



Science For A Better Life



Bayer in North America

**2010**

**Sustainable Development Highlights**



Science For A Better Life



## Advancing Sustainability in Our Operations, Products and Communities

**Some companies spend more money advertising about being “sustainable” than they do on sustainable practices. But the chemical industry knows that sustainability in all its forms – environmental, economic and social – is essential to present and future success. For us, it’s not a marketing gimmick or management “fad du jour.”**

Carl Duisberg, who founded Bayer nearly 150 years ago, understood what we now call sustainability. He insisted that the company invest in R&D for the long-term. He also created education programs and partnerships that remain part of Bayer’s culture. He knew there must be a balance between urgent present needs and vital future requirements.

Industry’s overall reputation, in good measure, hinges on good sustainability management practices.



As sustainability consultant Chris Laszlo put it, “Managing sustainability-related business risks is not so much about value creation as it is about avoiding its destruction.” That’s why Bayer applies systems thinking to sustainability. It helps us to minimize, and in some cases even avoid, unintended consequences that can occur when the entire system is not taken into account.

This North American Bayer sustainability highlights report describes how we worked last year to conduct our activities in a manner that will help to sustain our planet, the communities where we do business and the lives we touch. It supplements our global sustainability report, which we’ve issued annually since 2005. Our North American sustainability programs emphasize operations, products and communities where we do business.

**Operations:** How we make our products is just as important as the products themselves. One example is our voluntary work with El Dorado Nitrogen to install equipment to reduce greenhouse gas emissions by 80 percent at our El Dorado nitric acid plant in Baytown, Texas. That’s equivalent to reducing 550,000 metric tons of carbon dioxide emissions annually.

Bayer in North America

2010

Sustainable Development Highlights

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## Advancing Sustainability...

>> **Products:** Bayer innovation has led to products that make buildings more energy efficient. We are part of a consortium to improve energy efficient building technologies. It involves material innovation, systems integration, policy development and worker training. We are confident the work, underway at the Philadelphia Naval Business Center, will reduce building energy consumption significantly, possibly by as much as 50 percent.

**Communities:** Most of Bayer's North American community-focused programs involve education. We know that improving education – especially science education – is what sustains the innovation that moves our industry forward. Bayer's *Making Science Make Sense*® program celebrated its 15th anniversary last year. It has helped strengthen science education and science literacy for more than one million American elementary school students and teachers. The program is supported by the dedication of more than 1,000 Bayer volunteers.

These and other examples in this report show how sustainability programs can change the future to the great benefit of business and society.



**GREG BABE** | President and CEO  
Bayer Corporation and Bayer MaterialScience LLC

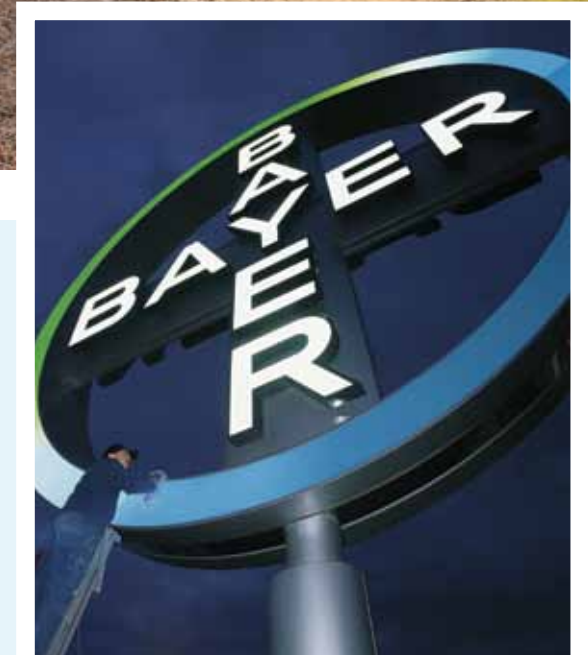


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Bayer CropScience embarked upon a “lighthouse” project at its Development and Training Center in Clayton, N.C., in 2009 and 2010. Taking into account the carbon footprint of the building and the grounds, the site is one of the first carbon-neutral research facilities in North America.

Featured on the cover is Karl Morris, Site Manager at the Bayer CropScience facility. The Clayton site has been used to evaluate the performance of Bayer CropScience products for more than 50 years.

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## Ensuring Our Actions Sustain Our Planet, the Communities Where We Do Business, and the Lives We Touch

Each year the Bayer Group publishes a Sustainable Development Report, which details how the Group is working to advance sustainability worldwide. The most recent report can be found online at [www.sustainability2010.bayer.com](http://www.sustainability2010.bayer.com).

This booklet describes how Bayer worked to meet sustainability challenges in North America during 2010, through our company operations, products, and in our communities. It's all in keeping with our mission, [Bayer: Science For a Better Life](#).

# Operations



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Bayer CropScience LP

## Protecting Tomorrow...Today

### Carbon Neutral Facility in Clayton, N.C.

To shine a light on its commitment to sustainable practices and serve as a beacon for others to follow, Bayer CropScience LP (BCS) has embarked upon a “lighthouse” project at its Development and Training Center in Clayton, N.C. In 2010, BCS completed a whole host of green initiatives including a major renovation of its 53-year-old building to increase energy efficiency; a carbon footprint determination of the 281-acre site; a biodiversity assessment; and new break-through environmental research into the carbon sequestration potential of healthy turf and trees.

“*Protecting tomorrow...today*’ is our overall mission at Bayer CropScience,” said Dr. Nick Hamon, Vice President of Sustainability, Bayer CropScience North America. “In just three words, that mission encapsulates our goals and accomplishments at the Clayton facility.”

When all the dust settles, the facility will have dramatically reduced its energy consumption, with a corresponding drop in carbon emissions, establishing Clayton as a model carbon neutral<sup>1</sup> Bayer site in the United States. “We applaud Bayer’s commitment to sustainability,” said Professor David Smith, Associate Dean for Research in the College of Agriculture and Life Sciences at North Carolina State University (NCSU), whose team was involved in many aspects of the site redevelopment. “This commitment is expressed in the support of our research programs in the sustainability arena,

as well as the integration of sustainable business practices in the Bayer company culture.”

#### Building Renovation

Bayer’s research and testing complex in Clayton, N.C., is located 30 minutes outside the Raleigh-Durham research triangle. The 9,100 square-foot main building provides office, conferencing, and laboratory space and is constructed mostly with concrete block. To increase energy efficiency and reduce carbon emissions, BCS is partnering with its sister

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**DAVID SMITH | Professor and Associate Dean for Research in the College of Agriculture and Life Sciences at North Carolina State University (NCSU), whose team was involved in many aspects of the site redevelopment**

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company, Bayer MaterialScience LLC (BMS), to upgrade the “building envelope” insulation system incorporating products from the BMS EcoCommercial Building program.

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<sup>1</sup> The designation “carbon neutral” is based on the operation of the site and takes into account the carbon footprint of the building and the grounds.



>> The project to date has included replacement of the aging roof with a highly efficient, white reflective insulating roof system using polyisocyanurate (PIR) rigid foam. Over its service life, this material helps to save 70 times as much energy as is needed to produce it. In addition, the 76 single-paned windows were replaced with a newly developed, ultra-high-insulating, composite window system utilizing BMS materials in the frames and window coatings. New photovoltaic panels that utilize BMS materials in the glass binder system were installed on the roof. Not only does the building use significantly less energy but the solar panels generate 23 kW of clean electricity. This effort is complemented by a major renovation to Clayton's 10 glasshouses, which allows for much more efficient heating, cooling and controlled lighting.

Based on a NCSU energy audit, BCS projects up to a 70 percent energy savings potential once all of the proposed renovations are implemented. According to the Department of Energy, buildings consume approximately 40 percent of all energy in the U.S. and account for 38 percent of carbon emissions. "Significant improvements in the energy performance of existing buildings can be achieved through retrofit of the building envelope with highly efficient insulating materials and technologies," said Dr. Mark Witman, Senior Manager, Industry Innovation-Construction, BMS. "Imagine what an enormous difference we can make to our collective corporate carbon footprint," he added.

### Calculating the Carbon Sink Value of Trees and Turf

Determining the overall carbon footprint of the site was another focus of the lighthouse project. The Environmental Science team at BCS partnered with NCSU to calculate a scientifically robust assessment of the carbon offset potential of the managed turf and trees on the Clayton site. "There are at least 40 million acres of managed turf in North America," said Terry Gouge, BCS Director of Development for Bayer Environmental Science,

NA. "It is one of the largest 'crops' in North America and a valuable sink for carbon." In addition, this research has provided a scientific basis for measuring the carbon sequestration impact of using Bayer plant health products for turf and urban forest management, leading to the creation of a first of its kind urban greenspace carbon calculator that can be found at <http://greenyard.bayercropscience.com>.

### Biodiversity for More Than 50 Years

The Clayton site has been used to evaluate the performance of Bayer CropScience products for more than 50 years. While the company has always been driven to be a good steward and protect the environment, BCS also engaged NCSU in 2010 for an independent assessment and verification.

Biodiversity is a measure of the variation of plant and animal life within an ecosystem and is often used to assess the health of a biological system. Over several months, NCSU faculty and students visited the Clayton site to survey for plant, insect and macroinvertebrate populations, and to assess the quality of the water in the site's four ponds. A wide variety of plant and insect species were identified and mapped on the site. Their presence, along with positive water quality and nutrient assessments, indicates that the Clayton site is an oasis of plant and animal life in what is rapidly becoming a highly urbanized dormitory town for Raleigh and the Research Triangle Park area.

"The results of this survey are a clear indicator that the site is biologically healthy and validate the company's commitment to protecting the environment, even after the long site history of product development and use," said Smith. "We are really impressed with the diversity of material so far. We actually found an incredibly rare wasp in the family Mymaromatidae, the first record of this family in North Carolina!

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**Bayer CropScience partnered with North Carolina State University to calculate the carbon offset potential of managed turf and trees at the company's Development and Training Center in Clayton, N.C. With nearly 40 million acres of managed turf in North America, it is one of the continent's largest "crops" and a valuable sink for carbon. Shown analyzing native pines are Mike Newnam and Terry Gouge, both with Bayer's Environmental Science Development team.**

>> We also found numerous other rare insects. It has been pleasantly surprising to say the least," said Dr. Andy Deans, NCSU Assistant Professor of Entomology, whose team worked on the biodiversity surveys.

The reduced carbon footprint of the Clayton site, combined with the carbon sink value of the healthy managed turf and forests equate to a site operating at carbon neutral or carbon sink capacity. "What has been achieved at Clayton – 'walking the talk' on sustainability –

could not have been done without the close collaboration of so many dedicated teams," commented Hamon. "Through the efforts of the BCS staff at the site, the support of BCS senior management in making the investments, Bayer MaterialScience and the students and faculty from various colleges at North Carolina State University, we have all achieved this new milestone toward a more sustainable future."

Bayer Animal Health

## New Wastewater Treatment Facility Supports Sustainability

Bayer HealthCare LLC (BHC) is committed to sustainable operations and its Animal Health headquarters in Shawnee, Kan., is a perfect example.

Last year, Bayer Animal Health invested in a new wastewater treatment facility which will remove even trace amounts of organic material from its wastewater as well as save up to four million gallons of water per year. This water can then be re-used, saving on natural resources.

“We believe that sustainability is part of being a responsible steward and good corporate citizen of the community,” said Ian Spinks, President and General Manager of Bayer Animal Health North America. “When we evaluated how we could improve the long-term sustainability of our operations, we decided to voluntarily protect and preserve our water resources to be a role model and industry leader.” The 720,000 square-foot administrative and production facility produces a significant portion of BHC’s portfolio of veterinary products.

### Treatment Facility Cleans and Conserves

The new wastewater treatment system filters water through carbon adsorption tanks where any trace organic materials are removed. The treated wastewater is then transferred directly into the Shawnee facility’s cooling towers where it is re-used for office building temperature control and process temperature control in the production facility. The company plans to re-use



**Bayer Animal Health invested in a new wastewater treatment facility at its headquarters in Shawnee, Kan., last year. The new facility will remove even trace amounts of organic material from its wastewater as well as save up to four million gallons of water per year.**

nearly 100 percent of the wastewater in the summer months as the cooling towers demand more make-up water to operate. This process modification reduces the need for purchasing city water for make up to the cooling towers and also reduces the volume of wastewater sent to the local municipal treatment plant, lowering the company’s disposal cost.

The wastewater treatment investment is yet another proactive measure taken at the Shawnee site. Animal Health has consistently received accolades for its environmental commitment in Shawnee. Since 1998, Bayer’s Shawnee facility has received the “Gold Award” from the Kansas Water Environment Federation. The Johnson County Environmental Department has recognized the Shawnee facility with the “Environmental Excellence Award” each year since 2005. Other sustainability initiatives at the Shawnee site include a new energy conservation program and recycling effort. The company recycled over 94 tons of production cardboard and metal wastes in 2010.

Bayer HealthCare LLC

## Berkeley Facility Reduces Carbon Emissions by 40% Per Unit of Production

Bayer HealthCare LLC’s (BHC) facility in Berkeley, Calif., reduced its CO<sub>2</sub> footprint per production unit between 2005 and 2010 by about 40 percent. “We are very proud to have reduced our impact on the environment and, at the same time, we have increased our production levels,” said Joerg Heidrich, Senior Vice President and Global Head, PS Biotech and Berkeley Site Head, Bayer HealthCare. “This achievement is the result of several process improvements in our manufacturing facilities, new energy optimization projects, and the commitment of our engineers and employees to create a greener tomorrow,” he added.

Globally, Bayer HealthCare has set a 2020 goal of reducing absolute CO<sub>2</sub> emissions by 10 percent of the 2005 level. This is to be achieved regardless of increased energy demands due to foreseen production increases. The BHC facility in Berkeley is on track to meet this target by focusing on technical projects as well as on raising employee awareness around sustainability topics and conservation projects.

Berkeley is responsible for the production of the drug which is used in the treatment of Hemophilia A, a bleeding disorder. The site also is focusing on the next generation of hemophilia treatments to further improve the lives of people living with Hemophilia A.

### Optimizing Operations

“One of the first places to improve our environmental impact was to optimize our site operations,” said Heidrich. The plant embarked on a series of innovative process improvements, as well as incorporating industry best practices, to achieve its sustainability goals. New improvements to the manufacturing process included efficiency gains in fermentation through more efficient cells, as well as in purification through an increase in the number of lots produced weekly.

The site also installed and commissioned a number of Variable Frequency Drives (VFD) for the cooling towers on site. Typical motors run at one speed, regardless of the load, thus wasting energy if the load is low. The new VFDs regulate the motor speed depending on the load by use of an automated control system and thus have decreased electricity consumption.

Bayer engineers also evaluated potential water conservation improvements. Analysis determined that some pumps in building systems caused water hammering during normal operations. By replacing the pumps with new steam motive pumps, the condensate (water) from the steam system was redirected to the main steam plant, thereby saving 1.5 million gallons per year. Additional analysis determined

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>> that the cooling tower water that was used to cool the clean steam condensate was being sent to drains. Plant engineers redirected this water back into the cooling tower, saving the site another 2.6 million gallons annually.

Throughout the Berkeley site, new emphasis has been made on overall energy conservation. Employee awareness and participation has been significant. In 2010 alone, the Berkeley facility was able to decrease its carbon footprint through an 18.8 percent reduction in natural gas usage and an 8.8 percent decrease in electricity consumption. Water consumption was reduced by nearly 14 percent and diesel consumption by 31 percent.



### Making Sustainability Happen

In addition to the focus on reducing carbon emissions, BHC Berkeley has instituted a multitude of other conservation programs, led by its Sustainability Council. The Sustainability Council is a cross-functional group with representatives from Central Utilities; Maintenance; Health, Environment & Safety; Bayer Technology Services (BTS); and Public Policy and Communications who translate corporate sustainability goals and drive innovative energy conservation projects

at the Berkeley site. Projects are currently underway in six target areas: electricity, waste, water, refrigerants, employee awareness, and community.

Two Berkeley colleagues, Thomas Daszkowski and Jim Breitlow, are members of both the Bayer North America Corporate Sustainability Community Council and the Berkeley Sustainability Council. The site maintained an 86 percent recycling rate for 2010 and was recognized by the Alameda County Waste Management Authority for its recycling and waste reduction initiatives. “The Berkeley site has achieved year-over-year progress in this area, which reflects the engagement of our Bayer employees and their commitment to sustainability,” Breitlow said. The site has secured California’s Waste Recycling Award every year since 1997.

In an effort to collaborate with other local businesses to further reduce the region’s carbon footprint, Bayer has partnered with the City of Berkeley and Pacific Gas & Electric to found the East Bay Environmental Network (EBEN). EBEN is an informal network of commercial and industrial businesses working together to reduce energy use and greenhouse gas emissions, and identify quantifiable metrics to measure success. The Network works in collaboration with the cities of Berkeley, Emeryville and Oakland, utility providers and other businesses in the East Bay. Bayer is a charter member and through EBEN is active in promoting good environmental stewardship throughout the region.

“By embedding sustainability in our products and processes, we ensure future viability for our company, our customers, our employees and our operation in the East Bay,” said Thomas Daszkowski, Head BTS Process Technology.

Bayer MaterialScience LLC

## Reducing Emissions and Increasing Energy Efficiency

In the last year, Bayer MaterialScience LLC (BMS) made two major improvements to the plant facilities in Baytown, Texas, resulting in more green – both for the environment and the company’s bottom line. “We are especially proud of our employees’ ingenuity to develop innovative engineering solutions and to lessen our company’s impact on the environment,” said Rod Herrick, Baytown Site Manager. “More environmentally friendly operations are a key to the success of our company, our communities and our planet,” he added.

### Reducing Emissions by 80 Percent

Bayer MaterialScience invested \$1.1 million to improve its manufacturing processes for nitric acid in Baytown. The improvement resulted in a reduction of greenhouse gas emissions by approximately 80 percent, equivalent to removing 123,000 vehicles and their carbon emissions from the road each year. Nitric acid is made for use in the manufacturing of isocyanates (MDI and TDI). The emissions reduction at Baytown is a voluntary step taken by BMS and El Dorado Nitrogen (EDN), which operates and maintains the nitric acid plant and is responsible for the air permit.

### Real Rewards

EDN became one of the first nitric acid plants to register with the Climate Action Reserve (CAR), a national offsets program working to ensure integrity, transparency and financial value in the U.S. carbon market. In the first nine months of the program, 460,000 credits were received for the greenhouse gas emission reductions at Baytown. These credits were sold to reap around \$1.6 million. Since December 2009, carbon credits can be sold to other registered entities via CAR.

### Less Energy

In addition to the nitric acid plant improvements, BMS was recognized for a boiler optimization project by the American Chemistry Council (ACC) in 2010. Three Baytown employees were recognized at an ACC national convention for their efforts in optimizing the operation of a boiler control system, which resulted in a 23 percent annual energy savings for the company. The reduction in energy consumption provides the additional benefit of reducing nitrous oxide and carbon dioxide emissions.

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>> The optimization project included the development of a new control strategy (patent pending). This control strategy born in Baytown is being considered for implementation at other BMS plants around the world. “The team in Baytown developed an impressive engineering solution to not only save energy, but also increase

plant efficiency and reliability,” said Anna Clark-Emerick, Responsible Care advocate for Bayer Corporation. “Their award-winning project is a perfect example of Bayer’s commitment to sustainability and Responsible Care.”



**At the Baytown nitric acid plant operated by El Dorado Nitrogen (EDN), Bayer worked with EDN to install a secondary catalyst at the screen to eliminate approximately 80 percent of the greenhouse gas emissions produced at this step.**

**This voluntary reduction is equivalent to removing 123,000 vehicles and their carbon emissions from the road. Nitric acid is a precursor for the production of TDI at Baytown, pictured.**

In addition, the American Chemistry Council recognized three Baytown employees in 2010 for their innovation in optimizing the operation of a boiler control system. The patent-pending control strategy resulted in a 23 percent annual energy savings for the company.

Bayer Inc.

## One of Canada’s Greenest Employers



Bayer Inc. was selected as one of Canada’s Greenest Employers for 2010 by Mediacorp Canada Inc. It was the second year Bayer received this prestigious honor.

“Being recognized for consecutive years as one of Canada’s Greenest Employers is truly an achievement by all of our employees and community partners across the country,” said Philip Blake, President and CEO, Bayer Inc. “We are in great company with the number of other organizations honored. Together we’ve embraced our responsibility to reduce our collective environmental footprint and protect our planet’s health, both today and for tomorrow,” Blake added.

In 2007, Bayer Inc. launched Green Matters to encourage and implement best practices to help the company and employees make a positive and lasting contribution to the environment. The program is now wrapped into a country-wide Sustainability Council. “Sustainability is a key driver of Bayer’s past, present and future success. It’s the common element that weaves together our business practices, employee engagement, community involvement and of course, our environmental initiatives,” said Ernie Springolo, Senior Country Representative, Bayer MaterialScience, and Co-Chair of the Bayer Inc. Sustainability Council.

Some of the initiatives that Bayer Inc. has implemented, and for which it has been recognized over the years include:

**Operation Zero Waste** – This program has diverted 80 percent of the company’s head office waste from landfills. Switching to 100 percent post-consumer recycled paper in the building has saved 864 trees, or the equivalent of two garbage trucks of waste and seven cars of CO<sub>2</sub> emissions per year. The Bayer MaterialScience transload site reduced emissions of CO<sub>2</sub> from transport activities by the equivalent of 20,000 25-year-old maple trees.

**Green and White Roofs** – The Bayer Inc. head office features a green roof, composed of 10,000 square feet of plant life, as well as two white roofs, covering 26,000 square feet of the building. These roofs reduce energy use and greenhouse gas emissions, by lowering reliance on air conditioning and heating.

**Consumer Care Canada Sustainable Packaging Initiative** – The vision is to package all Bayer Inc. over-the-counter products in materials that still do their job, but with less impact on the environment. Actions include replacing solvent-based varnishes with water-based varnishes on cartons and using FSC-certified paper for over 95 percent of all

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>> marketing materials produced in Canada. Bayer Inc. also only contracts creative design firms that are 100 percent Bullfrog powered, meaning that they only use electricity from renewable sources.



**RStandard™ Power Transmission poles** – These modular composite poles made using Bayer raw materials have been installed in the Toronto headquarters' Outback green area. These replace wood poles at one-third the installed weight and will not rot nor leach chemicals into the soil while leaving the trees in the ground to continue to absorb greenhouse gases.

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### About “Canada’s Greenest Employers”

Each eligible employer was evaluated for this honor by Mediacorp Canada Inc. on the basis of: (1) the unique environmental initiatives and programs they have developed; (2) the extent to which they have been successful in reducing the organization’s own environmental footprint; (3) the degree to which their employees are involved in these programs and whether they contribute any unique skills; and (4) the extent to which these initiatives have become linked to the employer’s public identity and whether they attract new people to the organization.

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# Products



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Bayer MaterialScience LLC

## Building Up a Network for Holistic EcoCommercial Solutions

To meet the planet's need for building solutions with lower environmental footprints, Bayer MaterialScience launched the EcoCommercial Building (ECB) Program in North America to build a collaborative network within the industry. The ECB vision is to develop “net zero energy commercial buildings through integrated design and sustainable technology solutions.”

In the U.S., buildings account for nearly 40 percent of total energy consumption, which makes them well-known targets for energy efficiency improvement, climate protection, and economic revitalization. By collaboratively addressing the commercial construction value chain, the ECB Network advances a comprehensive approach to sustainable building technologies, with performance metrics and technical support that make it feasible to predict how the technologies will perform in a fully operational building. The ECB Network also streamlines the search for sustainable construction options, enabling architects, engineers, contractors and other decision makers to save valuable time and money.

Members of the ECB Network provide expertise in complementary design elements, including building envelope, lighting, indoor environmental quality, renewable energy, consulting and modeling, and mechanical systems, among others. To date, Network members include: Acuity Brands, Bayer, Bostik, CB Richard Ellis, CENTRIA, Deloitte LLP, Eaton Corporation, Graham Architectural Products, IDC Architects, Kingspan, Noveda Technologies, and Winco Windows. The ECB Program also has established alliances with organizations that execute building projects and study the next generation of sustainable design, including: PJ Dick Incorporated and Burns & Scalo Roofing.



Promoting solutions that advance sustainable living to the building decision makers at all points along the construction value chain is part of the foundation of the ECB concept. The ECB Network companies participate in numerous industry trade shows, including the GOVgreen Conference and Exposition, the Greenbuild International Conference and Expo, and the American Institute of Architects (AIA) National Convention.

“We are excited about the growth of the ECB Network and the collaborative momentum that has spontaneously developed over the first year. The Network continues to expand and we’re becoming recognized as an organization that offers real solutions for energy efficient, sustainable buildings from design concept to occupancy and operation,” said Paul Platte, Head, EcoCommercial Building Program, NAFTA, Bayer MaterialScience LLC.

### Walking the Walk

While launching the ECB Program in the U.S., Bayer embraced its own EcoCommercial Building projects. The company unveiled a new Conference Center on its headquarters campus in suburban Pittsburgh, Pa., last year. The solar-powered, net-zero greenhouse gas emissions facility serves as a showcase and education center for environmentally friendly building solutions, as well as a working center for evaluating new construction materials and technologies. Throughout the year, the Conference Center hosted dozens of school groups, commercial building industry leaders, suppliers, and government officials.

Bayer MaterialScience LLC

## Building Better Buildings

### Bayer MaterialScience Part of \$129 Million Energy Grant

The U.S. Department of Energy (DOE) and other agencies granted \$129 million to a Penn State-led consortium to research developing technologies to make buildings better and more energy efficient. Bayer MaterialScience (BMS) will be a key player in the new consortium, dubbed the Greater Philadelphia Innovation Cluster (GPIC) for Energy-Efficient Buildings.

“We are thrilled to be part of this impressive new research team to bring the best innovations to market and make the construction industry even more sustainable,” said Rick Baxendell, Director, Integrated Building Solutions, Bayer MaterialScience LLC.

The GPIC will bring together academia, the private sector, and national laboratories to research, develop, demonstrate and deploy energy-efficient building components, systems, and models as well as policies,

**Bayer MaterialScience, with its long-standing commitment to sustainability and long history of providing materials to the construction industry, will be a valuable member of our group.**

**HENRY C. FOLEY | Penn State Vice President for Research and the Executive Director for the project**

financial models, workforce training and commercialization models for commercial building retrofits. Buildings account for nearly 40 percent of total energy use in the U.S., according to the DOE. The grant is the largest in Penn State history.

Bayer MaterialScience’s energy-saving building products and research capabilities were

embedded in the initial grant proposal. The GPIC will commit \$2.5 million to BMS over the next five years to partially fund its role in the project. BMS will research advancements in light-emitting diode (LED) lighting and energy-efficient building envelope systems, including spray polyurethane foam, polyiso board, and insulated metal panels. BMS also will be involved with the GPIC’s research on low-emissions coatings, adhesives and sealants.

“Bayer MaterialScience, with its long-standing commitment to sustainability and long history of providing materials to the construction industry, will be a valuable member of our group,” said Henry C. Foley, Penn State Vice President for Research and the Executive Director of the project.

BMS Government Services Group is coordinating participation in GPIC-related activities among the EcoCommercial Building Program, New Business Group and individual business units. Working together, BMS will advocate integrated building solutions that push the limits of what is possible and in the process, spur greater adoption in the marketplace.

Bayer MaterialScience LLC

## Green Chemistry

### Bayer MaterialScience Plays Key Role in Defining a Standard

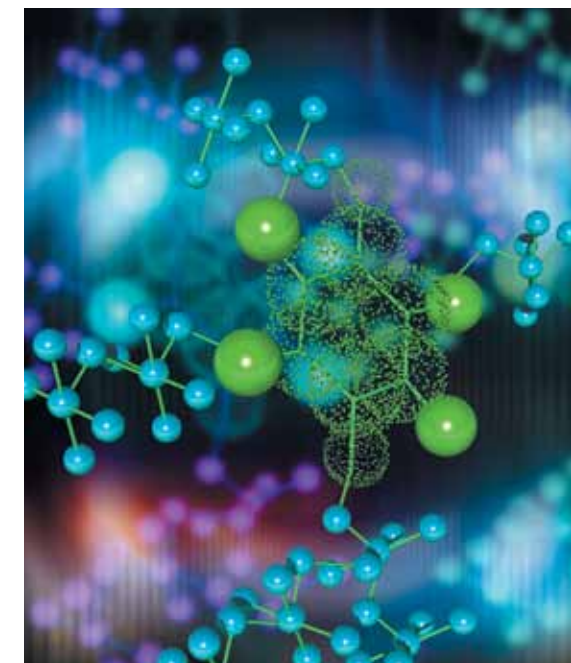
If you are wondering what “green” chemistry is, you are certainly not alone. Many are confused about the environmental claims made about chemicals; some have been debating a definition for almost a decade. But last year, an expert committee of the American Chemical Society (ACS) began to tackle this definition challenge with help from Bayer MaterialScience (BMS).

The ACS Green Chemistry Institute, working with NSF International, established a Joint Committee to write and pilot a standard method to communicate and measure properties related to the “green-ness” of chemical products and processes. Jim Charron, Head of Thermoplastic Polyurethane Resins, NAFTA, Bayer MaterialScience LLC, was selected to be a member of the Joint Committee. He has been working alongside a panel of industry peers, government representatives, non-profits and environmental groups to develop and revise the Standard for more than a year.

The group’s work has resulted in a newly-drafted “Standard for Greener Chemicals and Processes Information NSF/GCI 355,” which hopes to provide a transparent and consistent way to communicate the health, safety and environmental data of a particular chemical product and its manufacturing process.

“We have been delighted to be part of the dialogue,” said Charron of Bayer’s participation. “I think this Standard is a good first step in giving us a method to share comparative health, safety and environmental data about our products and processes,” he added.

BMS also was chosen to pilot the trial use of the Standard on two of its polyol products. “Through our



analysis, we were able to provide valuable feedback to the Joint Committee on how to make the Standard more valuable to both users and industry,” said Charron. While BMS has been pleased to participate, the Company does not believe this first Standard should be used alone to make decisions about the “green-ness” of chemicals. “The challenge is that this Standard only reviews the molecular transformation phase of chemicals, specifically how they are made,” said Charron. This molecular transformation is sometimes referred to as the “gate-to-gate” phase because it deals with what happens within a chemical plant or a chemical processing unit.

Bayer’s recommendation is to use this Standard as the second in a series of three addressing the entire lifecycle of the chemical product. The NSF/GCI 355 Standard looks at “gate-to-gate” considerations and should be

>> considered as Part B. “We would suggest that we need to add a Part A to look upstream to the raw materials used to make the product, as well as a Part C to look downstream to the ways the product is used and disposed. This more holistic approach of a three-part standard recognizes that a measure of ‘green-ness’ must take into account impacts and benefits across all lifecycle stages of a chemical product,” Charron said.

An excellent example of the benefit of analyzing a product’s entire lifecycle is BMS polyurethane systems frequently used for insulation. “When you evaluate the ‘green-ness’ of manufacturing these chemical products, you see one chapter of its story,” noted Charron. Polyurethane foam insulation used in residential and commercial buildings drastically reduces net energy consumption and carbon emissions. “When you calculate the net environmental and energy impacts garnered throughout this product’s entire lifecycle, you fully understand the value – the ‘green-ness’ – of this chemistry compared to the alternatives,” he said.

The Standard is now under review by NSF International’s Council of Public Health Consultants and should soon be issued as a new ANSI Standard. BMS is committed to remaining part of the process to shape future revisions and additions to the Standard. “The chemical industry is definitely heading in the right direction by promoting and encouraging greener chemical products and processes, and we here at Bayer stand solidly behind that effort,” Charron concluded.



Bayer CropScience LP

## Winter Wheat Breeding Helping Improve the Sustainability Profile of North American Agriculture

Bayer CropScience (BCS) has joined forces with the University of Nebraska-Lincoln (UNL) to improve wheat breeding, in particular generating new winter wheat varieties. The new collaboration will provide innovative solutions to wheat growers and ensure resources for advanced education in the field of wheat agronomy.

“We are very excited about this new partnership with UNL and are confident that by working together we can make great advances in wheat productivity to benefit farmers and the grain trade worldwide,” said Dr. Geoff Kneen, Head of the BioScience RTP Operations.

Bayer is establishing its first North American wheat breeding station near Lincoln, Neb., and will gain access to UNL’s outstanding wheat germplasm. Bayer is supporting the University’s effort in wheat breeding and education through a new endowed chair for cereal breeding faculty, scholarships, fellowships, and a new Agricultural Research Division Crop Innovation Fund.

Approximately 25 percent of global agricultural land is utilized for wheat cultivation, making wheat the largest food crop worldwide in terms of area.

### Winter Wheat Also Protects Waterfowl Habitats

The UNL partnership dovetails very well into BCS’s research partnership with Ducks Unlimited, a nature conservation organization. Since 2009, Bayer has sponsored a “Winter Cereals: Sustainability in Action” initiative to, in part, develop new, higher-yielding winter wheat varieties adapted to the “Prairie Pothole Region” of the U.S. and Canada. Through research

sponsored at South Dakota State University, North Dakota State University, the University of Minnesota, the University of Saskatchewan and Agriculture Canada, the goal is to provide farmers with new winter wheat varieties with combined better cold tolerance, improved resistance to disease and improved grain quality. The effort has a dual aim of increasing agricultural productivity and providing greater protection for waterfowl habitats.

Winter wheat provides important waterfowl breeding habitats in the “Prairie Pothole Region,” where up to 70 percent of North American waterfowl nest. Studies have shown that nest densities are up to 24 times greater in fields in which winter wheat is grown than in those where spring sown crops are planted. Farmers also benefit from incorporating winter wheat into their rotation because it has attractive financial benefits. Seeding winter wheat in the fall spreads the farmer’s workload, provides versatile crop rotation and produces higher yields. The environment also benefits because growing winter wheat as part of a no-till rotational cropping system contributes to improvements in soil and water quality and reduced energy inputs.

Bayer CropScience and Ducks Unlimited recognize that their responsibility goes beyond the farm gate, and are committed to working with the entire value chain – growers, seed companies, food suppliers, environmental organizations, and retailers – to ensure high-quality affordable food is available while, at the same time, enhancing and protecting the environment.

Bayer HealthCare LLC

## Bringing Sustainability to Consumer Care Products

Bayer HealthCare's Consumer Care Division has embarked on an initiative to identify product or packaging opportunities that, in the future, could lead to more sustainable offerings in the marketplace. Through a lifecycle assessment of key brands (LCA), the initiative fosters sustainable thinking between Consumer Care internal teams and customers by identifying opportunities in current product and packaging offerings as well as future designs to ensure more environmentally friendly products.

The LCA pilot program began in the fourth quarter of 2010 and includes a diverse mix of Consumer Care products including Bayer® Aspirin, Aleve® and One A Day®. The pilot has analyzed the impact of factors such as weights, package types like blister packs or foils, and dimensions on the overall product sustainability footprint. The results will establish baselines by which new Consumer Care products and packaging initiatives are benchmarked.



# Communities



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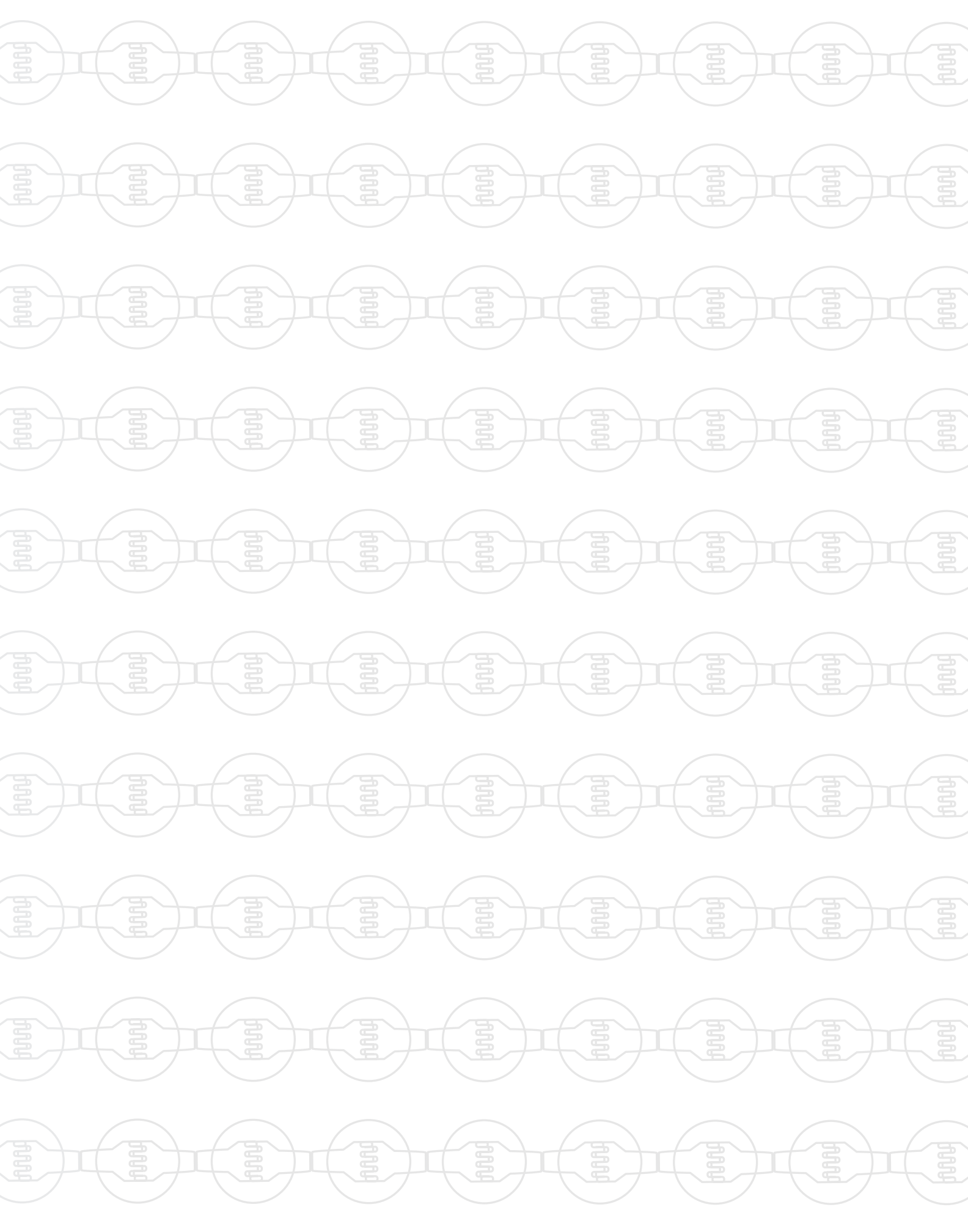
**Pop the Corks**

**Keeping Our Water Clean**

**Leading the Way for World Environment Day**

**2010 Green Chemistry Roundtable Series**

**Bayer International Summer Sustainability Camp**



### Pop the Corks Making Science Make Sense® Celebrates Its 15th Anniversary



When Bayer Corporation formally launched *Making Science Make Sense® (MSMS)* in 1995, few could have envisioned the longevity and impact the science education program would have.

But longevity and impact it has had.

In fact, *MSMS* has touched the lives of millions of students, teachers, parents, business leaders, scientists and other Americans through the support of standards-based science education, employee volunteerism and a public education campaign led by former astronaut and *MSMS* spokesperson, Dr. Mae C. Jemison.

Now celebrating its 15th anniversary, *MSMS* has grown in recent years to take on an important national advocacy role, particularly in the area of STEM (science, technology, engineering and mathematics) diversity.

Bringing more women, African-Americans, Hispanics and American Indians into STEM fields is a priority for the United States. Tapping this talent pool and building a diverse STEM workforce requires the commitment of many stakeholders, including the business community.

Through a series of STEM diversity forums in Washington, D.C., and San Francisco, annual Bayer Facts of Science Education research surveys that examine the issue, and resources designed for STEM industry leaders, Bayer and *MSMS* have taken on an important national leadership role, calling on other companies to get involved and support STEM education.

Recently, Bayer was invited to join Change the Equation (CTEq), a national initiative that supports the Obama Administration's

"Educate to Innovate" program. CTEq comprises leading science and technology companies who want to improve STEM education, especially for girls and underrepresented minorities. As a national voice for diversity, Bayer is in a unique position and once again in the forefront, sharing its knowledge and resources with CTEq's 100-plus other member companies.



Still, no matter how much it grows, *MSMS* remains true to its roots. It is firmly grounded in the service of its employee-volunteers and the school-based science education partnerships they've forged in their local communities. These volunteers are at the heart of the program's success. In honoring them, Bayer produced a special anniversary video featuring Bayer Corporation President and CEO Greg Babe, extolling the important work they do.

>> “While [our MSMS volunteers] go about their work quietly, their work never goes unnoticed,” he explains. “They and Bayer have been honored with numerous awards, including two Presidential Awards – the President’s Service Award and the Ron Brown Award for Corporate Leadership – and the National Science Board’s highest honor, the national Public Service Award.

“Their contributions to society and to science literacy have had, and will continue to have, a positive impact on both our company and our country.”

Science literacy is not a nicety, it is a necessity. When we talk about science literacy, we are not talking about producing the next generation of scientists. In the 21st century, people – just to function adequately – will need a basic level of science and technology understanding.

Bayer and I are working to achieve science literacy for all students. It is not about creating a million nuclear physicists. We don’t need them. Science literacy is about educating a hundred million people so that they can read an article on a science topic and understand it; vote responsibly on health care or environmental issues; and prepare nutritionally sound meals for their children.

DR. MAE C. JEMISON | Bayer’s *Making Science Make Sense* Spokesperson; First African-American Astronaut; CEO, BioSentient Corporation; Founder, The Earth We Share



## Keeping Our Water Clean Bayer Launches New Science Experiment for Students

Bayer Corporation has added a new environmental experiment to its science literacy efforts. The new “Keeping Our Water Clean” experiment encourages school students to consider the importance of conserving freshwater.

“This is one more way we hope to encourage science students to think about sustainable lifestyles and help them to discover small ways they can make a difference,” said Deborah Wallace, Chairperson, Bayer Association for Science in Communities (BASIC). “As with all of our science experiments, the kids really enjoy the hands-on learning and are very excited when we come to the classroom.”

The program highlights the importance of freshwater as a somewhat renewable and somewhat non-renewable resource that needs to be conserved and well treated. The water conservation experiment is one of 50 experiments Bayer offers to local teachers and students.

“The students are really surprised to learn that even though three-quarters of the Earth’s surface is covered with water, only 2.5 percent of that water is fit for consumption,” Wallace added. “I think it helps them to realize the importance of conservation.”

Bayer Association for Science in Communities is Bayer’s *Making Science Make Sense*® employee volunteer program in Pittsburgh, Pa. More than 100 employees volunteer their time and expertise to work with local teachers and students to improve science education and science literacy. Each year, these volunteers visit more than 175 classrooms and participate in a variety of community events, reaching more than 15,000 students a year in the Pittsburgh region.

*Making Science Make Sense* is Bayer’s company-wide initiative that advances science literacy in the United States through hands-on, inquiry-based science learning, employee volunteerism and public education.

BASIC programs include: Adopt-A-Scientist, Science Is Fun, interactive chemistry shows, environmental learning activities, community special events, and a speaker’s bureau. Volunteers also serve as science fair judges and mentors to local students.



## Bayer Corporation Leading the Way for World Environment Day



The United Nations Environment Programme's partnership with Bayer in North America led to the most successful World Environment Day celebration regionally and one of the best globally. Bayer and Pittsburgh have set a high standard for future World Environment Day celebrations in North America.

ELISABETH GUILBAUD-COX | Deputy Director,  
UNEP Region of North America (RONA)

In partnership with the United Nations Environment Programme (UNEP), Bayer met its goal in successfully leading the 2010 World Environment Day (WED) celebrations in Pittsburgh, Pa., location of Bayer's North American headquarters.

Commemorated each year on June 5, World Environment Day is one of the principal vehicles through which the United Nations stimulates worldwide awareness of the environment and enhances political attention and action. Selected by UNEP, Pittsburgh embraced its role as North American host city with pride and enthusiasm.

### Pittsburgh Partnership

Bayer AG and Bayer Corporation are global and regional World Environment Day sponsors, respectively. In preparation for WED 2010, Bayer Corporation assembled the Pittsburgh WED Partnership – a team of local leaders from businesses, foundations, non-governmental organizations and policy makers. The Partnership, co-chaired by Greg Babe, President and CEO of Bayer Corporation, spearheaded the region-wide celebration that began on Earth Day, April 22, and ran for the six-week period that “bridged the gap” with WED on June 5.

“Bayer has had a long partnership with UNEP on a global level and a growing regional collaboration in North America,” said Babe. “Taking a leadership role to support the UNEP World Environment Day 2010 effort was a natural fit for Bayer and our corporate commitment to protect the environment.”

All events highlighted the theme for the WED celebration, “Biodiversity – Ecosystems Management and the Green Economy,” and within that theme, Pittsburgh focused on the sub-theme, “Water Matters!”

Bayer Corporation hosted two key WED events in the areas of youth and environment. The annual International Children's Painting Competition received a record-breaking 945 North American submissions. Dr. Mae C. Jemison, astronaut, environmental studies professor and Bayer's long-time *Making Science Make Sense*® spokesperson helped Pittsburgh-area middle school students learn about the global water shortage by identifying and solving key local water issues during the “Water Matters! To Youth, Too!” interactive workshop.

### Generating National Exposure

In addition, WED 2010 in North America was highly visible. Over the course of the six weeks, more than 130 events were planned by over 100 local participating businesses, individuals and organizations. The event generated media coverage in every major media outlet in the region – television and radio broadcast, print and online. Money raised by the Pittsburgh WED Partnership and in-kind donations totaled more than \$1.8 million.

“UNEP's partnership with Bayer in North America led to the most successful WED celebration regionally and one of the best globally. Bayer and Pittsburgh have set a high standard for future World Environment Day celebrations in North America,” said Elisabeth Guilbaud-Cox, Deputy Director, UNEP RONA.

“Bayer's partnership with UNEP is a cornerstone of our commitment to social responsibility and environmental stewardship,” said Babe. “We were pleased to take part in World Environment Day 2010 and are looking forward to a long partnership with the United Nations Environment Programme to protect our environment for generations to come.”

## Manufacturing a Sustainable Economy 2010 Green Chemistry Roundtable Series

Bayer Corporation and Bayer MaterialScience LLC had key roles in the Green Chemistry Roundtable Series, “Manufacturing a Sustainable Economy,” presented by the Rachel Carson Homestead Association and Sustainable Pittsburgh's “Champions for Sustainability” during 2010. The three-part roundtable series brought together leaders from Pennsylvania's manufacturing business to discuss how green chemistry can propel the region to advance sustainability in all its forms.

The three sessions included: Preventing Pollution by Design, Policy Issues and the Reform of the Toxic Substances Control Act, and Showcasing the Achievable to Inspire the Possible. Dr. Janet M. Mostowy, Product Safety and Regulatory Affairs, Bayer MaterialScience LLC, participated as a panelist and

**Bayer is pleased to be at the forefront in promoting sustainable development and innovative products to meet the needs of the future, in an environmentally responsible way.**

VALERIE PATRICK, Ph.D. |  
Sustainability Coordinator,  
Bayer Corporation

sustainability in all its forms by applying the principles of green chemistry,” said Patrick. “Bayer is pleased to be at the

forefront in promoting sustainable development and innovative products to meet the needs of the future, in an environmentally responsible way.”

Champions for Sustainability (C4S) is a program of Sustainable Pittsburgh. The three roundtable workshops were held on January 13, March 18 and July 29, 2010. The Rachel Carson Homestead Association carries on its founder's zeal for the environment from its location 18 miles from Pittsburgh.

### About the C4S Workshop Series

Champions for Sustainability sponsors a series of events and workshops for its members throughout the year. The goal is to provide information about trends and challenges; provide access to tools, knowledge, and examples; and engage the membership in assessments and reflections to help craft the regional practice of sustainability.

### About C4S

Champions for Sustainability (C4S), a network for sustainable business solutions, brings together companies large and small to put sustainability into practice. C4S provides value via education, technical assistance and consulting on operational needs, and serves as a catalyst for new enterprise and innovation for cementing the business case for sustainability.

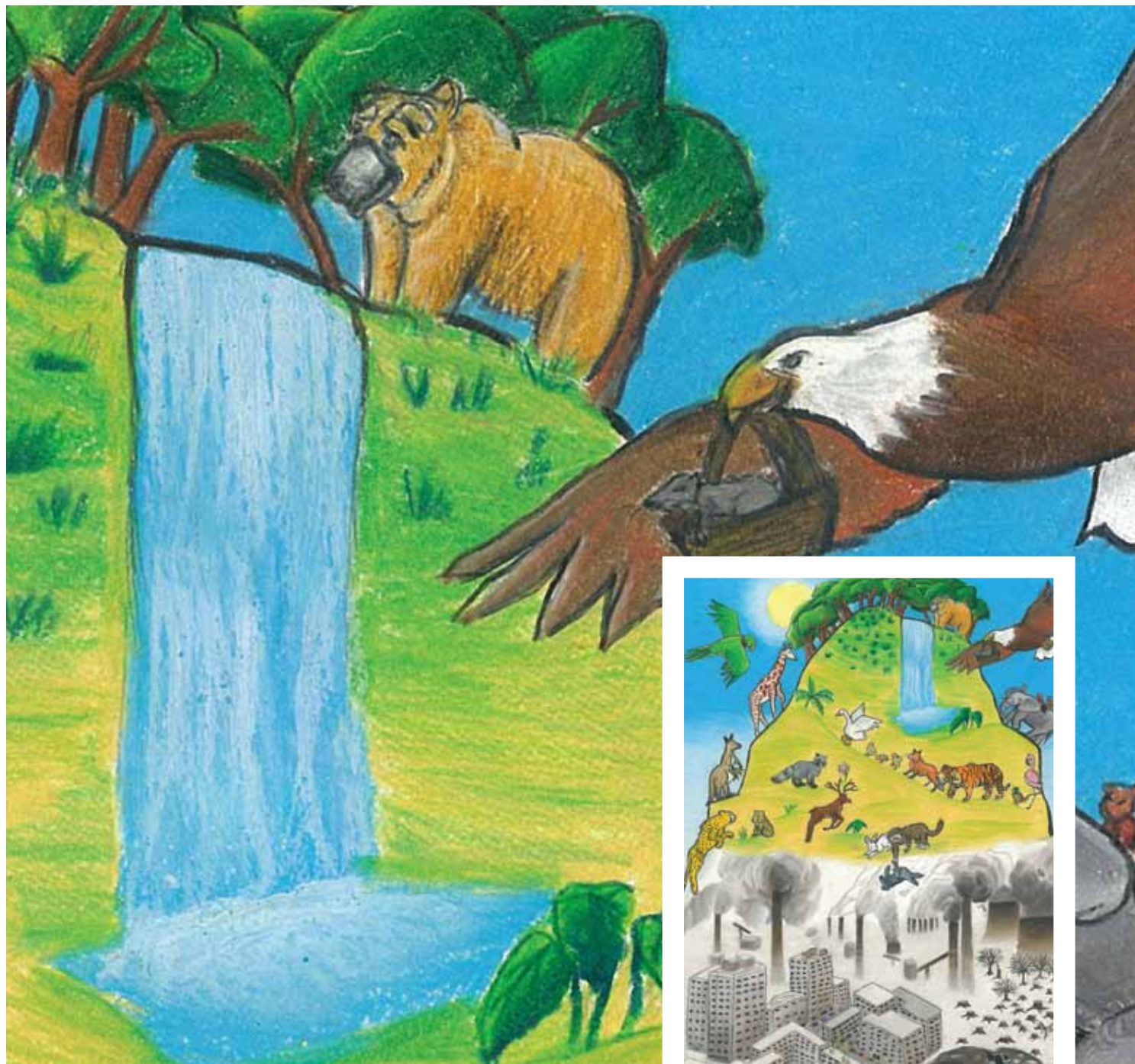
## Bayer USA Foundation Bayer International Summer Sustainability Camp

Bayer hosted 15 high school students from the United States and Europe during its third annual International Summer Sustainability Camp in July. During the two-week camp, students had a unique opportunity to learn about the environment, sustainable development and global climate change issues through urban-river experiences.

The camp, funded by the Bayer USA Foundation and the Bayer Science & Education Foundation, is conducted by RiverQuest, a Pittsburgh-based, nonprofit educational organization. Bayer's support for the camp is part of the Bayer Climate Program, a global initiative to develop and carry out environmentally sustainable programs.

“This camp fosters the intellectual development of a select group of international students for two weeks of sustainability education,” said Rebecca Lucore, Executive Director, Bayer USA Foundation. “Once again working with RiverQuest, we’re educating the next generation of leaders on energy, climate change and sustainable development, which are vital, global issues.”





As a partner of the United Nations Environment Programme (UNEP) in the area of youth and environment, Bayer sponsored its annual International Children's Painting Competition. In the last 20 years, more than two million girls and boys from around the world have submitted paintings. Shown here is the Regional Winner for North America, painted by Prerika Chawla, age 13, from the United States.

Pictured here are the photovoltaic panels installed on the roof of the Bayer HealthCare Pharmaceuticals Commercial Operations Headquarters building in Wayne, N.J. These panels are part of a 454 kW solar power system that provides clean energy and reduces the generation of greenhouse gasses.



## For More Information...

Bayer's Worldwide Commitment to Sustainability:  
[www.sustainability2010.bayer.com](http://www.sustainability2010.bayer.com)

Bayer Corporation in North America:  
[www.bayerus.com](http://www.bayerus.com)

Bayer MaterialScience LLC  
EcoCommercial Building Products:  
[www.ecocommercial-building.com/index.html](http://www.ecocommercial-building.com/index.html)

Green Chemistry:  
For more information about Green Chemistry, visit the American Chemical Society website at: <http://portal.acs.org/portal/PublicWebSite/greenchemistry/index.htm>

For more information about the NSF/GCI 355 Standard, visit NSF International's fact sheet at [www.nsf.org/business/standards\\_and\\_publications/pdf/COR\\_GCI\\_355\\_Insert\\_reference\\_final.pdf](http://www.nsf.org/business/standards_and_publications/pdf/COR_GCI_355_Insert_reference_final.pdf)

Bayer's Commitment to Science Education:  
[www.bayerus.com/msms](http://www.bayerus.com/msms)  
[www.facebook.com/BayersMSMS](https://www.facebook.com/BayersMSMS)

## Corporate Sustainability Community Council Members

### **George Bartha**

Director, IT Operations Bayer Data Center  
Bayer Business and Technology  
Services LLC  
Pittsburgh, PA  
412-778-6686

### **James Breitlow**

Head, Health, Environment and Safety  
Bayer HealthCare Pharmaceuticals Inc.  
Berkeley, CA  
510-705-5403

### **Brandon Buell**

Environmental Specialist  
Bayer MaterialScience LLC  
Baytown, TX  
281-383-6436

### **Thomas Daszkowski**

Vice President, Process Technology  
Bayer Technology Services Americas  
Berkeley, CA  
510-705-6878

### **Santo Guillermain**

Associate Director  
Health Environment & Safety  
Facility Operation  
Bayer HealthCare Pharmaceuticals Inc.  
Wayne, NJ  
973-305-5408

### **Jody Gossman**

Director, Maintenance,  
Engineering and Utilities  
Bayer Healthcare LLC  
Shawnee, KS  
913-268-2474

### **Nick Hamon**

Vice President, Sustainability  
Bayer CropScience North America  
Research Triangle Park, NC  
919-549-2527

### **Drew Johnston**

Product Supply  
Director, Technical Support  
MEDRAD  
A Business of Bayer HealthCare  
Warrendale, PA  
724-940-7904

### **Bob Kumpf**

Chief Administrative Officer and  
Head of the Bayer North American  
Corporate Sustainability Community  
Council  
Bayer MaterialScience LLC  
Pittsburgh, PA  
412-777-2010

### **Halwyn Lewis**

Director, Engineering North America  
Bayer HealthCare LLC  
Myerstown, PA  
717-866-3848

### **Rebecca Lucore**

Executive Director, Bayer USA Foundation  
Head, CSR Activities  
Bayer Corporation  
Pittsburgh, PA  
412-777-5725

### **Irene McGee**

Vice President, Regional Business Support  
Bayer MaterialScience LLC  
Pittsburgh, PA  
412-777-4997

### **Valerie Patrick**

Sustainability Coordinator  
Bayer Corporation  
Pittsburgh, PA  
412-777-3930

### **Jeff Reynolds**

Director, Technology Innovation  
Bayer HealthCare LLC  
Tarrytown, NY  
914-333-6268

### **Ahmad Soltani**

Vice President and  
Chief Procurement Officer  
Bayer Business and Technology  
Services LLC  
Pittsburgh, PA  
412-777-2100

### **Paul Thiel**

Vice President, Industry Relations  
Bayer CropScience Inc.  
Calgary Alberta Canada  
403-723-7435



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