefits of using powder coatings in these applications. It should be noted that, in addition to protection, powder coatings offer the advantages of much, much greater color choice, more texture options, and a wider range of gloss levels.

Other than VOC content, what properties of paints and coatings are considered (durability, renewable content, use of green chemistry processes, etc.?)

Grigbenberg (DSM): The concept of a circular economy is increasingly receiving attention. Considering a product’s life cycle from raw material sourcing through manufacturing and customer use to recycling will be an important issue in the future. Coatings will need to be developed that not only have safer and renewable ingredients (such as waterborne alkylds) and help improve indoor air quality, but are also more durable, and that at the end of their useful life, do not interfere with the recyclability of the substrate.

Minchew (Benjamin Moore): In addition to the typical performance requirements and other raw material-related issues, we are also beginning to see requirements related to social concerns. For example, California has passed a law that requires companies to disclose whether or not they take any steps to ensure that materials they purchase are produced using fair labor practices. As a result of this law, many manufacturers that do business in the state are taking a closer look at this aspect of the production process.

Sweeten (Oelenian): Each category of building material provides a balance of benefits to the built environment with its impact on people and natural resources. In paint and coatings, it begins with raw material extraction, innovative green and sustainable chemistry, durability, and VOC emissions, which need to be considered during both application and occupancy.

Manning (PPG): PPG considers seven categories when assessing the impact of its coatings offerings on the sustainability goals of customers and end-use markets. These categories pertain to our building products, but apply equally across our entire offering, and include energy, natural resources, emissions and waste, useful lifetime, toxicity and health, risk, and the welfare of people and the planet.

Energy covers energy use, recovered energy, and renewable energy. With natural resources, we look at the reduction of the use of materials, particularly those resources that are not readily renewable, as well as the increased use of readily renewable and recycled content. Emissions and waste can be viewed on multiple levels, with the obvious VOC content reduction, but active exterior coating materials can help transform harmful pollutants into less/noxious compounds, and are recognized by the green labels, they are nevertheless important to architects and specifiers.

Reinstadter (Bayer MaterialScience): Interestingly, the industry is starting to recognize that there is a difference between odor and VOC content. For instance, a zero-VOC coating can still have high odor due to the presence of VOC exempt solvents or additives. Therefore, multiple points in the value chain are demanding low VOC and low odor.

Stokes (BASF): Carbon footprint is becoming a concern. BASF has developed polymers that enable customers to reduce TiO₂ consumption by up to 25% of traditional formulated paints, which greatly reduces the carbon footprint, because the production of TiO₂ is a very energy-intensive process.

Duan (Valpar): Durability—lasting longer—is certainly an important feature, particularly for exterior coatings. In many parts of Asia, the dirt-pickup (DPU) resistance is a very important coating property, because the buildings are surrounded by heavy traffic and other industrial pollutants. In Australia and New Zealand, a coating’s ability to withstand harsh sunlight (UV) exposure is very important, and protectors/conditioners need for adding cost (and need for added costs) optimize material efficiency and offer a “do more with less” solution to customers.

Greenwood (Behr): The move toward green building and product development has also garnered more transparency from manufacturers to end of life, including transport. We realize, as part of the life cycle, we may be asked to share a variety of information from raw material sourcing to location to provide customers, who want to continue to improve life cycle management, the American Coatings Association (ACA) has involved the entire industry in its efforts to make waste paint drop-off more efficient by allowing both contractors and residents in certain states to drop unused coatings at off various depots through its PaintCare® program. After being dropped off, the waste is reused, recycled, or put through a process that allows for energy recovery.

Van Beuvingen (AkzoNobel): Low-emitting paints and embedded energy are important elements of eco product offerings. Increasingly, coatings are making a positive contribution to energy use reduction, protection of materials and durability, and a healthy indoor climate. Moreover, the aesthetic elements of paints contribute to architecture, which can promote well-being. While not all of these attributes are recognized by the green labels, they are nevertheless important to architects and specifiers.

Hazem (Valpar): In the North American wood coatings market, other components that are considered include formaldehyde, heavy metals, and phthalates. Durability must be equal to or better than current conventional systems. Renewable content is starting to see some movement, but interest remains minimal at the present.

Boujneh (Air Products): From an Air Products perspective, we see durability as a key component. In flooring systems, floor longevity is also important when considering sustainable systems. Floor longevity can be achieved through improved resistance to chemical, mechanical, and thermal exposures.

Gaston (OMNIva): In floor polishes, removal of certain chemicals indicates about the benefits of using other ingredients, such as surfactants, that are readily biodegradable are important factors. Each ingredient used in the manufacture of a green coating is evaluated, and if there is a more environmentally friendly alternative, the formulator should show that this material cannot be substituted. There are instances where an ingredient may not have the best environmental profile, but is of critical importance to the performance of the final product. In this case, this material may be accepted, but it is flagged so that if an alternative ever presents itself in the market, this new material can be substituted.

What Influence does the green building movement have on the development of raw materials and formulated products?

Gaston (OMNIva): The green movement now guides most development work at all levels. Formulators and marketers know that if they can offer a high-performance product that also has a green component, this type of product will bring a premium to the demand for new buildings and contractors to use green products.
products in green building, because they are often designed to be energy-efficient. Their primary sources of information on sustainable products are the Green Building organizations, such as the U.S. Green Building Council (USGBC) and the Green Building Alliance (GBA).

Hummel (BSA): There are several criteria based in the green building movement that are flowing through to be forces in developing new products. For BSA, sustainability is one of the key drivers. Polymer design is addressing problems to lower VOCs and increase recyclable content. The end polymer performance in the field also needs to help reduce energy consumption through its physical properties or ease of use.

Munro (PPG): The green building qualification requirements align well with our sustainable product goals and overall sustainability vision and are a natural extension of our thought processes when developing new products. Nevertheless, green building qualification requirements are pushing us to continually refine and improve our formulations to meet evolving standards.

Beyond new requirements for LEED, the Living Building initiative is presenting us with difficult challenges. This certification system prohibits coatings containing solvents, phthalates, lead, chrome, and other substances from being used in qualified projects, and currently there are few coatings available to meet these demands. Powder coatings are an option, but they are not available for coil applications and do not have the same properties that are desired.

Sweeney (CVi): This environment of evolving and improving building products has had an interesting benefit. Raw material suppliers and formulators are developing new products that address the evolving requirements of the green building movement.

Duan (Valspar): Raw material suppliers are reducing the residual monomer content in their resins, eliminating the use of lead-based paints, removing APEO from their products, and developing resins with lower minimum film-forming temperatures (MFFT) so that paints and coatings can be formulated without coalescent solvents and with zero-VOC options. Formulators are still facing some challenges, reducing the use of solvents (minimizing the use of any kind of solvents), developing waterborne systems with performance properties that can meet our customers' requirements, reformulating with APEO-free surfactants, and generally paying a lot more attention to VOC requirements.

Hosotte (PPG): Coating manufacturers are developing products with a lower environmental impact over the full life cycle of the building. As an example, the technical performance of coatings over the entire life cycle is being improved, including the maintenance intervals between system replacement. In five years, in addition, formulators are using raw materials with reduced environmental impacts but similar technical performance.

Boujnah (Air Products): Raw materials suppliers are working on supplying systems that are free of solvents for improved applicator safety and for improved indoor air quality to provide an enhanced living and working environment.

Reinstadter (Bayer MaterialScience): Market demand is driving the green building organizations, architects, and the market further define their green or sustainability preferences, raw materials suppliers quickly adapt their production process and product lines to meet these demands. For example, Bayer developed a new proprietary process for creating ultra-low-VOC polyurethane dispersions (PUDs) via a patented acetic recovery process that allows paint manufacturers to formulate with zero-VOC.

Hummel (BSA): As a supplier, BSA is committed to offering low- and zero-VOC products and APEO- and formaldahyde-free products to our customers. We are working with our customers in many areas, from improving the polymer performance to making products that are easier and faster to use. BSA helps by addressing specific needs, such as designing polymers that give the latitude to remove zinc from a manufacturer's roof-coating formulation to helping add desired functionality that a specialty coating may need.

Where is the green building movement going? Will it have more influence in the future, and if so, why and how?

Hosotte (PPG): The green building market is growing very fast. The European green building market is expected to reach 6.8 billion square meters by 2015, according to Pike Research. Meanwhile, the new, nonresidential U.S. green building market is predicted to total $14.5 billion in 2015, according to the McGraw-Hill Construction Report. In addition, according to the World Business Council for Sustainable Development, in 2009, buildings accounted for up to 40% of energy use in most countries, contributing to a significant portion of greenhouse emissions. To address these issues, many governments are advancing green building, such as with the EU 20-20-20 policy, which aims by 2020 to have all new buildings designed to achieve “nearly zero-energy” results, with energy sources coming primarily from renewables.

Boujnah (Air Products): Sustainability is a long-term trend, and the influence of the green building movement will only become more important in the future. The increasing demand for safer products without performance compromise is leading to the development of new industry standards.

Gaston (OMNIVA): The green building movement will continue to grow, in my opinion, especially as we move more time to developing high-performing products that use ingredients that are safer for the environment and the users of the products. The challenge is facing manufacturers is how much more the end user will be willing to pay for the environmentally preferred product. If the product does not yet still costs more, then green products are at a serious disadvantage. A balance has to be found; the more it is mandated by building owners and pension funds, the more green products must be used to maintain buildings, the more important it will be to have products that perform well and meet the definition of green.

Duan (Valspar): When we talk about “green” and “sustainability,” it is very difficult to clearly define what these terms actually mean. I personally believe that we need to build a culture of awareness of green and sustainability in our industry and our customers. We have formulated based on cost and performance. We now need to also be looking at how green our new formulations are. Without being specific, Valspar is definitely working toward that goal.

Gøsta (Ibher): While it’s difficult to pinpoint exactly what changes we’ll see next, we do think an increasing number of voluntary certification criteria will become mandatory codes, particularly in locations with a leadership position within the green building movement. This will lead to further movement toward waterborne and radiation-cure technologies and continued acceptance of powder by OEM manufacturers.

If there is a “green” solution that costs less and continues to have optimum performance, our customers will buy it. Right now what people want are products with optimized performance at a lower price point—more so than paying for a green solution. It will be the responsibility of raw material vendors and coatings manufacturers to step up with solutions balancing the value of green materials, cost, and performance. In China, we believe that the government, in response to the continued poor environmental conditions, will pursue an aggressive strategy for reducing the use of solvent-based wood coatings.
products in green building because they are often designing buildings with LEED certification in mind. Their primary sources of information on sustainable products are the Green Building organizations, such as the U.S. Green Building Council (USGBC) and the Green Building Alliance (GBA).

Hummel (BSF): There are several drivers based in the green building movement that are flowing through to be forces in developing new products. For BSF, sustainability is one of the key drivers. Polymer design is addressing requirements to lower VOCs and increase recyclable content. The end polymer performance in the field also needs to help reduce energy consumption through its physical properties or ease of use.

Munro (PPG): The green building qualification requirements align well with our sustainable product goals and overall sustainability vision and are a natural extension of our thought processes when developing new products. Nevertheless, green building qualification requirements are pushing us to continually refine and improve our formulations to meet evolving standards.

Beyond new requirements for LEED, the Living Building Initiative is presenting us with difficult challenges. This certification system prohibits coatings containing solvents, phthalates, lead, chrome, and other substances from being used in qualified projects, and currently there are few alternative selections available to meet these demands. Powder coatings are an option, but they are not available for coil applications and do not have the same level of performance as liquid coatings. Because everybody in the value chain recognizes the advantage of partnering with like-minded, innovative companies, this means that raw material suppliers and formulators are developing new products that address the evolving requirements of the green building movement.

Duan (Valspar): Raw material suppliers are reducing the residual monomer content in their resins, eliminating the use of less-based products, removing APEO from their products, and developing resins with lower minimum film-forming temperatures (MFFTs) so that paints and coatings can be formulated without coalescent solvents and with zero VOC options. Formulations still allow for color, reducing the use of solvents (minimizing the use of any kinds of solvents), developing waterborne systems with performance properties at current levels, reformulating with APEO-free surfactants, and generally paying a lot more attention to VOC requirements.

Hosotte (PPG): Coating manufacturers are developing products with a lower environmental impact over the full life cycle of the building. As an example, the technical performance of coatings over the entire life cycle is being improved, i.e., the maintenance interval of the coatings is extended. In addition, formulators are using raw materials with reduced environmental impacts but similar technical performance.

Boujnah (Air Products): Raw materials suppliers are working on supplying systems that are free of solvents for improved applicator safety and for improved indoor air quality to provide an enhanced living and working environment.

Reinstadler (Bayer MaterialsScience): Market demand for improved energy-driven green building organizations, architects, and the market further define their green or sustainability preferences, raw materials suppliers quickly adapt their production process and product lines to meet those demands. For example, Bayer developed a new proprietary process for creating ultra-low VOC polyurethane dispersions (PUDs) via a patented acetonite recovery process that allows paint manufacturers to formulate with nearly zero VOC.

Hummel (BSF): As a supplier, BSF is committed to offering low- and zero-VOC products and APEO- and formamide-free products to our customers. We are working with our supplier in many areas, from improving the polymer performance to making products that are easier and faster to use. BSF helps by addressing specific needs, such as designing polymers that give the latitude to remove zinc from a manufacturer's roof-coating formulation to helping add desired functionality that a specialty coating may need.

Where is the green building movement going? Will it have more influence in the future, and if so, why and how?

Hosotte (PPG): The green building market is growing very fast. The European green building market is expected to reach €187 billion on square meters by 2015, according to Pike Research. Meanwhile, the new, nonresidential U.S. green building market is predicted to total $145 billion in 2015, according to the McGraw-Hill Construction Report. In addition, according to the World Business Council for Sustainable Development, in 2009, buildings accounted for up to 40% of energy use in most countries, contributing to significant greenhouse gas emissions. To address these issues, many governments are advancing green building, such as with the EU 20–20–20 policy, which aims by 2020 to have all new buildings designed to achieve "nearly zero-energy" results, with energy sources coming primarily from renewables.

Boujnah (Air Products): Sustainability is a long-term trend, and the influence of the green building movement will only become more important in the future. The increasing demand for safer products without performance compromise is leading to the development of new industry standards.

Guinto (Valspar): There will be increasing numbers of requirements, most of which will be driven by cost rewards, but some will be driven by perception of the benefits. The trend toward smart buildings will also provide opportunities for smart coatings.

Kauffman (Arkema): We believe the green building movement will continue to grow in importance, particularly in the commercial building segment. By focusing on improved energy-driven green building organizations, architects, and the market further define their green or sustainability preferences, raw materials suppliers quickly adapt their production process and product lines to meet those demands. For example, Bayer developed a new proprietary process for creating ultra-low VOC polyurethane dispersions (PUDs) via a patented acetonite recovery process that allows paint manufacturers to formulate with nearly zero VOC.

Hummel (BSF): As a supplier, BSF is committed to offering low- and zero-VOC products and APEO- and formamide-free products to our customers. We are working with our supplier in many areas, from improving the polymer performance to making products that are easier and faster to use. BSF helps by addressing specific needs, such as designing polymers that give the latitude to remove zinc from a manufacturer's roof-coating formulation to helping add desired functionality that a specialty coating may need.

If there is a "green" solution that costs less and continues to have optimum performance, our customers will buy it. Right now what people want are products with optimized performance at a lower price point—more so than paying for a green solution. It will be the responsibility of raw material vendors and coatings manufacturers to step up with solutions balancing the value of green materials, cost, and performance. In China, we believe that the government, in response to the continued poor environmental conditions, will pursue an aggressive strategy for reducing the use of solvent-based wood coatings.

Gaston (OMNADVA): The green building movement will continue to grow, in my opinion, especially as we devote more time to developing high-performing products that use ingredients that are safer for the environment and the users of the products. The challenge that is facing manufacturers is how much more the end user will be willing to pay for the environmentally preferred product. If the product does not yet still costs more, then green products are at a serious disadvantage. A balance has to be found: the more it is mandated by building owners and specifiers, the more green products must be used to maintain buildings, the more important it will be to have products that perform well and meet the definition of green.

Duan (Valspar): When we talk about "green" and "sustainability," it is very difficult to clearly define what these terms actually mean. I personally believe that we need to build a culture of awareness of green and sustainability in our industry that is harmonized based on cost and performance. We now need to also be looking at how green our new formulations are. Without being specific, Valspar is definitely working toward that goal.

Gaeta (Iberol): While it's difficult to pinpoint exactly what changes we'll see next, we do think an increasing number of voluntary certification criteria will become mandatory codes, perhaps in parallel with the leadership position within the green building movement (27% of LEED-certified projects are public buildings, according to the American Coating Association).
Greenwood (Behr): Per the product life cycle analysis trends we see within our industry and without, environmental product declarations (EPD) are gaining momentum. An EPD provides detailed information on the life cycle impacts of a product, including specific amounts of raw materials, water, and energy used in production and corresponding emissions to air and water and waste generated. An EPD can be thought of as a nutrition label for a product featuring its environmental impact. With some European countries already adopting this approach, we anticipate it may be leveraged in the United States in the coming years.

Reinstadler (Bayer MaterialScience): I believe that sustainability is here to stay. Sustainability isn’t something that you put on a pedestal and simply observe. Sustainability must be woven into the way a company does business, and become part of the company’s DNA. And it must become a consideration like any of the other traditional drivers when developing a new raw material or product—economics, logistics, production, and performance.

Sweeney (Celanese): The future of the green building movement may be difficult to predict, but it almost certainly will continue to have a profound effect on the buildings in which we live and work. Generations to come may not recognize what they do as green building, but rather see it as business as usual.

Van Beuningen (AkzoNobel): Green buildings are key to a more sustainable future, as is sustainable transport and water usage in cities. Increasingly, cities are taking a more holistic and long-term view of sustainable development. Green labels will continue to drive the building market into a sustainable direction, increasingly also in the in-use phase. If finances can be made available, a wave of retrofitting can be unlocked in Europe, while in Asia the focus will be on more sustainable new buildings. As the investment case for green buildings becomes clearer, so investors will also push for more stringent certifications. The endgame could well be buildings contributing to energy supply (“every building a power plant”) for the electrification of the harvest, transport, and use of rainwater.

Over time, the coatings industry will introduce more functional products that bring a sustainability advantage for customers. Going forward, the challenge is to make the claims and positive benefits of these solutions properly verified.