CLOSE TO CUSTOMERS AND COUNTING TO THE WORLD

2015 ANNUAL AND SUSTAINABLE DEVELOPMENT REPORT

DESIGNED BY ARKEMA

INNOVATIVE

ARKEMA INNOVATIVE CHEMISTRY
THANK YOU TO OUR CUSTOMERS SHAREHOLDERS PARTNERS AND EMPLOYEES FOR EXPLORING THE FUTURE AT OUR SIDE

Arkema is celebrating its tenth year. Ten years of progress and innovation. You have driven our successful transformation. You have helped us meet our daily challenges, helped us become the designer of materials and innovative solutions we are today.

Together, let’s continue the innovation that drives our growth and performance.
2015 IN ACTION

A TRANSFORMATIVE 10 YEARS

Thierry Le Hénaff, Arkema’s Chairman and CEO, revisits 2015’s strong performance, the tangible outcome of the disruptive strategy pursued since the company was publicly listed on May 18, 2006. His analysis also looks at the future, which he envisions as a new era of growth led by expansion in Asia, high-performance materials and innovative solutions to promote sustainability.

2015 PERFORMANCE UP SHARPLY

Thierry Le Hénaff > In a mixed global business environment, Arkema posted very solid earnings in 2015, exceeding the goals that had been set. Our revenues totaled €7.7 billion, up 29% from 2014. We also sharply improved our profitability, reporting EBITDA of €1.057 billion, an increase of 35% year-on-year and 13% on a like-for-like basis.

Several factors contributed to this performance. Our thiochemicals production complex in Kerteh, Malaysia, in early 2015, commissioned quickly became a technological and business success. We’re very pleased, since this kind of investment is decided five years in advance and a lot can happen in five years. Our acquisition of the world’s third-ranked adhesives producer, Bostik, effective in February, also appreciably boosted our results. In its first year with Arkema, Bostik posted an EBITDA of €183 million, up from €158 million in 2014 — another bet on growth that paid off.

In 2015, our six innovation platforms, which focus on solutions to promote sustainability, continued to fuel our growth. Our results were also buoyed by the strides in operational excellence made by all our teams, which yielded €30 million in savings.

Our performance in 2015 confirms that the strategic business directions we have chosen are the right ones. We continue to adjust our regional presence: Asia now accounts for 24% of our revenues and Europe’s share has dropped further, to 38%. Growth in our High-Performance Materials segment, which delivers significant value-added, is picking up speed. Lifted by Bostik’s arrival, it now accounts for 44% of Arkema’s sales, alongside our Industrial Specialties (32% of revenues) and Coating Solutions (24%) segments. This brings our share of so-called cyclical business activities, which are sensitive to economic fluctuations, down by 10%.

GROWTH OUTLOOK

Thierry Le Hénaff > Arkema’s macroeconomic assumptions for 2016 are prudent, to reflect volatile energy and feedstock prices and currency exchange rates. But we’re confident in our ability to keep improving our profitability. Our short-term priorities will be growth through innovation and the company’s continued transformation.

We plan to accelerate the expansion of Bostik, which still has many regional opportunities to tap, and strengthen its synergies with the rest of Arkema. The thiochemicals complex in Kerteh will continue to ramp up until it reaches full capacity this year. Our fluorogas business will forge ahead with its recovery plan, which was introduced after a tough 2014 and started delivering results in 2015. Lastly, Arkema will continue with the €500 million divestment program for the period 2015-2017.

These priorities are part of our longer-term roadmap. We are aiming for revenues of €10 billion in 2020. And we’re banking on a balanced distribution of one-third each for the three major regions: the Americas, Europe, and Asia and the rest of the world.

DESIGNER OF MATERIALS AND INNOVATIVE SOLUTIONS

Thierry Le Hénaff > Today’s Arkema is almost unrecognizable from the Arkema of 10 years ago. Once known as a major manufacturer of specialty chemicals, we are now positioned as a “designer of materials and innovative solutions.” In our R&D centers and production plants, we “shape” materials to develop practical applications that address the contemporary world’s major challenges. When our materials are used in smartphones, they connect people. When they make a vehicle lighter, they help fight climate change by enhancing fuel efficiency. In a solar panel or a battery, they produce and store tomorrow’s energy.

Our support for our customers tracks closely with their needs: we accelerate their performance and competitiveness by devising solutions that help them bring disruptive innovations to market.
10 YEARS OLD TODAY BUT WITH OUR EYE ON THE FUTURE

Thierry Le Henaff

Arkema was publicly listed in 2006, a few months after being created. Ten years later, the company has been almost totally transformed. We are now an innovative, agile, global chemical producer with a regionally balanced portfolio, providing specialty chemicals and advanced materials. By tripling our operating income in a decade and doubling our EBITDA margin, we have proved our ability to ride out the ups and downs of the world economy and fluctuations in currencies and energy costs. Lastly, our market capitalization virtually tripled over the same period.

The success of Arkema and our people is no accident. It is the result of the company’s profound transformation, guided by a bold strategy. From the outset, we have looked to emerging markets: our capital spending on production capacity in Changshu, China, and Kerteh, Malaysia has boosted Asia’s share of our revenues from around 10% to 24%, while Europe’s has been reduced to below 40%.

Thanks to a selective investment and acquisitions strategy, we have sharply reduced our dependence on cyclical activities and commodities, shifting our focus to higher-value-added specialty chemicals. Our recent acquisition of Bostik and its immediate contribution to our results is yet another example of the change.

Arkema has made innovation a growth driver since day one. Named one of the Top 100 Global Innovators by Thomson Reuters for the last five years, we have six R&D platforms, focusing on performance materials that tackle the environmental challenges of the future.

Lastly, we are strongly engaged in a process to improve our corporate social responsibility performance. We had one of the lowest recordable injury rates in the industry in 2015. Environmentally, in 10 years we have slashed our greenhouse gas emissions 64% and our air emissions 43%. And we are shrinking our energy bill every year.

The last 10 years were just the first step. The next milestone is already set for 2020. In keeping with our roadmap and drive, we will continue to transform the company. Our focus on innovation, emerging markets, sustainability and performance materials gives us myriad growth opportunities. Arkema is strongly positioned to keep our momentum going; we have the people, the talent, the projects and the determination it takes.
In 2006, Arkema went public with a clear strategy and an ambitious transformation plan focused on:

- Growing our business in emerging economies
- Innovation
- Targeted acquisitions

We are now more streamlined, more expert, more innovative and more future-focused than ever, with confidence and new goals.

Arkema is a more profitable, competitive company today.

In 10 years our revenue has soared by €2 billion, to €7.7 billion in 2015.

Our EBITDA margin has more than doubled, from 6.2% in 2005 to 13.8%.

And our EBITDA has tripled to €1.057 billion.
We are committed to growth while practicing Arkema’s 4 core principles:

- Simplicity
- Solidarity
- Responsibility
- Performance

In line with our values, our HR teams emphasize diversity, teamwork, problem-solving skills and initiative.
The Famous 5

(CSR Commitments)

5 major commitments tracked using indicators, that bring our corporate social responsibility (CSR) performance to the level of the world’s best chemical producers.

- Rank with the best in class in the chemical industry for safety.
- Significantly shrink the environmental footprint of our activities.
- Promote the personal and collective development of our people.
- Make sustainable development solutions a centerpiece of our innovation policy and our product lines.
- Maintain open lines of communication with our stakeholders.

A 6th Sense

Innovation

6 forward-looking, solution-oriented R&D platforms to support our customers’ growth and sustainable development.

- Bio-Based Products
- New Energies
- Water Management
- Electronics Solutions
- Lightweight Materials and Design
- Home Efficiency and Insulation
1. **Pebax® Rnew**
The first bio-based, high-performance elastomer

2. **Rilsan® HT**
A light polymer that can withstand very high temperatures and replace metal in car engines

3. **Altuglas® ShieldUp**
A transparent, ultra-solid acrylic glass that is twice as light as real glass

4. **Elium®**
A resin to make the first recyclable composites

5. **Kepstan®**
An “extreme” polymer that withstands temperatures of 360°C

6. **Bostik® gel**
A flame-retardant adhesive to assemble composite structures in airplanes

7. **Axios™ Tri-linking™ Technology**
For flooring adhesives that block moisture and reduce noise

Otherwise known as 7 of our best innovations!
In the last 10 years Arkema has developed lighter, more efficient materials to meet energy and sustainability challenges.

8 acquisitions have changed the shape of Arkema and shifted our global footprint and our portfolio toward specialty chemicals and performance materials.

- **Coatex**
Additives, thickeners and dispersing agents for paper and paint

- **Dow Chemical assets**
Acrylic acids and esters, latex emulsions

- **Cray Valley**
Resins for paints and coatings

- **Sartomer**
Photocure resins

- **Bostik**
The No. 3 adhesives maker in the world

**Casda Biomaterials and Hypro Polymers**
Sebacic acid and bio-based polyamides

**Jurong Chemical’s acrylic acid assets**
in China

Creation of the Sunke joint venture

And a pool of innovative startups in high-value-added materials such as **AEC Polymers** and **Piezotech** and its piezoelectric materials

Thomson Reuters has included Arkema in its list of Top 100 Global Innovators, all business sectors combined, for five years in a row.

In 2016, these new activities make up 40% of Arkema’s portfolio.
Leadership

Over the years, Arkema has become a global leader in our 9 main product lines.

No. 1 in Technical polymers (specialty polyamides and PVDF)
No. 2 in PMMA
No. 3 in Adhesives
- Hydrogen peroxides
- Coating resins
- Acrylics
- Fluorogases

Priorities for 2020

# Reach €10 billion in revenue
# Attract top talent and rank among the “best companies to work for”
# Have organic growth and acquisitions each account for half the growth in our revenue
# Keep growing our dividends
# Keep improving our financial performance
# Strengthen safety and operational excellence
# Make 50% of our revenue from high-performance materials
# Provide new sustainable solutions for major social and environmental issues
# Achieve a perfect geographical balance among Europe, Asia and North America
# Have sustainability-related inventions account for close to half of the patents we file

10 out of 10 for the course we’ve set!
WITH A TRIP OF 0 IN 2015, THE CHANGSHU SITE IN CHINA, ARKEMA’S BIGGEST PRODUCTION COMPLEX, WON THE SAFETY AWARD.

Arkema creates buzz on social media. Here’s a small sampling of 2015 posts and news items on Twitter, Facebook, Instagram and LinkedIn. Follow us to stay connected!

Arkema’s biggest production complex, the Changshu site in China, won the safety award.

Transat Jacques Vabre
A nice spotlight on César and Lalou, of the Arkema Transat Jacques Vabre team, on Instagram. More on page 9.

It took 3 years to complete this enormous project in Malaysia. A Facebook retrospective through a milestones photo album and key figures.

Kerteh is the biggest construction project ever carried out by Arkema. Work began in 2012 and was not completed until 2015. The other statistics are just as mind-boggling.

Nearly €200 million invested. As many as 1,200 workers at the building site at one time. Some 2,400 people in all worked to make its construction a success. 70,000 kilometers of pipes and 2,000 tons of structural steelwork on a 14-hectare site.

With Kerteh’s help, Arkema continues to grow in the animal feed, petrochemicals and refining markets.

The 140 animals sculpted out of Altuglas® in the Arche de Noé Climat (Climate Noah’s Ark) are unveiled to the public. For more about this impressive exhibition, see page 49.

Top 100 Innovators
For the fifth year in a row, Arkema has been ranked among the top 100 innovating companies and organizations in the world, across all business activities. The Group features among the 3 French companies selected for this award.

INTERESTING FACT
More than half of the players competing in the 2014 FIFA World Cup wore shoes with soles made of Pebax®, a material in high demand for its exceptional properties. A review of its high-tech characteristics on YouTube.

French chemical producer #Arkema invests €60 million at its Honfleur site.

Arkema - Innovative / 7

Arkema - Innovative / 6
For three years Arkema’s Multi50 trimaran, skippered by Lalou Roucayrol, has been competing in one trans-Atlantic race after another. It’s nothing less than a floating laboratory for our materials and adhesives. After finishing second in the Route du Rhum race in 2014, the Multi50 finished third in its category in the Transat Jacques Vabre in November 2015. Next up is the legendary solo crossing of the North Atlantic, The Transat, in May 2016. Buoyed by our experience with the Multi50, Arkema has opted to recommit to Lalou Roucayrol through 2018.

In addition to the Multi50, the partnership is building a Mini 6.50 monohull, packing a wide range of Arkema innovations into it from the get-go. A hull made of Elium® thermoset composite and carbon fiber, AEC Polymers structural adhesives for the bracing inside the boat and a wheelhouse window of Altuglas® ShieldUp acrylic glass are a few examples. Quentin Vlamynck, a young sailor mentored by Lalou Roucayrol, will skipper the high-tech prototype. Set to be launched in 2016, it will compete in 2017’s flagship race for its category, the Mini-Transat.
Bostik's colors took to European skies aboard a Boeing 737-800 flown by Transavia Airlines, an Air France-KLM subsidiary. A 250-square-meter flying advertisement was "glued" to the plane's body, allowing Bostik and its parent company Arkema to demonstrate their know-how in aircraft adhesives and materials that meet the aviation industry's lofty requirements.

This unique experiment showcased Bostik’s expertise in making adhesives for industry, construction and consumers. Millions of travelers saw the plane at Orly Sud and at 45 stopovers in 17 countries. The six-month-long, wide-ranging campaign helped Bostik boost its brand awareness across Europe and the Mediterranean and supported the brand presence in big-box DIY stores.

Bostik’s instantly recognizable gecko is becoming a fixture in the publicity caravan in the hill-climbing race-against-the-clock known as the Tour de France. Bostik, an official supplier for three years, has four vehicles decked out in the brand’s logo and colors. The campaign gives the adhesives-maker broad visibility among the general public, through the distribution of giveaways and advertising merchandise to spectators.

It’s also an opportunity for Bostik to offer customers a once-in-a-lifetime experience. In 2015, more than 200 of them from eight countries were hosted over the 24 stages of the race, enjoying an up-close view of the competitors from official cars.

The sponsorship was also a chance to deploy a poster and promotional campaign in DIY stores across France and to hold a contest offering 100 bikes as prizes.
Arkema is working with a mix of technology and industry partners to design the materials of tomorrow. Christian Collette, Vice President, Research & Development, spells out our strategy, which is based on openness, agility and anticipating the future.

Open Innovation Steers Our R&D to THE BEST Expertise

A Conversation with Christian Collette, Vice President, Research & Development

What prompted Arkema to opt for a strategy of open innovation? Christian Collette > Our open innovation strategy makes our R&D efficient by syncing it with precisely identified, real-world issues or challenges. Working with partners worldwide helps us fine-tune our market and technology intelligence, get a jump on major social, industrial and technological changes, better target our research and, ultimately, move more quickly on promising projects. For basic research, we seek out complementary expertise from universities, top-ranked engineering schools and labs. For applied research, we team up with manufacturers to accelerate the development and marketing of applications using our materials. This enables us to take a "big picture" approach to a project, tapping the best specialists in their fields, to devise products that provide real value-added to our customers.

Can you give us an example? C.C. > We’re developing thermoplastic composites for lighter vehicle bodies and also provide recyclability. For this project we’ve teamed up with European carmakers and equipment suppliers, a South Korean laboratory internationally renowned for thermoplastic composites, and a French institute of applied technology specializing in infusion processes for composite parts. We showcase our own innovation processes with the knowledge, methods and technologies we need wherever they can be found.

How do you choose your R&D partners? C.C. > We work with top-flight academic institutions. They can offer more expertise, collaborative research, and project assessments by scientific committees. For a state-of-the-art technology, we sometimes partner with high-potential startups. On the industry side, we give priority to companies that are market leaders. Our joint development agreements in such cases stipulate exclusive commercial use of the resulting material. Given the capital expenditure required, our partners must be able to promote and distribute the new product on a large scale.

You have organized your R&D into six innovation platforms. Why is that? C.C. > Our six platforms cover lightweight materials and design, electronics solutions, new energies, home efficiency and insulation, bio-based products, and water management. All six address major social challenges and offer strong potential growth. More importantly, we’re entirely credible in these niches: we have recognized expertise in the materials used in many of these applications. Lastly, each platform pools the energy and drive of international teams into targeted research to achieve genuine technological advances.

What are the key factors to successfully carry out your R&D projects? C.C. > Pace and momentum are crucial. You need a tight-knit team of researchers with clearly defined roles and objectives. Every six months, we reassess a project’s status before moving on. Success also requires knowing when to call time on projects that are going nowhere. We shut down about a quarter of them every year — always a tough call — and redeploy the resources elsewhere. We measure the vitality of our R&D by the number of patents filed, nearly 200 each year. And by the fact that in 2015, Thomson Reuters named Arkema one of its Top 100 Global Innovators for the fifth straight year.

You’ve also created an incubator. What does it do? C.C. > Our incubator is a cross-functional, independent program that serves both the platforms and the R&D goals of our business lines. Its role is to nurture high-potential innovations based on technologically disruptive materials. The program involves 500 scientists and engineers who work through all the aspects of development, from design and manufacturing to positioning and marketing. They deliver proven innovations to the business lines responsible for marketing them. The incubator brings precious product, such as carbon nanotubes, piezoelectric polymers and polyether ketone ketone (PEKK), to market.

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Ludwik Leibler, Winner of the European Inventor Award and partner of Arkema

A member of the French Académie des Sciences, researcher with the French National Center for Scientific Research (CNRS) and associate professor at ESPCI ParisTech school of industrial physics and chemistry, Ludwik Leibler has been working with Arkema for more than 20 years on new materials development and applications. He is the inventor of vitrimer, a plastic that is heat-formable like glass and pliable like rubber or room temperatures. This revolutionary polymer won him the European Inventor Award 2015 in the “Research” category.

Arkema is working with a mix of technology and industry partners to design the materials of tomorrow. Christian Collette, Vice President, Research & Development, spells out our strategy, which is based on openness, agility and anticipating the future.
Arkema designs high-performance thermoplastics that can replace metal and that offer an innovative mix of lightness, flexibility and excellent mechanical strength. Naturally recyclable, thermoplastics became “composites" when reinforced with carbon or glass fibers. They can then stand in for thermoset composites, which are widely used but not easily recycled. Lightweight thermoplastic composites are ideal materials for lightening vehicles and planes. “They’re one of the most effective ways to improve fuel economy and cut carbon emissions from fuel,” stresses Michel Glotin, Director, Materials Science at Arkema. We work with around 30 manufacturers, in transportation or high-potential wind power, to improve production processes and help them grow their businesses.

Arkema is conducting three major R&D programs, in partnership with PSA Peugeot Citroën, Renault and several French automotive OEMs, all within the French government’s Investing in the Future initiative. The first program, called Compofast, is winding up now. We and our partners developed thermoplastic composites that can replace the welded sheet metal components known as bodies in white (BIW) and other vehicle structural parts. The advantage: they sharply reduce car weight and carbon emissions. The next two programs, Fast RTM and Fast Form, call for building an industrial pilot for high-speed production of composite auto parts at M2P, a materials, metallurgy and processes research institute in Metz, France (see “Plus”).

Effiwind
Recyclable Wind Turbine Blades
We are working with 10 technology and industry partners on the Effiwind project in France to develop wind turbine blades made of thermoplastic composite. The initiative is backed by the Aquitaine region. Quicker to produce and more efficient, the blades are also fully recyclable, unlike the thermoset composite blades used in the world’s wind turbine farms today, which weighed in at 550,000 tons of materials installed through 2014. Effiwind will reach a major milestone in 2016 when it produces three, 25-meter blades for an experimental wind turbine.

Arkema has developed a complete line of high-performance materials for today’s additive manufacturing technologies — aka 3D printing. A revolutionary production technology, 3D printing can produce complex, custom parts that are often lighter than molded ones. “The laboratory that Arkema recently opened at Hanyang University brings the company closer to its customers in Asia. Our university benefits in many ways: internships for our students, expertise shared with our research faculty, technology transfers and marketing jointly developed materials. We’re partnering to develop thermoplastics for wind turbine blades and automotive and aerospace parts.”

Sung Kyu Ha, Professor, Department of Mechanical Engineering, Hanyang University, Seoul, South Korea. A world-renowned expert in composite structures and materials, he heads the Ha Structures and Composites Laboratory.
Arkema has long been involved in developing bio-based products. We are the world’s leading producer of the technical polyamide-10 and -11 grades made from castor oil, widely used in the automotive industry and offshore piping. We also make biomaterials from soybean or linseed oil and conifer resins. These materials are employed in diverse markets, including pharmaceuticals, paints, lubricants and road paving. A bio-based chemicals pioneer, we’re a key player in large-scale collaborative projects to develop new renewable feedstocks.

Arkema has been working for several years with Polymem, a French membrane maker specializing in low-pressure filtration systems, to develop new hollow-fiber ultrafiltration membranes with durable hydrophilic properties. Made from a brand-new grade of nanostructured Kynar® PVDF fluoropolymer developed by Arkema, the new membranes contain pores as small as 20 nanometers, or 10 times finer than ordinary microfiltration membranes, and can remove the minutest particles — viruses and bacteria — from water without adding chemicals. Their long-lasting hydrophilic properties yield a filtration flow rate 20% faster than conventional membranes — without using any more energy — and extend the membrane’s filtration service life from five to ten years. Polymem is preparing a production line for the membranes, intending to bring them to market in 2017.

This green and economical solution is currently undergoing full-scale testing in a municipal treatment plant in Toulouse, in partnership with Veolia. There is also a range of potential applications in the manufacturing and residential sectors.

Arkema is committed to helping tackle the planet’s looming scarcity of potable water. One of our innovation platforms is dedicated to water management and to the development of materials that make filtration processes more efficient and less energy-intensive. To speed industrial and commercial development, Arkema is forming partnerships with stakeholders in the water treatment chain. An example is the new nanostructured Kynar® PVDF, which will soon be used to make the first durable hydrophilic ultrafiltration membranes.

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The Center for Renewable Energy Sources (CRES) is conducting open-grown field trials of camelina and crambe in Greece, in addition to trials at agricultural universities in the Netherlands, Italy and Poland, to cover the diversity of European geoclimatic conditions. We’re analyzing crop growth, yields and quality. We’re sharing our data with Arkema to confirm potential uses in green chemical production. Leveraging our interrelated expertise, we’re starting to put together the entire value chain for the two oilseed crops.

Christos Myrsini, Center for Renewable Energy Sources (CRES), a Greek public research organization and partner of the COSMOS project.

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Christos Myrsini, Center for Renewable Energy Sources (CRES), a Greek public research organization and partner of the COSMOS project.

Arkema sought out Polymem as a recognized filtration module manufacturer for the tests and evaluation protocols for the Kynar® PVDF ultrafiltration membranes. We were able to prove their effectiveness quickly using a demonstrator set up in our buildings. Our partnership enabled us to get this new technology to market faster.

Jean-Michel Espenan, CEO, Polymem SA.
“PLUGGED-IN” ELECTRONIC POLYMERS

Nanolithography: The Challenge of Printed Circuit Miniaturization

Current microelectronics technology using photolithography on silicon to make printed circuits has reached its limits, unable to push resolution below 40 nanometers. In France, Arkema has joined forces with the research institute CEA-Leti in Grenoble and the organic polymer chemistry lab LCPO in Bordeaux in a high-stakes project to develop electronic nanocomponents. Called “directed self-assembly” (DSA) lithography, the process relies on the ability of certain copolymers to self-organize on a nanometric scale (one billionth of a meter). The resulting geometric patterns — or nanocircuits — offer extremely fine resolution (5 to 10 nanometers) and can be precisely customized. Nanolithography makes it possible to design less energy-intensive circuits with ten times more capacity. Thus continuing to miniaturize chips, doubling processor performance every 18 months in accordance with “Moore’s Law,” which has guided the semiconductor market for more than 40 years.

Following successful laboratory testing, Arkema teamed up with various semiconductor leaders — including Intel, STMicroelectronics and Brewer Science — on two projects supported by the European Union: Playd and CoLiSA. The goal is to build pilot production lines and move a step closer to commercial scale-up.

The Connected Object and Haptic Interface Revolutions

Through our subsidiary Piezotech, we are developing a line of fluoropolymers that are electroactive, or piezoelectric. That means that they change shape when stimulated by an electrical field and, conversely, generate current under mechanical pressure. They set the stage for objects that are interactive and connected. Examples in medicine include sensors that measure temperature and blood pressure or surgical guides that can be positioned to within one millimeter; applications in transportation include sensors that can recover mechanical energy and store it as electrical energy. Electroactive polymer films will also be used for ultra-sensitive touch interfaces that will transmit very realistic sensations to users. Examples include a paper-thin flexible keyboard with keys that vibrate when struck, an interactive car dashboard, and flexible smartphones. Arkema is collaborating here with the U.S. start-up Novasentis to develop miniaturized haptic interfaces, a major innovation in electronics.

Printed Electronics: Circuits on (Almost) Any Substrate

We and our subsidiary Piezotech have a piezoelectric polymeric ink that will permit printed electronics on substrates such as fabric, paper and flexible plastics. It turns out that it’s much simpler and cheaper to print with these conductive inks than to make silicon-circuit-based components. Many everyday objects including smart labels and clothing, connected packaging and medical monitoring devices will be printable using such inks and will act as sensors (temperature, impact, moisture and more) and real-time information relays.

Our research focuses on the use of piezoelectric polymers in printed electronics. The polymer’s formulation and the type of ink are decisive for component performance and printing processes. We formed a partnership with Arkema to take advantage of their expertise in such materials. We’re optimizing the structure and weight of the molecules and the composition and purity of the materials.

Professor Shizuo Tokito, Director, Flexible Organic Electronics Laboratory, Yamagata University, Japan
## #3 Setting Our Sights on the Batteries of the Future

**Oxis Energy + Arkema**

Since 2012, Arkema has been cooperating on research with Oxis Energy, a UK-based company that is designing, developing, and manufacturing lithium-sulfur batteries, the next generation of rechargeable batteries. Oxis has already filed more than 75 related patents.

"Arkema brings us its materials expertise to enhance the efficiency of the electrodes and electrolytes in the lithium-sulfur batteries. The new technology has five times the energy density of lithium-ion batteries. It is also lighter, more reliable, and cheaper to produce. It has many potential applications, from electric vehicles to satellite systems and aviation."

Huw Hampson-Jones, CEO, Oxis Energy

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## GREEN CONSTRUCTION IN THREE WORDS

Since 2015, we have increasingly focused our R&D on sustainable building materials and solutions. Today, a sixth innovation platform and partnerships with major players in the industry will get a jump on where construction technologies and methods are headed.

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## Acquisition

In 2015, our acquisition of Bostik expanded our portfolio of materials for housing construction and comfort. We now offer lines of non-polluting sealants, adhesives, binders, mortars, and grouts that help improve thermal or sound insulation. Armed with these solutions and committed to more sustainable housing, Arkema has created a new "Home Efficiency and Insulation" innovation platform.

## Platform

All Arkema and Bostik products used in construction are showcased in the Smart House by Arkema project and the neighboring showroom. Inaugurated in 2015 at the R&D center in Venette, France, this one-of-a-kind housing lab is designed to serve as a collaborative and futuristic showplace. It brings Arkema researchers together with partners from science and industry and customers to transform R&D concepts into innovations that will make buildings more sustainable in 2030.

## Solution

This concept develops and demonstrates solutions that can meet the major challenges of tomorrow’s housing, including energy efficiency, environmental protection, and the comfort and health of occupants (see pages 46 and 47).
You might be surprised to learn that Arkema materials are an unobtrusive part of your apartments, homes and gardens. They’re definitely “in the house!,” beautifying your surroundings and making them more comfortable, helping to keep food fresh and protecting your plants. Here are a few recent “Designed by Arkema” innovations as efficient as they are low-key.

**Windows**

**Smart, Insulating Window Glass**
Arkema’s low-emissivity Certinoat® flat-glass coatings make windows smarter and improve building insulation. A huge plus in cold climates, they let the sunlight in and keep heat from getting out. The end result: heating savings of 30%. Another product in the range, designed for warm climates, limits the amount of heat from the sun that gets inside and reduces the need for air conditioning.

**Window Panes**
Keeping Moisture Out
The Siliporite® molecular sieves made by CECA, an Arkema subsidiary, are tiny beads that adsorb around a third of their weight in water. Window manufacturers use them to prevent condensation in double-pane windows. Placed inside a perforated aluminum frame, the sieves protect the window’s features for years. CECA recently developed a new grade of sieve that can be added to the polymer used to make the seals of double-pane windows. This saves time and optimizes the cost of manufacturing the windows.

**Kitchen**

**Sterilization to Suit Every Kind of Package**
The food-grade cardboard used to make brick packs for soup, milk or fruit juice is sterilized with hydrogen peroxide prior to assembly. Arkema has also developed an ultrapure grade of hydrogen peroxide to sterilize the increasingly popular plastic PET bottles with screw caps. Slender nozzles can be used to spray microdroplets of the residue-free disinfectant inside each bottle during manufacture.

**Outdoors**

**Keeping You Safe From Processionary Caterpillars**

Pheromones are an eco-friendly way to fight processionary caterpillars, which attack pine forests. Introducing pheromones causes mating confusion and disrupts the pest’s reproductive cycle. Arkema subsidiary Coatex has designed a micro-encapsulation technique that allows controlled release of the chemical substance into trees. Applied via paint ball, it protects the pines for the 120 days of the caterpillars’ lifecycle. Applications for this pesticide-free biocontrol solution exist for other types of arboriculture.

**Walls**

**Brighter and Thrifter Colors**
Wall paints usually contain between 30 and 40% titanium dioxide (TiO₂). This mineral pigments tiny particles refract light and give it excellent hiding power. But TiO₂ is becoming more and more scarce and expensive. Two Arkema innovations are helping paint manufacturers use less TiO₂ and lower their costs. Tiny hollow particles made of Kelvon™ polymers replace up to 12% of the TiO₂ in some formulations with no loss in performance. And Coatex’s Bumper Technology® optimally disperses the TiO₂ within the paint, ramping up its reflection and hiding properties.

**A Coating That Insulates**
Bostik has developed a leveling coat that incorporates glass microbeads to provide thermal insulation. The first of its kind, this prep coat reduces heat loss by 15%. It can be applied with a roller or a paint spatula and does just as good a job prepping walls for painting as conventional coatings. It’s a two-in-one, saving time and ultimately cutting energy costs.

**There’s a Little Arkema in Every Home…**
Motorcycles
Switching to "Acrylic Glass"

Flawlessly transparent, superbly tough, and moldable into almost any shape, what's not to like about Altuglas® ShieldUp? It already enjoys a solid fan base among manufacturers of roofs and windshields for cars and motorcycles — and their users. The unique material's secret? Mixing polymethyl methacrylate (PMMA), also known as acrylic glass, with a nanostructured elastomer. This combination yields outstanding transparency combined with optimized shock and chemical resistance. Another weight argument in its favor: Altuglas® ShieldUp is only half as heavy as glass, helping make vehicles lighter and more fuel-efficient.

Transportation
A Purer Fuel, Service Included

Arkema also provides technical assistance. Our Coreflex® teams help oil companies remove sulfur from their fuels, as required by regulations. Our technicians step in at the end of the production cycle to refine oils all over the world. Using proven procedures, they inject a compound — called DMDS, for dimethyl disulfide — to activate a chain reaction that removes the sulfur from the fuel. Since sulfur released by gasoline or diesel combustion contributes to acid rain, the teams and their operational know-how are invaluable.

Automotive
Air Conditioning
Goes 4G

The air conditioning of the future is here now! Arkema developed a process to make a new refrigerant for car air conditioning systems, HFO 1234yf, that complies with European Union regulations. These require that manufacturers use low Global Warming Potential (GWP) fluids in all new vehicles sold in Europe after January 1, 2017. HFO 1234yf (hydrofluoroolefin) is a specialized fourth-generation refrigerant. Highly energy-efficient, 4G refrigerants emit ten times less greenhouse gases than hydrofluorocarbons (HFCs), the third-generation fluids found in today's vehicles.

Electric Vehicles
Going the Distance

Electric and hybrid vehicles owe some of their improved range to Arkema's Kynar® polyvinylidene fluoride (PVDF). A special grade of this fluoropolymer is used in their batteries to "bind" the active particles to the anode and cathode that produce the current. Kynar® PVDF's electrochemical stability extends the life and improves the performance of batteries (see Electric Vehicles, right). We're also tapping our expertise in fluorocarbons to develop a new electrolyte, the medium in which ions form and travel between the electrodes. The goal is to make a more powerful, safer and durable battery.

Wind Power
Nicely Coated Blades

To avoid exposing their personnel to styrene, makers of wind turbine blades are turning to acrylic coatings from Sartomer, an Arkema subsidiary. Applied as a surface coating, photocure acrylic coatings harden instantly under ultraviolet light. This new protective technology is greener than green: it is solvent-free and emits zero volatile organic compounds (VOC).

Smartphones
Never Run Out of Juice

One-third of the lithium-ion batteries in laptops, cell phones, tablets and smartphones contain Kynar® PVDF. Used to assemble electrodes, the material's electrochemical stability extends the life and improves the performance of batteries (see Electric Vehicles, right). We're also tapping our expertise in fluorocarbons to develop a new electrolyte, the medium in which ions form and travel between the electrodes. The goal is to make a more powerful, safer and durable battery.

Ousting Steel

Elion® HT is a flexible plastic that can withstand very high temperatures and replaces metal and rubber in a number of automotive engine parts. The substitution yields significant weight savings: Elion® HT is six times lighter than steel, so using it helps boost fuel efficiency. But that's not the only green thing about it. Elion® HT is a bio-based technical polyamide, containing up to 70% renewable sourced carbon obtained from castor oil.
that began as a bleaching agent for paper pulp. Getting to this point involved listening to customer needs and working closely with aseptic filling system manufacturers, who were running into performance and cleaning issues with existing hydrogen peroxide grades. We were looking for new applications for this product — a recognized oxidizing agent and disinfectant. And we discovered common ground for development.

Bernard Pinatel is in charge of High-Performance Materials. Marc Schuller is responsible for Industrial Specialties and Coating Solutions. These two operational Executive Vice Presidents engage at different links in the value chain but share the same vision: bringing the right products and expertise to boost the performance and competitiveness of their customers. We sat down for a conversation on how they go about it.

What does being customer-focused mean in your business lines?

Marc Schuller: We’re much more about selling innovative solutions than products. That seems pretty obvious for the High-Performance Materials activities — which have downstream applications — Bernard manages. But it’s also true moving back upstream, in Industrial Specialties and Coating Solutions. This shift in our activities hasn’t gone unnoticed by our customers: we sell fewer and fewer molecules picked straight from the catalogue. Increasingly, our products are custom-developed to suit specific applications.

Could you give us some examples?

M.S.: We recently developed a specific grade of hydrogen peroxide to spray on plastic food packaging to sterilize it. This booming niche is a new market for a product that began as a bleaching agent for paper pulp. Getting to this point involved listening to customer needs and working closely with aseptic filling system manufacturers, who were running into performance and cleaning issues with existing hydrogen peroxide grades. We were looking for new applications for this product — a recognized oxidizing agent and disinfectant. And we discovered common ground for development.

Bernard Pinatel: For performance materials, we strive to offer technological breakthroughs, enhance our products beyond their primary function and make them smarter. That requires a deep knowledge of the market. We work closely with our customers and often reach out farther still, to the customers of our customers, to better pinpoint or anticipate needs.
B.P. > Bostik makes adhesives that do a lot more than just hold things together. Diapers adhere to babies, making their diapers leak-proof, and engine mount adhesives make our vehicles quiet. We act as flame retardants in the interiors of airplanes. We are focused on renewable technologies and meet the needs of these industries. We are innovating adhesives for personal care products. These new sites bring us closer to our bigger customers that make diapers and personal hygiene products and are major players in those populous countries.

**Does staying close to your customers also mean being geographically nearer?**

B.P. > Of course. That’s what our investment strategy is all about. In 2015, Bostik opened plants in Mexico, India, Egypt and China to produce adhesives for personal care products. These new sites bring us closer to our bigger customers that make diapers and personal hygiene products and are major players in those populous countries.

**How do you choose the focus of your customer-based developments?**

M.S. > We try to understand our customers’ challenges and how our materials and solutions could meet them, make our customers more competitive, accelerate their performance and thus become a game-changer. The solutions we provide — the technological advances we are known for — can be very different in type: an improved process, lower production costs, streamlined logistics and, of course, more environmentally responsible solutions.

This last advance is, moreover, central to our strategy these days. It allows us to miss out on the market leaders.

**Are you looking to globalize your production through your capital spending projects?**

M.S. > Yes, it’s a global initiative, but the local dimension is important. Needs vary from place to place. You don’t grow in emerging economies simply by copying what’s been done in Europe or the United States. Here too, we have to move closer to the front lines and reformulate our solutions for local markets. So in Kerteh, we combined three approaches: capitalizing on our thermochromics know-how, seizing a market opportunity and offering an innovative, more sustainable process. To do that we worked with our local partner, Coatek, and an animal feed specialist, to incorporate biomass feedstock into the process and supply them with the sulfur-containing feedstock they used to make bio-methane. The Kerteh plant is a great example of innovation inspired by local needs.

B.P. > You find the same thing in the construction and coating markets. People don’t build in China the same way they do in Europe. That’s why it’s important to have an R&D center in Changshu, near Shanghai, to adapt our materials to local requirements.

**What do you gain from the coating industries in terms of global production capabilities and the opportunity to meet custom-made demands?**

B.P. > Our technical polymers also meet a requirement of our customers: we can deliver from several sources if needed, securing their supply. This is a must if you want to work with market leaders.

**Does working this closely with your customers require any special skills and expertise?**

M.S. > Yes, of course. The talent aspect is important. We have talented people promoting these kinds of custom solutions at every level: a market focus rather than product focus, applications-oriented R&D, and sales teams organized to work closely with customers. For each one, we have to find the right balance, the right amount of closeness, offering a single dedicated contact to streamline dealings with us, while also respecting each activity’s specific requirements. That’s the challenge produced by the breadth of our lineup: we offer multiple solutions to the same customer.

**How does digital fit into your approach to customers?**

B.P. > Digital is becoming essential not only in B2C, but also in B2B. Bostik has a digital marketing strategy, complete with reworked procedures and a revamped web presence. We want to do more than just present our products. We want to offer something more: to provide them with smarter solutions and services to consumers, guiding them more quickly to the products they're looking for and to nearby retail outlets. The next step is activating social media, online marketing campaigns and other communication initiatives, such as webinars and testimonials. Bostik also has a YouTube channel, with a comprehensive program of tutorials for consumers and training programs. Together with our customers, we want to produce more than just a video campaign on social media. We use a Bostik adhesive is a service. At Boeing, we provide a real service by designing innovative materials. We hold open houses at our technical polymers research center to show European carmakers and their suppliers our latest materials innovations for the aviation industry. We help glass manufacturers use our glass coating solutions to lengthen the life of bottles. (Marc could add the highly technical Carelflex® service at refineries, essential for removing the sulfur in fuels. It’s a long road to zero emissions, but it’s important)
In line with our roadmap, we are building capacity globally and putting down roots close to our strategic markets. In 2015 we invested €431 million in our industrial projects, divided equally between upgrading our production base and building new plants.  

**1. A Global Strategy**

With our Kerteh complex in Malaysia up and running, we now have world-class thiochemicals plants in Asia, North America and Europe. We continue to realign our activities regionally, to achieve an equal balance across Asia, Europe and the Americas by 2020.

**2. A Growth Strategy**

The big industrial projects initiated by Arkema allow us to serve fast-growing markets and cement our leadership. Facility start-ups and capital expenditure in 2015 targeted petrochemicals and refining, construction, hygiene products and animal feed.

**3. A Local Strategy**

Both regionally and nationally, we build production plants near our customers and markets. Our plant in Malaysia is one street away from the CJ Cheil Jedang site, our main customer. In India and Mexico, where population growth is soaring, Bostik is moving closer to disposable hygiene product manufacturers.

**Americas**

**BOSTIK/Mexico**

Bostik is upgrading and expanding its production base in Mexico. At end-2015, the “gecko brand” cut the ribbon on a new, state-of-the-art plant at its Monterrey site. The facility will make hot-melt, pressure-sensitive adhesives close to its customers in the disposable hygiene product industry in Mexico and Central and South America. The engineering and operations excellence of other Bostik production sites was incorporated into the plant’s design. Bostik supplies major global manufacturers of baby diapers and feminine hygiene and adult incontinence products. Its value-added adhesives produce fasteners that offer elasticity, wetness indicators and stretch.

**BOSTIK/United States**

In mid-2015, Bostik opened a new plant to make tile adhesives and flooring prep products in Dallas, Texas. This new production facility in the United States strengthens Bostik’s industrial network in an immense housing and construction belt. The site also has a cutting-edge training center for customers and brand distributors.

**Europe**

**CECA/France**

CECA, an Arkema subsidiary specializing in adsorption and filtration, launched a project in 2015 to double its production capacity for specialty molecular sieves in Honfleur, France. The €60 million capital expenditure will go to build a new production line to make adsorbents that remove petrochemical aromatics. The new unit will begin production in two steps — in the summer of 2016 and in January 2017 — and will create 15 jobs.

**Asia**

**BOSTIK/India**

In 2015, Bostik ramped up its capacity to produce hot-melt, pressure-sensitive adhesives in India by commissioning a new unit at its Bangalore site. The expansion increases Bostik’s ability to supply regional customers making disposable hygiene products, by meeting the high-growth market’s requirements.

**ARKEMA/Malaysia**

With a price tag of €200 million and a start-up in early 2015, the Kerteh thiochemicals complex in Malaysia is Arkema’s biggest capital spending project since the company was publicly listed in 2006. At this site, built from the ground up in barely three years, we produce DMDS for the refining and petrochemicals industries, along with methyl mercaptan. The latter is used by nearby CJ CheilJedang to make biomethionine for animal feed using an innovative bio-based process. Positioned in two growing markets, the Kerteh plant contributed to Arkema’s earnings in its very first year of operation.
Launch of an End-to-End Solution, Certinadvance®

Arkema offers glassmakers expertise and solutions they can’t find elsewhere in the market, under the brand Certinadvance®. We not only supply hot-end and cold-end spray-on coating solutions on the bottle-making line, but also the industrial hoods and spray guns required to apply them, plus a full suite of end-to-end services. Our people help install and maintain the equipment, provide training and perform technical audits to certify that the glass coatings are being applied correctly or recommend process adjustments. Recent improvements to our equipment deliver flawless application and assure compliance with the latest food standards.

Making Returnable Bottles Like New

Bottles are returnable in a number of countries, including Colombia, Germany and South Africa. Arkema offers local bottlers (brewers, mineral water and carbonated or non-alcoholic beverage producers) two interrelated technologies that greatly enhance the appearance and longevity of returnable bottles. The protective emulsion Kercoat® delays the appearance of scratches and white scuff marks. Opticoat®, a masking product, camouflages too-obvious scuffing, making the bottle look new again. These two solutions keep bottles in use at least twice as long — 50 cycles instead of 25 — while keeping them attractive to end consumers. This yields significant economic and environmental gains for bottlers.

The Glass Coating Academy

Bottlers have become more demanding about glass quality, creating a need to train the market’s glassmakers and bottlers in the importance of proper coating use. So in 2015 Arkema, as a recognized specialist in the field, created the Glass Coating Academy, an online training program to educate the industry about the new quality standards and the importance of applying coatings as intended.

Three training levels

The academy offers beginner, intermediate and expert level courses for each market: hot- and cold-end coating and returnable bottles.

THE WEBINARS, LED BY AN ARKEMA EXPERT AND FOLLOWED BY A QUESTION AND ANSWER SESSION, LAST 20 MINUTES.

PROTECTING GLASS CONTAINERS WITH ULTRA-EFFICIENT INVISIBLE COATINGS

A world leader in container glass protection, Arkema has unmatched expertise in hot- and cold-end coatings. These clear treatments sprayed on in thin coats at the start and finish of glassmaker lines make new bottles more scratch-resistant and deliver flawless surface properties and finishes. We’re also developing solutions for bottlers — the customers of glassmakers — to keep returnable bottles looking good longer. Both makers and bottlers look to us to supply recognized technical solutions and equipment alongside technical support, auditing and training services.

GLASS COATING

"The Glass Coating Academy has made Arkema a recognized stakeholder in relationships between the glass industry and bottlers."

Marc Maggiani, Business Director, Glass Coatings, Arkema
In June, Arkema jointly organized a prestigious conference in Shanghai with a long-standing partner, the paint manufacturer PPG. At the lectern, Eric Tomich — the architect behind the Burj Khalifa skyscraper in Dubai — praised Kynar® 500’s qualities to the prominent people gathered at the event.

In October at the MetalCon trade show in Tampa, Florida, we showcased Kynar 500®. We dedicated most of our display to the anniversary, including a series of videos featuring the iconic buildings clad in Kynar®.

In another 2015 anniversary event, we held our first University of Kynar® session in Dubai. It drew distinguished consultants, architects, and several major customers, among them Spectrum and Beckers. The event was a review of Kynar® 500’s advantages and Arkema’s licensing program. It will be repeated regularly, at the request of the region’s architects.

For skyscraper rooftops to offshore platforms, no challenge is too daunting for Arkema’s technical polymers. Customer events to celebrate Kynar® 500’s fiftieth anniversary were hosted in 2015, which also saw an R&D seminar for the automotive industry, end-user outreach in the electronics and photovoltaic markets and a long-term consulting assignment at Technip. All designed to help us do one thing: understand as much as possible about the needs of our customers and end users.

TECHNICAL POLYMERS,
TAILED TO
CUSTOMERS

Automotive
Some 20 representatives of automakers and major automotive suppliers from across Europe met for an R&D seminar at Cerdato, the Arkema research center in Serquigny, France. The two-day program featured technical presentations, lab tours and discussions of future developments in engine parts. “It was a great opportunity to zero in on a customer need and present our work on specialty polymers capable of withstanding high temperatures and chemical damage,” explains Sébastien Vautier, Global Market Manager, Transportation.

Offshore Platforms
In a mark of trust between two partners who have been working together for more than 40 years, Technical Polymers loaned one of its specialists to its customer Technip. His year-long assignment was to objectively advise the energy engineering giant in the use of high-performance materials in offshore oil extraction. “For some specifications, Technip chose solutions faster than would have been possible without our advanced materials knowledge,” stresses Philippe Bussi, the expert-on-loan. Arkema provided especially innovative answers for using thermoplastic composites in deep offshore drilling applications.

Semiconductors
In the semiconductor market, we support our partner Georg Fischer, a specialist in ultra-pure water systems for major electronics manufacturers such as Intel, Samsung, TSMC and GlobalFoundries. Semiconductor manufacturers require systems that produce and deliver water with high chemical purity. By meeting with them, we can promote our ultra-high-purity Kynar® PVDF for system components and, most important, better pinpoint end customer requirements.

Chemicals
A real leader accompanies the customer to the customer’s customer. In the chemical process industry (CPI) market, Technical Polymers met many times with the customer’s customer — or the end user — in 2015. “We supply Kynar® PVDF pellets to Simona and to Gehr, who specialize in the production of pipes, valves and fittings for facilities operated by major chemicals and petrochemicals producers,” explains Christophe Le Roy, Global Market Manager, CPI. “We find ourselves sitting down with the end users more and more, to understand their needs and come up with solutions in partnership with our customer, their supplier.”

In October at the MetalCon trade show in Tampa, Florida, a highlight of the metal construction industry’s calendar, we showcased Kynar 500®. We dedicated most of our display to the anniversary, including a series of videos featuring the iconic buildings clad in Kynar®.

In another 2015 anniversary event, we held our first University of Kynar® session in Dubai. It drew distinguished consultants, architects, and several major customers, among them Spectrum and Beckers. The event was a review of Kynar® 500’s advantages and Arkema’s licensing program. It will be repeated regularly, at the request of the region’s architects.

In Touch with End Users

Photovoltaic Solar Panels
In October 2015, Arkema co-organized a conference in China with Trina Solar, a Chinese solar energy leader developing a sweeping program of PV solar farms in the western part of the country. An audience of more than 300 people from panel assemblers and power utilities, Technical Polymers presented KPK®, an exceptionally durable film to protect PV panel surfaces, developed with German manufacturer Krempel. KPK® consists of a PET core sandwiched between two Kynar® PVDF sheets.

In Touch with End Users

In Touch with End Users

From skyscraper rooftops to offshore platforms, no challenge is too daunting for Arkema’s technical polymers. Customer events to celebrate Kynar® 500’s fiftieth anniversary were hosted in 2015, which also saw an R&D seminar for the automotive industry, end-user outreach in the electronics and photovoltaic markets and a long-term consulting assignment at Technip. All designed to help us do one thing: understand as much as possible about the needs of our customers and end users.
Training and performance to new levels, Pebax® heightens the appeal of brands.

A Star Turn at the ISPO Munich Outdoor Show

Pebax® Powered nabbed a fantastic showcase in January 2016 at ISPO Munich, the sports industry’s biggest trade show in Europe. Emblazoned on a huge poster at the entrance, the fledgling brand was also splashed across banners on the ceiling of the main aisle. Not a bad way to work yourself into the scenery — and the conversations of exhibitors! Visitors were also able to check out K2’s new Pinnacle 130 ski boot, which incorporates Pebax® Rnew and has the Pebax® Powered logo printed on the shell. This launch adds to the list of makers labeling their brands as Pebax® Powered, including Scarpa, Scott and Fischer in the ski market and The North Face for ultra trail shoes.

MVP

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STRETCHING THE LIMITS WITH PEBAX® POWERED

More flexible, more impact-resistant and lighter than its competitors, Pebax® elastomer is now recognized as a bona fide performance enhancer for athletic shoe soles and ski boot shells. Arkema’s new Pebax® Powered marketing campaign aims to better highlight Pebax®’s advantages to equipment makers and build awareness of the brand among consumers. The goal is to make Pebax® a “must have” for savvy consumers, heightening the appeal of our customers’ sports equipment brands.

PRE-GAME

A Marketing Kit for Sports Brands

Preparation is key in every sport. That’s why the Pebax® Powered program kicked off in 2014 to tout the toughness of athletic shoes made using this material. There’s even a Pebax® Powered brand book. Equipment makers interested in showcasing the material in their products can consult it to find out all the ways they can use the brand, its logo and its baseline “Stretch the Limits™.” The guide was personally presented to marketing managers of prestigious brands such as Nike, Puma, The North Face and Mizuno. Standardized QR code labels, translatable into several languages, are also available. At the same time, branding has been simplified. Gone are the overly technical details. And the logo has been updated in two styles: Pebax® Clear for the transparent version and Pebax® Rnew for the bio-based version.

GAME TIME

Pebax® vs. TPU: Five Elite Match-Ups

Why are more and more athletic shoes Pebax® Powered? Get the answers in a series of five entertaining, educational YouTube videos made with the help of Arkema R&D center Cerdà. Mixing science experiments and showmanship with sports commentary, each video pits Pebax® against its nearest rival, thermoplastic polyurethane (TPU), in a contest selected to highlight a key characteristic such as impact resistance or elasticity. And when the referee-slash-experimenter blows the whistle at the end of the competition, the results are beyond dispute: Pebax® comes out the winner in every game or sport.

MVP

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TRAINING

Athletes and Buzz for the B2C Niche

Following up on the outreach to equipment manufacturers in 2015, the Pebax® Powered offensive is branching out and targeting the general public in 2016. Elite athletes such as the freeride skiing star Giulia Monego have been filmed in action. The campaign was carried out in partnership with Scarpa, Fischer and Dynafit. Relayed by the brands, social media and specialized blogs, these spectacular videos help create buzz and raise the brand’s profile.
To Each His Own Sartomer Formula

The photocure, or UV-hardened, resins made by Arkema’s subsidiary Sartomer improve the performance of chemical formulations in a wide range of markets, from inks and protective coatings for wood floors to adhesives and nail polish. Working closely with customers, Sartomer’s teams cultivate a genuine culture of co-innovation, backed by extremely effective marketing.

Before, During and After Trade Shows
Sartomer meticulously prepares for every key event in its markets, including the European Coatings Show, the RADTech Conference & Expo on UV and EB curing technologies, the Inkjet-DIT Rubber Conference and Trade Exhibition and more. It issues news releases, updates presentation materials, leverages social media before, during and after the shows, holds preparation meetings with technical and marketing teams and debriefs participants so that marketing teams and technical managers can follow up on contacts made during these events.

Getting Interactive
Sartomer will offer a wide range of online services at its website in 2016. Dropdown menus will help customers locate the solutions that best meet their needs, based on application type and desired properties and performance. The Sartomer site will also offer secure access to high quality technical documents and samples.

Skilled Trades and Installers
Bostik supplies B2B wholesalers with everything they need to create a showroom in their sales outlets dedicated to the Bostik brand and its products’ advantages. A smart way to get skilled tradesmen and installers to think of Bostik first. The brand also invests in hands-on training programs to teach proper techniques, to make sure that professionals use its products the right way.

Retailers and Distributors
Bostik is a true business partner of its retailers and distributors. The brand works alongside them to inspire the right mix and understanding, to help them grow their businesses. “We look at things from their perspective,” stresses Mike Jenkins, Business Director, Construction and Consumer Business Unit at Bostik in the United States. Bostik and its partners share key performance indicators to implement growth strategies.

Consumers
To reach the seasoned, semi-pro DIY target, Bostik is present on social media, especially YouTube. The brand has its own studio, where it produces videos that include product demos and technical explanations, as well as interviews with experts on topics such as earth-friendly construction and advanced adhesives technologies. Designed for DIYers of every stripe, the videos also provide information useful to retail sales teams, professional installers and architects.

Architects and Interior Designers
To reach architects, interior designers and retailers, Bostik deploys the full gamut of marketing and customer relationship tools, from CRM and email to the trade press. That way, technical solutions are referenced right from the outset of projects and can be included in building specs as early in the process as possible. The brand provides its partners with the qualities of its installation and adhesive solutions — in videos, on social media platforms, in print advertisements — to these influencers. Bostik recently held a competition for architectural designers using its solutions the winner’s signed mosaic mural will be permanently installed at the MGM Grand Las Vegas Hotel & Casino.

Available worldwide in 1,600 DIY consumer retail outlets.

CONSTRUCTION SOLUTIONS ON EVERY FLOOR

Bostik’s communications cater to the four major customers of building materials in the United States, promoting a comprehensive and innovative range of adhesives, surface preparation products, mortars, grouts and sealants.
How did Arkema do on CSR in 2015?

Heike Faulhammer > We continued to improve in line with our sustainable development policy commitments (see pages 44 and 45). On the environmental front, we shrank our carbon footprint some more. In all, we have slashed our emissions of greenhouse gases by 64% and of volatile organic compounds by 43% in the last 10 years. Facility upgrades and a push for operational excellence by our organizations are paying off.

At the same time we’ve stepped up our investment in future-oriented solutions: nearly a third of the 193 patents Arkema filed in 2015 focused on sustainability issues such as bio-based materials, new energies, water treatment, lighter materials and sustainable housing. We expect the percentage of sustainability-focused patents to reach 50% in the relatively near future.

We’ve also strengthened our dialogue with stakeholders. During 2015, we implemented over a thousand Common Ground® initiatives around the world (see page 42), half of them with people living or working near our plants.

To what do you attribute your progress?

H.F. > At Arkema, CSR is not the preserve of a single department. CSR policy must be part of our daily life and operations to be worthwhile and beneficial for both stakeholders and the company. Employee buy-in and support are pivotal and stem from the development of our people as we adapt to a changing world — another basic cornerstone of our CSR policy (see pages 50 and 51). We rely on our employees, empower them and prepare them for the challenges to come. In return, they’re involved and engaged. Safety is a great example. Our total recordable injury rate (TRIR1) for 2015 is 1.5, on par with the best in the chemical industry (see page 45), thanks in part to 190,000 hours.
1,014 Opportunities to Make Friends

2015 was a record year for open houses at Arkema sites. A total of 1,014 events (up from 985 in 2014 and 644 in 2013) were held through Common Ground®, our program to foster dialogue between our sites and their neighbors. Priority was again given to discussions with neighbors (38% of events), followed by educational partnerships with schools (28%) and support for local nonprofits (14%).

A Conversation with Philippe Joubert, Senior Advisor, Energy and Climate for the World Business Council for Sustainable Development (WBCSD)

What happens now that COP21 is behind us? Philippe Joubert shares his insights into the pivotal change in direction for the economy decided on in Paris and on business's new roles and responsibilities.

What makes the Paris Agreement signed in December historic? Philippe Joubert > It is the first truly global commitment to seriously fighting climate change. The 195 countries that adopted it are aiming to keep the long-term global temperature rise below 2°C and limit the increase even further to 1.5°C if possible. The agreement includes a mechanism to regularly monitor goals and drive continuous improvement. For the first time an agreement everyone has signed also spells out the willingness of developed countries to support the transition of developing countries and finance it to the tune of $100 billion a year.

What does the agreement change? P.J. > Absolutely everything, because it commits the signatory countries to a sustainable development path they’ve initiated, to achieve a “net-zero emissions” society by the second half of the century. Each country sent in its desired target — but their commitments will be critical, but insofar as the transition to a low-carbon society can’t happen without strong business involvement. Businesses have the solutions for the future. And COP21 genuinely changed businesses’ image: they are now seen as the engine of change instead of culprits that pollute.

By the second half of the century we’ll live in a low-carbon society and business will drive the transformation.

Safety, Woven Into Our Culture

Thanks to a comprehensive behavior-based program, Arkema now ranks in the top 20% of global chemical producers for safety performance.

Just Half As Many Accidents As in 2013

In 2013, Arkema’s total recordable injury rate (TRIR) per million hours worked was down 22% from 2014, for an overall 50% decrease since 2013. In real-world terms, more than 100 of our 136 sites finished the year without any accident at all. The Changshu, China and Clear Lake, Texas plants, two of our biggest, have logged more than 4 million accident-free hours. In absolute numbers, we reported two fewer accidents than in 2014 (63 versus 65), despite the fact that our reporting base has expanded significantly with the arrival of Bostik.

The Effectiveness of Observation

In 2015, 14,000 employees completed a session of the Safety Academy, our internal training program that aims to instill safety awareness in everyone, even employees who are not based at plants. The 5,000 newly acquired employees at Bostik will have their turn in 2016. The number of employees worldwide qualified to audit facilities using the Arkema Integrated Management System (AIMS) — a guideline to assess the HSE management system — has risen to 77. We continue to promote peer observations: front-line operators correct one another’s practices by referring to safety rules established through a program called The Essentials.

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What does the agreement change? P.J. > Absolutely everything, because it commits the signatory countries to a sustainable development path they’ve initiated, to achieve a “net-zero emissions” society by the second half of the century. Each country sent in its desired target — but their commitments will be reviewed and improved every five years.

How will businesses contribute? P.J. > They’ll be critical, but insofar as the market can’t regulate itself, governments will have to adopt policies. After that, we’ll need clear signals like carbon taxes and global regulation of the carbon market. In anticipation of this new business model, some big international companies are already opting for low-carbon growth, using an internal carbon price to guide both their industrial investment and their R&D portfolio. Indeed, like Arkema, some businesses are basing their development today primarily on products that will help boost energy efficiency and spur the expansion of new energies and on solutions that make transportation and housing more energy efficient and less carbon intensive.

So industry and business will play a major role in the future? P.J. > Yes, absolutely. The energy transition to a low-carbon society can’t happen without strong business involvement. Businesses have the solutions for the future. And COP21 genuinely changed businesses’ image: they are now seen as the engine of change instead of culprits that pollute.

“By the second half of the century we’ll live in a low-carbon society and business will drive the transformation.”
ARKEMA WINS RECOGNITION FOR CSR PERFORMANCE

In 2012, we set out five major commitments to corporate social responsibility (CSR) and sustainability, backed by an effective monitoring process and aligned goals. In 2015, we updated the entire program. Several socially responsible investing (SRI) rating agencies recognized our CSR and sustainability performance in 2015, earning us a number of awards.

An Award-Winning CSR Process

We won the Carbon Disclosure Project’s (CDP) “Imaginovation Award – France” for sharply boosting our score from the previous year through improvements in transparency and performance. The CDP is an international organization representing more than 800 major investors that analyzes how well publicly listed companies integrate climate change into their strategies. Arkema has also been included in the FTSE4Good Index Series, which tracks the performance of companies worldwide that demonstrate strong environmental, social and governance (ESG) practices. In addition, Arkema earned a gold rating from EcoVadis1, ranking us among the top 5% of companies with the highest CSR performance. Lastly, Arkema has moved up on the Vigeo2 index and now ranks among the top 10 European chemical companies for sustainability performance.

New Safety and Environmental Goals

We rank among the best in class for workplace safety and environmental footprint. To build on our excellent results and continuous improvement over the last 10 years, we have now strengthened our long-term targets in these areas. Our ambitious corporate social responsibility framework for 2025 is underpinned by our highly engaged people, our technological know-how and a targeted investment strategy.

FIVE STRONG COMMITMENTS

1. RANK WITH THE BEST-IN-CLASS IN THE CHEMICAL INDUSTRY FOR SAFETY

Arkema’s industrial safety process is deployed globally and focuses on the three interrelated topics of technical, organisational and human (Behavior Based Safety) factors. Since the company was publicly listed, a shared safety culture across Arkema has steadily improved our safety performance.

2. SHRINK THE ENVIRONMENTAL FOOTPRINT OF OUR ACTIVITIES

We focus on three things: trimming our emissions, reducing resource consumption and stepping up our use of renewable resources. We also make sure that our products do not undermine either human health and safety or the environment.

3. MAKE SUSTAINABLE DEVELOPMENT A CENTERPIECE OF OUR INNOVATION POLICY AND OUR PRODUCT LINE

Working with our customers, we create solutions that help meet the planet’s challenges, which include new energies, fighting climate change, access to clean drinking water and the use of bio-based feedstocks. After acquiring Bostik in 2015, a new R&D platform was added, home efficiency and insulation.

4. FOSTERING THE PERSONAL AND COLLECTIVE DEVELOPMENT OF OUR PEOPLE

Elsewhere in the world, Arkema’s employee relations policy revolves around two concerns: personal development of our employees and social development through improved collective working conditions.

5. KEEPING OPEN THE LINES OF COMMUNICATION WITH ALL STAKEHOLDERS

Our Common Ground® initiative encourages dialogue with all our stakeholders. This fosters close relationships with our plants’ neighbours, local schools and colleges, and local communities, to build balanced, sustainable relationships based on trust.

Connect detailed tables and charts here.
Arkema has signed the International Council of Chemical Associations’ Responsible Care® Global Charter. We make sure that our products do not create any health issues. The Smart House helps us understand the interactions between construction materials in living spaces that are increasingly airtight, to achieve better air quality. It promotes the development of more healthful, less allergenic products, such as varnishes and adhesives that emit fewer volatile organic compounds.

The house of the future is here now. Chock-full of innovations, Arkema’s Smart House, located just outside Paris, helps us provide a future of sustainable buildings that keep their occupants nice and comfy. We take you on a guided tour.

Arkema’s Smart House, a one-of-a-kind harbinger of the future, is to construction what a concept car is to automobiles. Dreamed up by Bostik and opened in October 2015, this futuristic “housing lab” is a daily life simulator and a true-to-life testing ground for tomorrow’s materials and equipment. It gives Arkema a tool for designing net-zero-energy, green, comfortable homes that are healthy for the people who live in them.

The Smart House recreates a living space for a family of five plus one dog, complete with fully equipped kitchen, bedrooms, bathrooms, toaster, TV and more. But no one actually lives there. Researchers run the bath or open a window in the house remotely. With the help of an ultra-sophisticated home automation system, they set in motion the comings and goings of daily life from a control room in a neighboring building. A hundred sensors allow them to monitor how the home is behaving in real time.

The Smart House has a 60-square-meter curtain wall on its south side. Adapted to the building’s requirements, it combines a 60-millimeter-thick, triple-pane bay window and shutters that can be repositioned depending on the light. The whole assembly weighs a whopping four tons.

The home’s window glass was custom-made using innovative techniques that are not yet commercially available. The Smart House has four sustainable construction certifications: LEED® and BREEAM® green building and PassivHaus® and Bepos® Effinergie energy-efficiency certifications. It gives us and our partners from industry and universities a state-of-the-art laboratory to conduct our research, foreshadowing housing in 2030.

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With a rooftop blanketed in solar panels, the Smart House produces its own power. But the energy it generates has to be stored and used intelligently. That’s the rationale behind the research conducted on regulating heating, ventilation and air-conditioning. Other potential innovations aim to boost the insulating properties of materials such as adhesives, caulks, sealants and other coatings.

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Sail for Water is a humanitarian-slash-adventure project dreamed up by three young Frenchmen. The challenge: to complete the first sail around the world that promotes universal access to clean drinking water. They set sail in late 2015 on a three-year circumnavigation, with the inspiration for the Arche de Noé Climat. It imperils the very future of the human race. The Arche de Noé Climat borrows that image of a world at risk, with animals that come to our cities to warn children and families and solicit their ideas for shaking things up. A material such as Altuglas® is a perfect fit for the installation. It can be recycled over and over again. It is part of a circular economy, providing one solution to the problem of global warming.

Gad Weil, street artist and creator of the Arche de Noé Climat project, organized a gala event in Strasbourg and Aix-en-Provence, before kicking off a weeks-long tour through a handful of big French cities. The Arche de Noé Climat ended its trek in late September. The Arche de Noé Climat, or Climate Noah’s Ark, created by the street artist Gad Weil, made quite a splash in Paris. The massive multicolored megaplanet then made its way to several of the capital’s iconic sites, before kicking off a weeks-long tour through a handful of big French cities.

The Arche de Noé Climat project aimed to educate the French, especially children, about the risks and challenges of the fight against climate change. The artwork even offered them a video platform to contribute their ideas for saving the planet. Their suggestions were shared via the Internet and social media and forwarded to the Paris Climate Conference (COP21) participants in Le Bourget, where the Arche de Noé Climat ended its trek in early December. Commissioned by the French Ministry of Ecology, Sustainable Development and Energy, the modern-day Noah’s Ark bridged the gap between the general public and the COP21 delegations.

A whole nation of animals sculpted in eye-popping colors arrived on barges in late September. The Arche de Noé Climat, or Climate Noah’s Ark, created by the street artist Gad Weil, made quite a splash in Paris. The massive multicolored megaplanet then made its way to several of the capital’s iconic sites, before kicking off a weeks-long tour through a handful of big French cities.

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Gad Weil, street artist and creator of the Arche de Noé Climat project.

The Arche de Noé Climat is a festive, grass-roots undertaking that helps rally civil society. The problem affects everyone and everyone can take action.

Ségolène Royal, French Ecology, Sustainable Development and Energy Minister

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Developing All Types of Skills

A growing company, we rely more than ever on our employees to move our projects forward. Teams are changing in step with our company. People are and will be our strength going forward. Transfers to other business lines, to subsidiaries or new companies such as Bostik, expatriate assignments, project start-ups (see pages 52 and 53) and the opening of new sites offer opportunities for advancement to any and all at Arkema.

We pursue a policy of actively promoting from within. We’re committed to developing employees in both expert and management tracks. Investing as much in our experts as we do in our managers is a cornerstone of our HR policy. We have developed specific talent management approaches for Arkema experts.

Combining Talent and Values

For all our business lines, we recruit recent graduates and experienced professionals who are looking for demanding, intellectually stimulating responsibilities. Talent is the only thing that counts: Arkema hires, without regard to age, gender, ethnic origin or disability, people who are both ready to work and able to think ahead to help us build our future. Early career hires are often surprised by the freedom they have to make decisions in our action-oriented organization. Our work practices are based on our core principles of simplicity, responsibility, performance and solidarity.

Production, processes, logistics, marketing, finance and human resources — all are ways to get your foot in the door at Arkema. In France for example, we offer doctoral researchers a chance to pursue their theses in polymer chemistry, chemical engineering or human sciences through industry agreements involving training through research (CIFRE) and through partnerships with universities and engineering schools.

Supporting Career Paths

Human Resources at Arkema supports career development and planning for all employees. In Asia, we created a Talent Manager function in 2015 (see page 54) modeled after those established over the last few years in the United States and Europe. Talent Managers foster talent in the host country by offering responsible positions, both locally and internationally.

Employee development requires sharing progress goals based on professional interests and areas for improvement and building action plans. In 2015 Human Resources introduced a development program focused on self-assessments and regular interviews. It helps create development goals, based on training or career milestones, that enhance and add to skills.

Promoting Operational Excellence From the Ground Up

Who better than employees to give feedback on the strengths and flaws of a site’s organization? To improve operational excellence, Arkema has embarked on a program to gather improvement ideas from the front line. We want to make hands-on experience central to the analysis and tap the expertise of our people by listening to their suggestions. Facility layout (see page 55), safety, ergonomics and working conditions are areas where experienced employees can contribute, based on their detailed knowledge of the activity and the product line.

Encouraging Female Talent

Some 35% of Arkema’s middle managers are women. And we have set a goal of reaching this percentage among senior executives. To avoid a glass ceiling and support the advancement of our female employees, we recently created a mentoring program. Volunteer mentors — male or female senior executives — are trained to coach and assist their mentees in career development. Heike Faulhammer is supporting this initiative for the Sustainable Development Division.

Maintaining Quality of Life in the Workplace

For the past several years, Arkema has deployed an active policy to prevent stress and other psychosocial risks and emphasize the quality of worklife. Both managers and employees are trained in stress management and occupational physicians are enlisted to help them. A pioneer in workplace wellbeing, Arkema created a central stress monitoring database seven years ago, to spot high-risk situations at French sites. Similar initiatives are under way in the United States. Each year our “Netiquette Week” reviews tips for achieving online-offline balance, in a humorous, educational way. Workplace wellbeing is an Arkema core value, which is why we’re so vigilant about it.
To assure the successful start-up of their new thiochemicals plant, the Kerteh teams in Malaysia enlisted the expertise available at sister units in Europe and the United States and the Engineering Department based in France.

**American Sojourns**

Long before the Kerteh facility opened, Arkema’s production site at Beaumont, Texas in the United States hosted two teams of six Malaysian operators, production supervisors and engineers. For three weeks, each team was immersed in the day-to-day production of methyl mercaptan at Thiochemicals’ American unit. Working with their U.S. colleagues, they covered every aspect of the theory and practice involved in their future responsibilities, including organizing teams, running the plant, and technical and safety processes.

“I really appreciate everything the teams at Beaumont did to help us and hope that we’ll be able to work together again on technology transfer,” comments Azizi Mohamad, Operations Manager at the Kerteh site.

**Assistance On Site and from a Distance**

The teams were given on-site support in Malaysia in the run-up to the plant’s commissioning in January 2015. Staff reinforcements from Thiochemicals and the Engineering Department, sent from Beaumont in Texas, Lacq and Pierre-Bénilte in France, and Rotterdam in the Netherlands, were on hand for seven months. The baton was successfully passed. “The Kerteh plant quickly achieved a high degree of reliability on its own,” says a pleased Jean Morch, Production Manager in Thiochemicals. Kerteh personnel still rely on advice from their counterparts on other continents, delivered from a distance. One of the best offshoots of this sharing of expertise: the friendships formed between employees at the different sites.

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**TALENT PROGRAM**

Making Potential Bloom

The Talent Program launched in 2015 gives managers who are early in their careers a chance to spend several years in Arkema subsidiaries outside their home countries, an exciting opportunity to gain unmatched, engaging international work experience.

The Talent Program was created for managers in every business line who have completed a stint in their first position at Arkema. Martin Pouzet, a French engineer who went to India as a technical manager in Polyamides, and Shaoping Chen, a Chinese engineer who came to France to work in the Feedstock & Energy Procurement Department, are among the first in the new program. These promising managers are sent abroad to work on assignments entailing real responsibility, often carried out on a project basis, giving them an opportunity to apply their expertise in a different cultural environment for two or three years. A stimulating boost to a career, this immersion in Arkema’s international operations is an asset as they move up the ladder.

“The Talent Program is for managers who by virtue of being early in their professional careers are usually freer to move and are more open to being sent to a range of places. We offer them ideal conditions for unique personal and professional experiences and at a cost that is more manageable for the company,” says Arnaud Putz, International Mobility Manager at Arkema.

After working two years at Arkema’s research center in Japan as a technical support engineer for Polyamides, I was offered this newly created position in India. I’ll liaise between Arkema’s research centers in Japan and France and our prospects and customers in India. There are some interesting cultural, organizational and business challenges to tackle: adopting new work methods, providing value-added in a small team and strengthening our marketing in a country with a booming economy. It’s exciting.

Martin Pouzet, Technical Manager for Polyamides in India
New CECA Unit
A Participatory Process in Honfleur

The CECA site in Honfleur, France, will start up new production lines for molecular sieves (see pages 30 and 31) in the summer of 2016. Operators have been involved in designing their future shop, weighing in on ergonomics, safety, access and procedures. This participatory approach incorporated their experiences early on in the design process.

Idea
The Front Line’s Value-Added
CECA teams in Honfleur started writing improvement reports in 2009 and their combined suggestions provide real value-added. Michael Werth, project manager for the new production lines, is convinced that operator proposals help drive competitiveness. “They have the best vantage point to propose the right choices for layout and organization of the plant and work environment,” he says. So when the project to expand the site began in 2015, operators naturally attended the meetings, aiming to improve plans for their future shop. The design and engineering firm incorporated their comments, vetted by the plant manager and the project manager.

Lao Zhan, based in Shanghai, has been our talent manager for Asia since early 2015. She encourages career advancement and skills development for Arkema employees. Her role is vital to our growth.

Facilitator
Lao Zhan sums up her job as talent manager in one word: "facilitator." In Asia’s vibrant, fast-moving job market, it’s up to her to offer Arkema employees new opportunities in the region. Based in China, her job requires pragmatism and creativity, to build bridges between divisions, functions and sites on a highly diverse continent.

Career Committee
Lao Zhan meets regularly with employees, line managers and Human Resources managers to understand their ideas, needs and desires for career development. She holds a Career Committee meeting twice a year, bringing together around 20 regional unit, project and site managers. “They share information on their employees’ potentials and the kinds of skills they’re looking for,” explains the talent manager. This internal job market has resulted in transfers for people still in their first year with the company.

Mentoring
There’s more to success than skills alone. Buying into the company’s culture is essential. To help new hires advance within Arkema in Asia, Lao Zhan has developed a mentoring program. It’s a success; eight mentors are already supporting and advising 14 mentees. Mentors have no reporting authority over their charges. They simply share their perspectives and their experiences, passing on the company’s values to their “protégés.”

Arkema Asia
4,000 employees, including 3,000 in China

95% On-Point Suggestions
CECA operator Jean-Marie Delaporte participated in the discussions on the construction project. “Using 3D plans and our experience on the front line, we were able to make suggestions to improve shop design. Everyone feels involved in the project from start to finish. It’s great.” Some 230 safety, ergonomic, access and process improvements were suggested. Most were adopted: adding stairs here to make it easier to get around, installing a maintenance crane there, moving an access point somewhere else. Plus, throughout the construction phase, operators used virtual reality to “walk through” the new areas, to make sure no detail was overlooked.

Asia’s Tight Job Market
Source: 2016 Hays Asia Salary Guide

31% of employees had been with their current employer from two to five years
21% of employees had been with their current employer from one to two years
27% of employees had been with their current employer for less than a year
44% of employees report they are actively looking for a new job
60% of employers expect to increase their business activity in 2016
Arkema’s investor relations are based on transparent, open communication with shareholders. The Shareholders’ Notebook describes our governance organization, our 2015 financial performance, our share performance over the last 10 years and our calendar in 2016. More information is available at www.arkema.com/en/investor-relations.

The Board of Directors uses its expertise to steer the business in the right direction and closely monitor the implementation of our growth strategy. Chaired by Thierry Le Hénaff, the Board has 12 members, including nine independent directors — four of whom are women — and a director representing employee shareholders.

As is the case at most large, publicly listed French companies, Arkema’s Board of Directors has opted to have Thierry Le Hénaff serve as both Chairman of the Board and Chief Executive Officer, a dual mandate that enables decision-making bodies to respond quickly.

The Board of Directors has two permanent specialized committees.

**THE AUDIT & ACCOUNTS COMMITTEE**
The Committee is chaired by Philippe Vassor and made up of three other directors, Claire Pedini, Isabelle Boccon-Gibod and Hélène Moreau-Leroy. In accordance with France’s AFEP-Medef Corporate Governance Code of Listed Companies, none of its members hold a management position in the company and all have been recognized as independent by the Board. In 2015, it met six times with perfect attendance by all members.

In 2015 it principally focused on reviewing the accounts and financial statements, approving the statutory auditors’ fees, examining internal control procedures and the internal audit program and reviewing Arkema’s risks, tax situation and information systems security and Bostik’s integration.

**THE NOMINATING, COMPENSATION & CORPORATE GOVERNANCE COMMITTEE**
The Committee is chaired by Thierry Morin and comprised of three other directors, François Enaud, Bernard Kasriel and Victoire de Margerie. In accordance with France’s AFEP-Medef Corporate Governance Code of Listed Companies, none of its members holds a management position in the company and all have been recognized as independent by the Board. In 2015, it met four times with perfect attendance by all members.

In 2015 it primarily examined the compensation for the Chairman & CEO and the members of the Executive Committee, performed the annual evaluation of the Board of Directors and the committee itself, reviewed the candidates for directorships (election or re-election), in particular Hélène Moreau-Leroy, and oversaw the creation of performance share plans, the succession plan for the Executive Committee’s members, changes in Arkema’s governance and the employee share issue project.

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The Executive Committee is responsible for the day-to-day management of Arkema. The team of seven is headed by Thierry Le Hénaff, Chairman and Chief Executive Officer. Some members have been part of our story from the beginning, others joined more recently, but all have been instrumental in transforming Arkema over the past 10 years. Our first-decade milestone is an opportunity to size up the initiatives and projects they have led or supported.

Although we couldn’t be prouder of how far we’ve come and of the company’s rapid rise, our first 10 years are just the beginning. I’m convinced that, buoyed by our people’s engagement worldwide, our first-rate technologies, our drive, our innovative spirit and our desire to serve our customers ever better, our best days are still ahead.

With Bostik’s arrival, we’re proud to have helped accelerate our growth in High-Performance Materials and strengthened Arkema’s image as a designer of innovative materials.

Since Arkema’s creation we have established a global presence in all our major product lines. Examples include acrylics, thiochemicals and fluorochemicals, for which we now have world-class production sites in Asia, Europe and North America. We’ve also been able to form solid partnerships with major global leaders in each of those sectors, and have cemented Arkema as a new leader and powerhouse in coating solutions.

In the last 10 years we have totally revamped our portfolio. After divesting assets generating €1.6 billion in revenue and acquiring others with more than €3 billion in revenue, Arkema has repositioned itself as a global leader in specialty chemicals and advanced materials. We owe this success to the quality of our people, who successfully managed the large number of often complex portfolio transactions completed over the years.

Thanks to targeted capital spending plans and robust employee involvement, we drastically reduced our workplace injury rate by more than 85% and cut our carbon emissions by almost two-thirds over 10 years. We’re very proud of this performance.

During these first 10 years, we supported Arkema’s growth by financing major projects including the recent construction of our thiochemicals complex in Malaysia and the acquisition of Bostik. It’s a great source of satisfaction to have been able to make these changes while keeping Arkema’s balance sheet sound and gradually improving our cash flow.

More than half of our 19,000 employees worldwide weren’t with us when Arkema was created 10 years ago. What makes us strong is our ability to bring them on board and help them embrace our culture and values so that, together, we can build and develop Arkema over the next 10 years.

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2015 RESULTS
SOLID FINANCIAL PERFORMANCE

We reported very solid earnings in 2015 in a contrasting and volatile global business environment. Our impressive performance was driven by several transformative developments, including Bostik’s integration and the start-up of the new thiochemicals complex in Malaysia.

€7,683M
REVENUE
up 29%

EBITDA increased considerably from the prior year, led by the integration of Bostik and strong growth in most product lines, except for acrylic monomers, as was expected at the bottom of its cycle. Several structural factors drove our robust performance and successful transformation, including the smooth integration of Bostik, the ramp-up of our new thiochemicals complex in Malaysia and a gradual improvement in fluorocarbons earnings. A currency gain (conversion only) of around €80 million, lower prices for some feedstocks and improved operational excellence also contributed to Arkema’s enhanced performance.

€1,057M
EBITDA
up 35%

We have paid down our debt faster than expected, just one year after acquiring Bostik. At December 31, 2015, net debt was 1.3 times EBITDA and the net debt-equity ratio was back below 40%.

€442M
FREE CASH FLOW

Excellent Cash Generation
Arkema reported free cash flow of €442 million, an impressive jump from €21 million in 2014. Along with our sharply improved EBITDA, this performance reflects our good management of investments and working capital, an environment of less expensive feedstocks. The high, 42% free-cash-flow-to-EBITDA ratio illustrates our pursuit of improved cash generation.

€1,379M
NET DEBT

We have paid down our debt faster than expected, just one year after acquiring Bostik. At December 31, 2015, net debt was 1.3 times EBITDA and the net debt-equity ratio was back below 40%.

€312M
ADJUSTED NET INCOME
up 27%

€285M
NET INCOME
GROUP SHARE
up 71%

€4.23
EARNINGS PER SHARE

Performance by Business Segment

We have reported very solid earnings in 2015 in a contrasting and volatile global business environment. Our impressive performance was driven by several transformative developments, including Bostik’s integration and the start-of-the-new thiochemicals complex in Malaysia.

Key Indicators

INCOME STATEMENT (in millions of euros unless otherwise indicated)

<table>
<thead>
<tr>
<th>2015</th>
<th>2014</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue</td>
<td>€7,683</td>
<td>€5,952</td>
</tr>
<tr>
<td>EBITDA</td>
<td>€1,057</td>
<td>€784</td>
</tr>
<tr>
<td>EBITDA margin (%)</td>
<td>13.8</td>
<td>13.2</td>
</tr>
<tr>
<td>Recurring operating income</td>
<td>€604</td>
<td>€447</td>
</tr>
<tr>
<td>Net income – Group share</td>
<td>€285</td>
<td>€167</td>
</tr>
<tr>
<td>Adjusted net income</td>
<td>€312</td>
<td>€246</td>
</tr>
<tr>
<td>Earnings per share (in euros)</td>
<td>€3.97</td>
<td>€2.53</td>
</tr>
<tr>
<td>Adjusted net income per share (in euros)</td>
<td>€4.43</td>
<td>€3.72</td>
</tr>
<tr>
<td>Dividend per share (in euros)</td>
<td>1.90</td>
<td>1.85</td>
</tr>
</tbody>
</table>

BALANCE SHEET (in millions of euros unless otherwise indicated)

<table>
<thead>
<tr>
<th>2015</th>
<th>2014</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shareholders’ equity</td>
<td>€3,949</td>
<td>€3,573</td>
</tr>
<tr>
<td>Net debt</td>
<td>€1,379</td>
<td>€1,234</td>
</tr>
<tr>
<td>Gearing (%)</td>
<td>35</td>
<td>44</td>
</tr>
<tr>
<td>Capital employed</td>
<td>€6,466</td>
<td>€4,565</td>
</tr>
<tr>
<td>Working capital to revenue ratio (%)</td>
<td>14.6</td>
<td>16.1</td>
</tr>
<tr>
<td>Net provisions</td>
<td>€907</td>
<td>731</td>
</tr>
</tbody>
</table>
| CASH FLOW (in millions of euros unless otherwise indicated)
<table>
<thead>
<tr>
<th>2015</th>
<th>2014</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash flow from operating activities</td>
<td>€858</td>
<td>€507</td>
</tr>
<tr>
<td>Free cash flow</td>
<td>442</td>
<td>21</td>
</tr>
<tr>
<td>Capital expenditure</td>
<td>€431</td>
<td>€470</td>
</tr>
<tr>
<td>Capital intensity (investments/revenue %)</td>
<td>5.6</td>
<td>7.9</td>
</tr>
</tbody>
</table>

1. Dividend recommended to the June 7, 2016 Annual Shareholders’ Meeting.
2. Working capital to revenue ratio, as defined in Section 4.1.6 of the 2015 Reference Document.
3. Capital employed, as defined in Section 4.1.6 of the 2015 Reference Document.
4. Net provisions, as defined in Section 4.1.6 of the 2015 Reference Document.
5. Including capital expenditure related to portfolio management, as defined in Section 4.1.6 of the 2015 Reference Document.
quarter after quarter, the financial information we publish confirms Arkema as a must-have for investors in the chemical industry. A decade after our public listing, the ground we’ve gained shows that our transparent, open communication with shareholders is alive and well.

Institutional Investors: Ongoing Dialogue
On June 29, 2015 in Paris, Arkema’s 5th Investors Day attracted some 60 institutional investors and analysts. Hosted by Thierry Le Henaff and several Executive Committee members, the event confirmed Arkema’s ambitions for 2017 and 2020 and featured a detailed presentation of our strategy, our main growth investments and the latest innovations produced by our R&D. This commitment to sharing our long-term vision and tying a quantified outlook to innovation and development projects underpins our communications with institutional investors and analysts. Beyond this special meeting held every other year, dialogue continues year-round via quarterly earnings reports, frequent meetings and events, roadshows in the world’s leading financial centers, and conferences.

Individual Shareholders: Welcome to the Club
We also do a number of things to retain our individual shareholders, who continue to account for around 8% of the shareholder base. Besides the Annual Shareholders’ Meeting, a highlight for around 8% of the shareholder base. Besides the Annual Shareholders’ Meeting, a highlight for around 8% of the shareholder base, we hold shareholder meetings in various French cities each year to present our shareholders with our strategy, our main growth investments and the latest innovations produced by our R&D. This commitment to sharing our long-term vision and tying a quantified outlook to innovation and development projects underpins our communications with institutional investors and analysts. Beyond this special meeting held every other year, dialogue continues year-round via quarterly earnings reports, frequent meetings and events, roadshows in the world’s leading financial centers, and conferences.

RECOGNITION FOR SHAREHOLDER OUTREACH DURING 2015
Over and above the information required by regulations, we provide very detailed quarterly information about Arkema’s activity, performance and outlook. We also publish an annual Reference Document that covers all these aspects for the previous full year and outlines our principal strategic directions, our corporate social responsibility policy and our core governance principles.

Our shareholder outreach and our transparency earned recognition during 2015, including second prize for Corporate Governance Process in the 2015 Corporate Governance Awards of the French business and financial newspaper L’Agefi. Arkema ranks among the best in industry with a dividend yield of 2.9% of the share’s value on December 31, 2015 and a payout of 45% of adjusted net income.

No. of Adjusted Dividend
£
50.43
65.27
75.75
36.57
64.59
41.17
23.65
1.90
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
105
110
115
120
125
130
135
140
145
150
155
160
165
170

Arkema Share Performance Since Public Listing

Since Our Public Listing 10 Years Ago, the Financial Markets Have Hailed the Scale of Our Transformation”

Arkon’s share price has significantly outperformed the CAC 40 index since we were publicly listed in May 2006. Our market capitalization has tripled. This remarkable performance reflects the work done to persuade investors of our transformation’s scale and quality. Over 10 years, Arkema has gone from an unknown to a must-have for investors in the chemical industry. We have built brand awareness and are now on an equal footing with our main competitors. We’ve changed the way the market looks at us through ongoing dialogue with the financial community, tying together our ambitious financial targets and information about our activities, our development projects and our strategy. This transparency has resulted in strong relationships with our institutional investors, our individual shareholders, and the 15 analysts who follow us and regularly publish about Arkema.”

Dividend
Up for the Sixth Year in a Row
At €1.90 for 2015, Arkema’s recommended dividend has increased for the sixth straight year. This reaffirms the importance we put on the dividend, a key component of our shareholder return policy. Arkema ranks among the best in industry with a dividend yield of 2.9% of the share’s value on December 31, 2015 and a payout of 45% of adjusted net income.

Arkema Share Performance in 2015

Performance
since January 1, 2015
Price at year-end
€
64.59
Average of 30 most recent closing prices
€
65.27
High
€
75.75
Low
€
50.43

Shareholder Base
(at December 31, 2015)

8% Individual Shareholders
5% Employees
BY TYPE OF SHAREHOLDER
87% Institutional Shareholders
4% Rest of the World
18% Rest of Europe
10% United Kingdom
34% North America
34% France
BY REGION

Sophie Fouillot, Vice President, Investor Relations

Contacts

Investors

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investor-relations@arkema.com
+33 (0)1 49 00 74 63

Calendar

June 7, 2016
Annual Shareholders’ Meeting
(Palais Brongniart, Paris)
August 3, 2016
Third-Quarter 2016 Results
November 10, 2016
First-Half 2017 Results

Arkema Share Performance Since Public Listing

0 10 20 30 40 50 60 70 80 90 100
€
0
10
20
30
40
50
60
70
80
90
100

Lighter vehicles, wind turbine blades, phone batteries, water management, sustainable housing and more — Arkema designs advanced materials and innovative solutions to meet tomorrow’s challenges today.