



# **SOCIALRESPONSIBILITY**

COMMUNICATION ON PROGRESS



**ARKEMA**  
INNOVATIVE CHEMISTRY

Extract from 2015 Reference document

# SUCCESSFUL TURNAROUND



## STRONG FINANCIALS



## VERY INNOVATIVE

5<sup>TH</sup> YEAR IN A ROW IN THE  
**THOMSON REUTERS**  
**TOP 100 « GLOBAL INNOVATORS »**

**PROMISING PORTFOLIO  
OF INNOVATIONS**  
in new materials  
and sustainable solutions



## INCREASINGLY RESILIENT

BOSTIK ACQUISITION

VINYLS DIVESTMENT

High Performance  
Materials  
sales:

**x2** at **€3.4 bn**

CYCLICAL BUSINESSES

(% of sales)  
56% **↓ 29%**

**ARKEMA**  
INNOVATIVE CHEMISTRY

**2005-2015**



## RESPONSIBLE

TOTAL RECORDABLE INJURY RATE<sup>(2)</sup>

11.3 **↓ 1.5**

GREENHOUSE  
GAS  
EMISSIONS

**-64%**

VOLATILE  
ORGANIC COMPOUND  
EMISSIONS

**-43%**



## GEOGRAPHICALLY REBALANCED

Sales

EUROPE

57% **↓ 38%**

ASIA

**x2.5**

NORTH AMERICA

25% **↑ 34%**

(1) Dividend proposed to the annual general meeting of 7 June 2016.

(2) Total recordable injury rate per million of hours worked.

## MESSAGE OF THE CHAIRMAN AND CEO



**Thierry Le Hénaff**

Dear stakeholders,

I am pleased to renew Arkema's support for the Global Compact and our ongoing commitment to the initiative and its principles, on which Arkema builds its sustainability approach, with the Responsible Care® initiative.

Our strategic position as a central player in the industry, dedicated to serving our customers, creates a responsibility for us to set an example of excellence in environmental awareness, safety and sustainability in chemical production. I firmly believe that implementing an ambitious corporate social responsibility policy creates value for both stakeholders and the Company itself.

In ten years, we have become a key player of the sustainability world by bringing sustainable development solutions a centerpiece of our innovation policy and our product lines. Our innovation platforms cover lightweight materials and design, electronics solutions, new energies, bio-based products, and water management.

We launched in 2015 a sixth innovation platform on sustainable building materials and solutions with the Smart House by Arkema. With this unique laboratory-house concept, Arkema sets out its ambition to develop innovative, responsible and sustainable solutions for environmentally sounder buildings, throughout their lifecycle. During COP21, Arkema signed the French Companies Act on Climate and confirmed its commitment to invest significantly in low-carbon R&D and industrial projects.

Building on its excellent results and steady progress over the past 10 years in terms of occupational safety and environmental footprint reduction, Arkema has strengthened its long-term targets with a new ambitious Corporate Social Responsibility framework by 2025. Highlights are for safety a total recordable injury rate of 1.2 or below and for the environment a reduction of 50% of greenhouse gases in terms of EFPI (Environmental Footprint Performance Indicator).

This report details our ambitions and commitments in the field of Corporate Social Responsibility as well as our achievements there.

I sincerely thank you for your continued support and interest in our sustainable performance.



**AN INNOVATIVE  
GROUP**

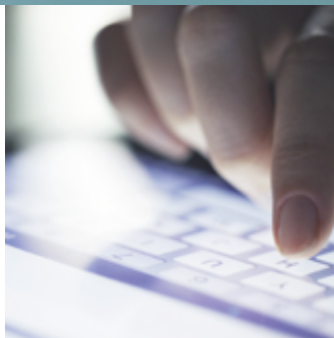
## RECOGNIZED R&D EXPERTISE

### TOP 100 GLOBAL INNOVATORS

THE GROUP IS INCLUDED  
IN THE THOMSON REUTERS TOP 100  
GLOBAL INNOVATORS RANKING LIST  
FOR THE 5<sup>TH</sup> CONSECUTIVE YEAR



### 6 RESEARCH PLATFORMS



BIO-BASED  
PRODUCTS  
NEW ENERGIES



WATER MANAGEMENT  
ELECTRONICS  
SOLUTIONS



LIGHTWEIGHT  
MATERIALS AND  
DESIGN  
HOME  
EFFICIENCY  
AND INSULATION

## PROMISING DEVELOPMENT AREAS



### **Smart House**

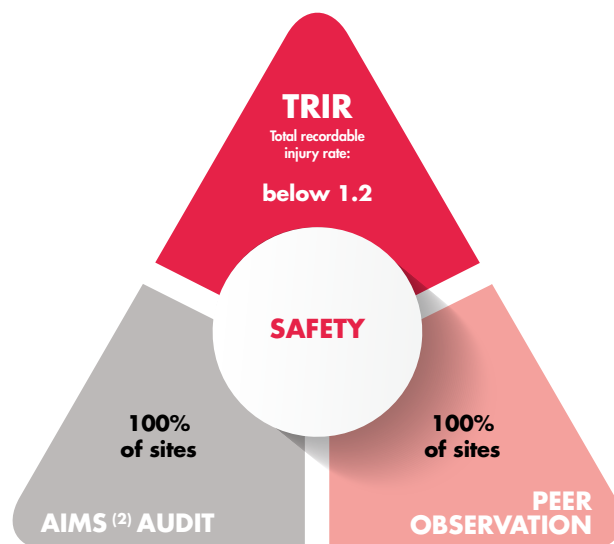
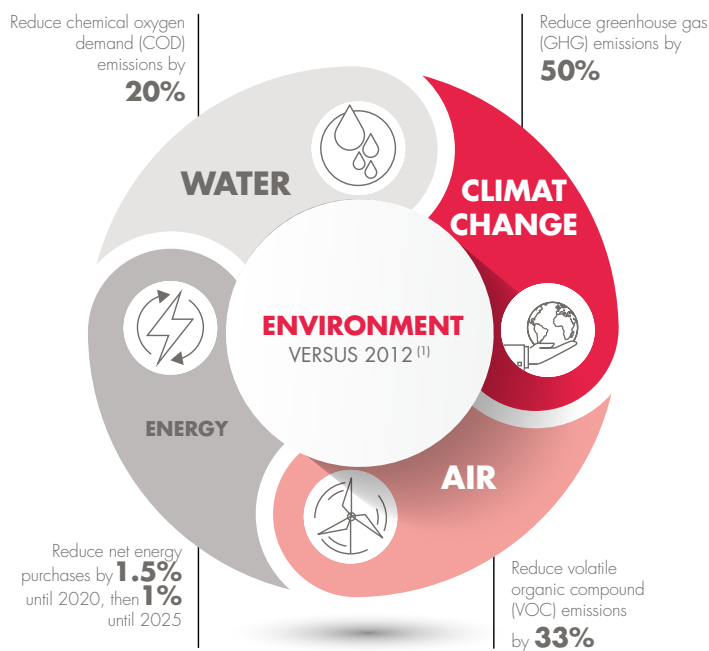
Inaugurated in 2015, the Smart House is a house-laboratory dedicated to sustainable construction, designed to address the major challenges facing the building industry: energy efficiency, environmental performance, and the health and comfort of building occupants.



### **A recognized player in composite materials**

The Group positions itself as a major player in the composite materials market, with many developments including Kepstan® PEKK, known as "the extreme polymer", Elium® resins, Altuglas® ShieldUp, Rilsan HT® and Polystrand® thermoplastic preregs.

## 2025 TARGETS



(1) Relative indicators based on 2012 reference year.

(2) The Arkema Integrated Management System (AIMS) combines ISO 9001, ISO 14001 and OHSAS 18001 requirements.

**COP21:  
Arkema  
at the heart  
of Noah's Ark  
for the Climate**





# Corporate social responsibility

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The different parts constituting the Annual Financial Report are identified in the content by the pictogram **AFR**



In a world that faces many economic, environmental and social challenges, the Group's Corporate Social Responsibility (CSR) policy is at the heart of its growth strategy and makes a positive contribution to the society in which we live and in which future generations will live.

The CSR objectives address the expectations of the Group and its stakeholders, and ensure sustainable and responsible growth for the Group.

The Group decided to consolidate Bostik in its CSR reporting from 2015. If Bostik is not included, this is stated in the text or in a footnote.

### The Group's CSR ambitions and commitments

The Group's CSR commitments concern five major areas:

#### 1. Being a top quartile performer in safety in the chemical industry

The Group's industrial safety initiative has been rolled out around the world and comprises complementary technical, organizational and human aspects. By introducing a Group-wide safety culture and making safety a priority, the Group has continuously improved its safety performance since its stock market listing.

#### 2. Reducing the environmental footprint of its activities

All Group employees are sharing the objective of reducing the Group's environmental footprint, which can be achieved through three types of actions: limiting the emissions of the Group's different activities, reducing consumption of natural resources and developing the use of renewable resources.

The Group also takes care that neither people's health or safety, nor the environment, are impacted by its products.

#### 3. Placing sustainable development solutions at the heart of its approach to innovation and its product range

The Group uses its product R&D and marketing teams to support sustainable development and address the challenges facing the planet. To this end, it creates innovative solutions in support of new energies, lightweight materials, the fight against climate change, access to water, and the use of bio-based raw materials. The Group's R&D policy is described in section 1.4 of this reference document.

#### 4. Encouraging open dialogue with all its stakeholders

The Group invites dialogue on its activities and products with all stakeholders, through programs such as the Common Ground® (*Terrains d'Entente*®) initiative, developed to build mutual understanding and trust-based relationships with local residents, associations and schools. With its suppliers, the Group also adopts responsible behavior based on the desire to develop balanced, long-term, trust-based relationships.

#### 5. Promoting the individual and collective development of all its employees

The Group's employees – unique in their know-how, profession, nationality, role and personality – make up together a community. The Group's employment policies around the world focus on two aspects: the individual development of its employees and social development through actions that aim to improve working conditions for all.

All Group entities aim to contribute to achieving the Group's CSR ambition in these five areas as part of a continuous improvement initiative. The rules governing the collection and consolidation process for the CSR data featured in this chapter are notably set out in section 2.6 of this reference document.

By carrying through these commitments, the Group will achieve its ambition of being a recognized contributor to the sustainable development of the world, and to stand among the leading chemical producers in the world in terms not only of economic performance, but also of labor, social and environmental performance.

### CSR players and governance

To deliver on its CSR ambitions, the Group set up a Sustainable Development department in 2012 comprising the Product Safety and Environment and the Sustainable Development departments. The Sustainable Development department reports directly to the Group Industry Executive Vice-President, who is a member of the Executive Committee.

The Group also set up a CSR steering committee in late 2012. Chaired by the Industry Executive Vice-President, the committee includes the Human Resources and Communication Executive Vice-President and a number of corporate Vice-Presidents, all of whom are actively involved in the Group's CSR policy. It oversees actions conducted as part of the Group's CSR policy, and defines projects for any planned CSR actions before submission to the Executive Committee. The steering committee meets twice a year.



The Executive Committee defines and validates the Group's CSR ambitions, the actions associated and implemented, the main indicators and the safety and environmental objectives, including those targeted for 2025. It submits this information to the Board of Directors once a year.

The Sustainable Development Vice-President makes a presentation to the Audit and Accounts Committee annually outlining the content of the extra-financial data audit and the findings of the Independent Third-Party auditor. These findings appear in the auditor's opinion issued to the annual general meeting along with the Board of Director's report, which also includes social and environmental information.

All 2015 indicators provided in chapter 2 of this reference document were subject to confirmation by the Independent Third-Party auditor, as indicated in its opinion in section 2.8.

### 2025 objectives

In 2013, the Group reinforced its commitments on sustainable development by setting four environmental objectives for 2020, on emissions to air, greenhouse gas emissions, emissions to water and net energy purchases. These objectives complement the three 2020 safety objectives set by the Group in 2012, the most important of which is a reduction in the total recordable injury rate (TRIR).

The Group decided in 2015 to review all its objectives to take into account Bostik's consolidation, whose environmental profile differs from that of most of the rest of the Group, and in the light of the very good results achieved in 2014 on safety, greenhouse gas emissions and emissions of volatile organic compounds (VOCs), thanks to the committed environmental awareness of the Group's employees.

This review also involved an adjustment to the target date, shifted from 2020 to 2025.

## FOCUS : COP21

Through its commitment and ongoing efforts to reduce its environmental footprint, and through the technological solutions offered to its customers on sustainable development, the Group stands among the companies that will contribute to meet the goals set in the Paris Agreement concluded at the COP 21.

### Standards and fundamental charters

As a participant in its initiative, the Group supports the ten principles of the United Nations Global Compact, notably on issues including human rights, labor, the environment and anti-corruption.

In addition to the principles of the Global Compact, the Group's values also extend to those of the 1948 Universal Declaration of Human Rights and those expressed by the International Labour Organization and in the OECD's Guidelines for Multinational Enterprises.

The Group also complies worldwide with the principles of the International Council of Chemical Associations (ICCA) Responsible Care® Global Charter, for which it signed the declaration of support on 16 November 2006.

All these principles are included in Group standards, namely the Code of Conduct and Business Ethics; the Code of Conduct for Arkema's suppliers; the Health, Safety, Environment and Quality Charter; and the Energy Policy.

## 2.1 BE A TOP QUARTILE PERFORMER IN SAFETY IN THE CHEMICAL INDUSTRY

### 2.1.1 General industrial safety and environment policy

The Group places safety, health and the environment at the heart of its objectives when conducting operations, with a permanent focus on improving performance in these areas.

The Group's Health, Safety and Environment (HSE) policy has been continuously strengthened since its creation in order to incorporate the applicable regulations and the Group's own requirements. The Group has formally expressed its fundamental requirements in the Health, Safety, Environment and Quality Charter and in a global standard, the HSE manual, which was implemented by the Group at the time of its creation. The Charter and manual form the basis of HSE management systems in all Group entities.

The Group's HSE policy is an integral part of its commitment to sustainable development, which is based on the firm belief that its long-term growth partly depends on the way it rises to its responsibilities in the areas of labor, safety, security and the environment.

Accordingly, the Group supports the International Council of Chemical Associations (ICCA) Responsible Care® global initiative, which is backed by the Association of International Chemical Manufacturers (AICM) in China and the European Chemical Industry Council (CEFIC) in Europe and followed by most national associations, including the Union des industries chimiques (UIC) in France. Responsible Care® is a voluntary initiative undertaken by the global chemical industry that extends beyond regulatory compliance. It was first launched in the 1990s in the areas of industrial health, safety and environment, before subsequently being extended to product stewardship.

In 2006, ICCA launched the Responsible Care® Global Charter to enhance the Responsible Care® initiative by strengthening sustainable development, product stewardship, measurable performance and third-party audits of procedures.

The Group signed the original declaration of support for the Responsible Care® Global Charter on 16 November 2006 and the new Responsible Care® Global Charter on 10 December 2014.

To support its commitments to sustainable development, and to safety in particular, the Group has set three 2025 safety objectives primarily reflecting its will to continuously improve safety performance and strengthen operational excellence. These objectives, which include Bostik (51 sites and 3 R&D centers), are as follows:

- **reduce the total recordable injury rate (TRIR) to below 1.2 by 2025;**
- **extend the peer observation program to 100% of sites by 2025;**
- **audit 100% of sites in accordance with the Arkema Integrated Management System (AIMS) by 2025.**

#### 2.1.1.1 GROUP ORGANIZATION IN TERMS OF INDUSTRIAL SAFETY AND ENVIRONMENT ISSUES

The Arkema Group's industrial safety and environment policy has been rolled out around the world and applies to all Group subsidiaries and all countries in which the Group operates.

The Group Safety and Environment department, which is based at the Group's head office, operates globally with support from safety and environment experts in every region.

#### 2.1.1.2 AN INITIATIVE BASED ON THREE PRIORITY AREAS

The Group's safety initiative is based on three areas: reducing risks related to safety, environment and pollution, following the management system and promoting a culture on safety and sustainability.

## Prevention of safety, environment and pollution risks

In compliance with applicable regulations, the assessment of risks on the Group's industrial sites is carried out through systematic studies of (i) manufacturing processes, (ii) operating conditions in existing units, (iii) transportation operations (particularly those involving hazardous products), (iv) the design and construction of new facilities, (v) changes to existing facilities, (vi) health and safety at workstations, and (vii) environmental impact.

For its industrial sites and for the transportation of hazardous substances, the Group has put in place technical and organizational resources in order to identify these risks, rank them using a qualitative and quantitative approach based on simulation models and input from a network of experts, and define preventive measures to reduce their impact and likelihood of occurring.

The Group attaches careful attention to the analysis of risks connected with its business activities, particularly in the case of Seveso sites (or their equivalent), for which the Group increases safety requirements in line with the potential risks identified. Similarly, the Group pays great importance to feedback (both inside and outside the Group), particularly regarding the level of incidents and accidents as well as best practice in industrial risk management.

When a new production unit is designed or a significant extension made to an existing production unit, the best options are sought to improve industrial safety. In addition, the Group regularly makes improvements to its existing production units. The Group's capital expenditure allocated to safety, environment and maintenance of its industrial units up to standard totaled 203 million euros in 2015 (versus 211 million euros in 2014).

In Europe, at the date of this reference document, 33 of the Group's production sites, under the 2015 consolidation scope, are monitored with extra vigilance and are subject to the European Directive 2012/18/EU of 4 July 2012 on the control of major-accident hazards involving dangerous substances, known as the "Seveso III directive". This directive requires, in particular, the introduction of safety management systems and regular updating of hazard studies, the findings of which can lead to additional risk-prevention requirements for the companies operating the sites.

French Act No. 2003-699 of 30 July 2003 and the relevant application decrees have strengthened the obligations imposed on companies operating Seveso sites in France by laying down the principle of government-designed and -implemented Technological Risk Prevention Plans (*plans de prévention des risques technologiques* – PPRTs), which aim to control urban development around potentially dangerous sites and to limit the impact of potential accidents. At end-2015, 16 sites operated by the Group in France were subject to PPRTs. The Group will be required to contribute to the funding of any measures related to these PPRTs. Furthermore, the ministerial decree of 29 September 2005 relating to the evaluation and consideration of the

probability of occurrence, the kinetics, the intensity of the impact, and the severity of the consequences of potential accidents in hazard studies for classified facilities subject to authorization, will also entail the introduction of additional risk control measures by 2018 at the 16 sites mentioned above for which a PPRT is required.

In the United States, industrial accidents risk management is primarily regulated by the Superfund Reauthorization Act (SARA), the Risk Management Process (RMP) and the Emergency Planning and Community-Right-to-Know Act (EPCRA). The latter notably requires companies to inform the government authorities when hazardous products, above a certain quantity, are being handled or stored, and requires companies storing such products to have emergency plans and procedures in place. Other regulations at federal, state or local levels govern certain specific aspects of the storage of chemical products, the safety of workers when handling stored products, and the storage of highly hazardous products.

The crisis management procedures at Group facilities are broadly based on the Group Crisis Management directive, which covers the management of potentially critical situations in the areas of health, safety and the environment. They include a year-round on-call system for ensuring rapid and effective response to potential incidents, assessing their context, and fielding crisis management teams accordingly. The Group also runs "crisis management and communication" training courses, along with exercises involving crisis simulation and the formation of crisis management teams.

## AIMS, the all-in-one audit

The Arkema Integrated Management System (AIMS) combines all Group-led safety, environment and quality audits into one single audit. It includes the Group's own requirements as well as those featured in standards endorsed by the Group, such as ISO 9001, ISO 14001 and OHSAS 18001. This "all-in-one" approach has the dual benefit of being in line with the Group's culture and ensuring consistency across all its safety, environment and quality management initiatives. In order to obtain external certifications, AIMS audits are conducted by mixed teams made up of Group auditors and auditors from a third-party accreditation body. They are conducted every three years and complemented by annual follow-up audits. This new method is well established and applied at Bostik sites since 2015.

In 2015, 61% of the Group's sites (including Bostik sites acquired in early 2015) had undergone an AIMS audit within the previous three years, versus 78% of sites in 2014 and 62% in 2013 <sup>(1)</sup>. The 2015 percentage is lower than that for 2014 because of the gradual rollout of the AIMS method across Bostik sites in 2015. Excluding Bostik sites, the percentage would be 91% in 2015, an increase on the 2014 figure.

(1) The figures for 2013 and 2014 do not include the Bostik sites acquired in early 2015.

### The 2025 target is for 100% of sites to have had an AIMS audit within the previous three years.

In 2015, 52% of Group sites worldwide (including the Bostik sites acquired in early 2015) are OHSAS 18001-certified, compared with 60% in 2014 and 54% in 2013<sup>(1)</sup>. This breaks down into 51% in Europe, 60% in North America and 45% in Asia. The decrease from 2014 to 2015 arises from the integration of Bostik sites, acquired in early 2015.

Each year, the Arkema Group also conducts a large number of non-AIMS audits, including:

- operational safety audits: such as construction site audits, pre-start-up reviews, operational safety audits on topics such as mechanical integrity and explosive atmospheres, and simplified AIMS audits for smaller sites;
- process safety audits: including fire safety audits, post-incident audits and risk analysis reviews;
- supplier and logistics audits: like transportation company and off-site warehouse visits and assessments. These audits are in addition to the evaluations conducted by third parties, such as the Safety & Quality Assessment System (SQAS) for land transportation, the Chemical Distribution Institute (CDI) questionnaire for maritime transportation, and the European Barge Inspection Scheme (EBIS) for river transportation. Some packaging is also verified;
- safety support action: this action is conducted at certain sites consisting in meeting with sites' management teams and sharing analyses of their accident records and HSE activities. The initiative also includes discussions on how to draw up and monitor action plans.

A feedback program also encourages experience sharing about relevant incidents in order to prevent them from reoccurring. This sharing takes place on a global scale through various networks (regions, professions and technologies). Through these networks, any significant incident triggers a safety alert and corrective measures at Group sites that might encounter a similar incident. The feedback process includes mechanisms for consolidating the measures implemented and verifying their efficiency. It also extends to all voluntary measures, as following rollout of an Essential or a Safety Culture campaign.

### Safety culture: training, information for employees and industrial safety and environment tools

Behavioral approaches represent a key component in risk prevention. The development of a safety culture where everyone is aware of their responsibility and the importance of their behavior lies at the heart of the Group's safety initiative. To develop a safety

culture shared by all employees, the Group makes use of various tools such as the "Safety in Action" program, the "Essentials", field activities (peer observation, flash audits, planned general inspections, safety tours, field safety audits, etc.) and the "Human and organizational safety factors" and "Safety culture and leadership" training courses.

The Group's safety culture took a further step forward in 2014 with the launch of the Arkema Safety Academy, which addresses all Group employees with the aim of developing interaction on safety issues, policy and tools. Training courses under this program have so far included a number of modules primarily addressing HSE managers, plus others on crisis communications, crisis management, accident prevention through peer observation, awareness-raising on safety culture, and human and organizational safety factors.

### General HSE training

Priority is given to HSE training in the induction of new hires, general on-site induction, workstation training plans and training initiatives for existing employees. HSE managers receive country-specific specialist training inside or outside the Group and regularly attend HSE conventions.

Safety training takes two forms: classroom courses and e-learning. In 2015, safety training <sup>(2)</sup> totaled 172,909 hours (12 hours per year per employee trained), and the number of employees reached by at least one safety training session totaled 14,582 (80% of the Group headcount) <sup>(2)</sup>.

In addition, 5,538 people (30% of the Group headcount) took e-learning courses on safety in 2015 <sup>(1)</sup>. These e-learning courses deal with safety-related topics such as Gestures and Postures, Moving on Foot, Explosive Atmospheres, Legionella, Pressure Equipment, Regulations for Labeling Hazardous Products, Transporting Hazardous Substances, Personal Protective Equipment (PPE), Accident Prevention Through Peer Observation, Slips and Trips, and Work at Height. Titles of forthcoming e-learning courses include Security of Travelers, Root Cause Analyses and Risk Analyses.

In 2015, the Safety Culture module was rolled out in all three regions (Europe, Asia and the Americas) by more than 300 in-house facilitators specially trained for this purpose. Further details on this Safety Academy program are given in section 2.5.2.4 of this reference document.

(1) The figures for 2013 and 2014 do not include the Bostik sites acquired in early 2015.

(2) In entities in which the Group holds a stake of 50% or more, and which employ more than 30 people.



### The Safety in Action program

The Group runs an ambitious employee information and motivation program to stimulate and follow through changes in behavior with regard to safety. This program reflects a will to establish relentless vigilance toward safety matters. It emphasizes individual and group commitment to taking action at the team and workstation level. The program is based in particular on two priorities targeting exchanges and communication, namely:

- producing "Site Safety" films, which systematically deliver information on site safety instructions to all visitors. These films were updated in 2015;
- organizing "Safety High Points", which offer a forum in which to regularly discuss safety-related topics, to draw up action plans specific to each work environment, and to define areas for improvement at the team level.

### The Essentials

The 14 "Essentials" are clear and simple safety rules that have been derived from feedback and apply to everyday situations. Everyone on all Group sites is expected to know and apply these rules scrupulously, and to lead by example. Employees are invited to suggest improvements that facilitate the application of a rule, and to report all substandard situations. All employees, regardless of their position, can step in when they witness someone breaking the rules. Three Essentials are rolled out per year. Each is accompanied by a specific, three-month campaign including a host of measures to encourage employee appropriation.

The three Essentials rolled out in 2015 were Mobile Phones, Electrical Risks and Safety in Buildings.

### Field activities

Peer observation raises awareness of risks in order to reduce the number of occupational accidents. It capitalizes on positive experiences and a collective search for solutions to improve practices. Using a structured observation method, each site implements the initiative in a way that best suits its own specific features (type of risks and nature of the activities). Employees with similar qualifications are then encouraged to observe each other while carrying out their duties. Peer observation helps identify best practices, deviations and potentially dangerous situations. The method has been successfully implemented in the United States, is being rolled out in Asia and the main European countries, and will be extended to all of the Group's production sites.

Bostik has developed a monitoring system for in-the-field detection of deficiencies and deviations from good practice. Employees detecting a problem of this kind can report it using the Smart Zone table. Immediate corrective action is then taken, and further measures discussed between the employee and the table manager. Implementation of a full solution is logged in the Smart Zone table through to completion, for rapid, effective tracking. Rollout of this approach across other Group sites is under examination.

In 2015, 57% of sites (including Bostik sites acquired in early 2015) had put in place the peer observation program to improve safety, versus 77% in 2014 and 62% in 2013. Excluding Bostik sites, the percentage would be 85% in 2015, an increase on the 2014 figure.

### The 2025 target is to extend the program to 100% of Group sites.

To move from a safety discipline culture to a safety commitment culture, the Group has integrated an initiative in place in the United States that was first devised in Canada. Named "SafeStart®", the initiative consists in observing oneself and other people to identify critical states (rushing, frustration, fatigue and complacency) that can lead to critical errors (eyes not on task, line of fire, mind not on task, loss of balance, traction or grip) which in turn transform minor risks into major ones. Critical error reduction techniques are used to continuously improve accident prevention.

The Group runs regular field safety audits at its sites to evaluate safety culture and facility compliance on a continuous, long-term basis. These audits can take various forms, including flash audits, planned general inspections (monthly or quarterly, depending on the site) and safety tours performed by management. They cover all personnel present, whether employees of the Group or of outside companies. They are also used for checking implementation of HSE recommendations on major projects, and for furthering a safety and risk-prevention mindset during turnarounds.

In France, many sites run yearly or twice-yearly "safety days" addressing their main subcontractors. These events involve local HSE employees, the Group contract manager, and the sales manager of the subcontractor concerned. Here, the Group is represented by the local management, the management of the business unit concerned, and representatives from the Procurement department and the Group Safety and Environment department. The events provide an opportunity for dialogue on best practices in health and safety at the workstation.

The Group has also stepped up communications on safety, by displaying safety results at each site, for example.

## 2.1.2 Safety performance

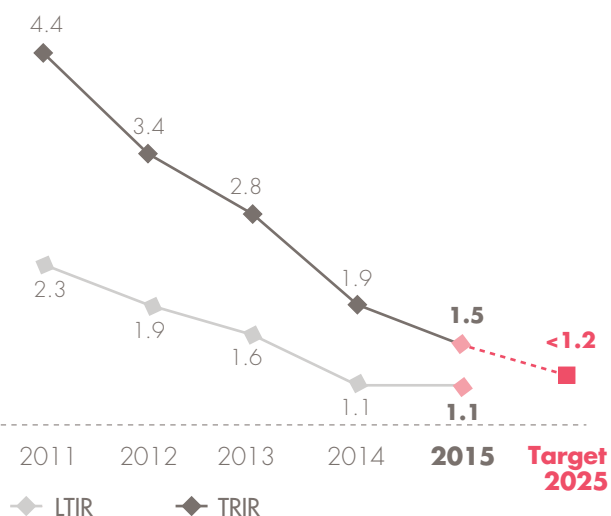
By implementing the safety policies based on the three priority areas described in section 2.1.1.2 of this reference document, the Arkema Group has improved its safety performance.

### Injury rates

In 2015, the total recordable injury rate (TRIR) was 1.5, down from 1.9 in 2014. This puts the Group among the best in its sector and confirms the very strong safety improvement dynamic underway in recent years, driven largely by firm employee commitment.

The following diagram shows injury rates within the Group for the period 2011 to 2015, calculated according to the methodology detailed in section 2.6 of this reference document. The rates are expressed as the number of injuries per million hours worked for all Group employees and subcontractor employees present at Arkema Group sites.

### LOST-TIME INJURY RATE (LTIR) <sup>(1)</sup> TOTAL RECORDABLE INJURY RATE (TRIR)



### The Group's 2025 target is to achieve a total recordable injury rate (TRIR) below 1.2.

For the record, the Group's injury rates in 2005 (a milestone date, the year before the stock market listing) were 11.3 for total recordable injuries and 5.3 for lost-time injuries.

The severity of accidents is established by the number of days lost per injury. This stood at an average of 48 days in 2015, across all Group employees and subcontractor employees at Group sites.

With regard to Arkema Group employees, 48 were victims of accidents recorded for the purposes of calculating the TRIR in 2015, 34 of which with lost time, out of a total global headcount of 18,912. Analysis of data from previous years shows a decrease in the number of serious and very serious accidents, which account for a very small proportion of the total. The Group is firmly committed to reducing the number of serious and very serious accidents further.

### Process safety

The Group's process safety objective is to minimize the number of process safety incidents as defined by CEFIC <sup>(2)</sup>.

Since 2013 the quality of this reporting is improving and continues to do so. From the same year on, the number of major and minor Process Safety Incidents (PSIs) has been systematically reviewed monthly by the Executive Committee. In addition, Executive Committee members are notified promptly of all major PSIs occurring.

In 2015 (including Bostik sites), 27 major PSIs (type A or C1, according to the CEFIC method) were reported. In 2014 (excluding Bostik), the figure was 33, stable versus 2013.

(1) "Lost-time injury" refers to any event causing bodily harm or psychological shock to an employee in the course of his/her duties and resulting in time off work.

(2) See the note on methodology in section 2.6 of this reference document.

## 2.2 REDUCE THE ENVIRONMENTAL FOOTPRINT OF THE GROUP'S ACTIVITIES

### 2.2.1 General policy in terms of reducing the environmental footprint

Committed to continuous improvement, in respect to the regulations, the Arkema Group has integrated environmental protection in its management system. Accordingly, the reduction of its environmental footprint is one of the five CSR objectives set up by the Group. To achieve this goal, the Group adapts its industrial practices to minimize its emissions and to optimize and reduce its consumption of energy, water and non-renewable raw materials. The Group's industrial sites rigorously monitor their waste and emissions.

Each year since its creation, the Group has reported its emissions and consumption of resources in extensive values.

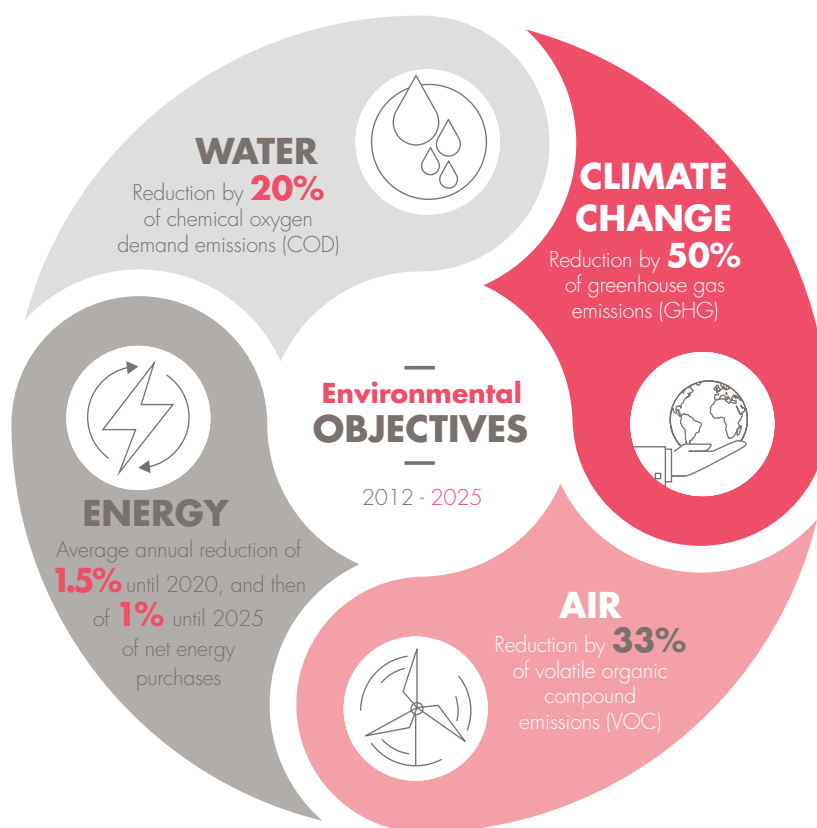
To manage its environmental performance more precisely and provide a consolidated Group data report that more accurately describes changes to this performance, the Group has adopted a methodology that also enables its facilities to report on relative indicators. This methodology limits the impact of any changes to the Group's scope of business, production facilities, or the method used to assess or calculate environmental footprint variables.

The procedure for calculating these intensive indicators, known as Environmental Footprint Performance Indicators (EFPIs), is described in the note on methodology in section 2.6 of this reference document.

In 2013, the Arkema Group decided to strengthen its commitment to sustainable development by setting four objectives for 2020. These primarily translate the Group's initiative to reduce its environmental footprint and strengthen its operational excellence.

In 2015, the Group decided to tighten its objectives, for two reasons. First, in 2015, it acquired the business activities of Bostik, whose environmental profile differs from that of most of the rest of the Group. Second, some of the objectives set for 2020, including those on greenhouse gas and volatile organic compound (VOC) emissions, had already been reached by 2014.

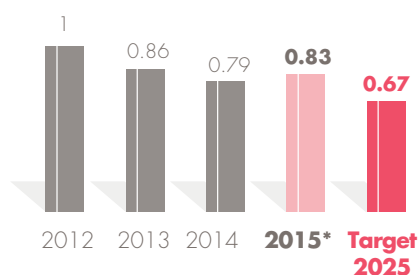
Beyond these four specific relative indicators, the Group will continue to report absolute figures in all areas used to monitor its environmental footprint.



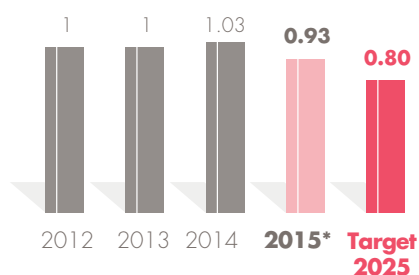
These objectives apply to relative indicators, the Environmental Footprint Performance Indicators (EFPIs).

The diagrams below show Group results since 2012:

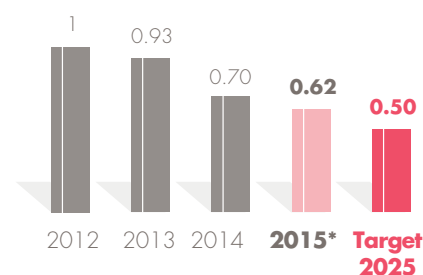
#### VOLATILE ORGANIC COMPOUND (VOC)



#### CHEMICAL OXYGEN DEMAND (COD)



#### GREENHOUSE GAS (GHG)



\* In 2015, figures include data for Bostik sites. 2014 and 2013 exclude Bostik.



## 2.2.1.1 ENVIRONMENTAL MANAGEMENT SYSTEM

### Environmental certifications

The Group has put in place environmental management systems at its industrial sites, most of which have received external environmental certification in accordance with the ISO 14001 standard. Depending on the local context, certain sites have adopted other standards, such as the Responsible Care® Management System (RCMS) in the United States.

The environmental management system requires each of the Group's industrial sites to identify its environmental impact in terms of water, air (including greenhouse gas emissions), waste, noise, odors, soil, use of resources and logistics flows, and then to define the priorities of its action plan. A regular environmental analysis of the sites is used to measure progress and to determine new improvement objectives. Each site rigorously monitors its waste and emissions, including carbon dioxide (CO<sub>2</sub>) and greenhouse gas (GHG) emissions.

To harmonize identification, evaluation and analysis of environmental risk, the Group rolled out a new methodology, with global application, in 2013. A dedicated IT system was rolled out in Europe and the United States in 2015, and will be extended to Asia in 2016.

In addition to the audits conducted by the Internal Audit department, Group sites undergo two other types of audits: certification by external bodies and audits conducted by experts from the Group Safety and Environment department (DSEG).

In 2015, 62% of Group sites worldwide (including the Bostik sites acquired in early 2015) were certified to ISO 14001 or RCMS (in the United States), compared with 70% (excluding Bostik sites) in 2014 and 59% (excluding Bostik sites) in 2013. Excluding Bostik, the figure would be 93%, a steep rise on 2014. Percentages (including Bostik sites) by geographic area in 2015 are 69% in Europe, 60% in America and 41% in Asia.

### Environmental declaration

The Group issues a declaration on environmental indicators, including GHGs, in accordance with its environmental declaration directive and the guidelines provided to all its subsidiaries. This declaration is based on the principles of relevance, representativeness and consistency, and is drawn up according to the methodology detailed in section 2.6 of this reference document.

### Management involvement

The declaration of actions undertaken to reduce the Group's environmental footprint is the subject of various presentations and discussions within the Group:

- for each business, an annual review of the full environmental footprint, including the energy footprint, is carried out at

individual meetings between the business and industrial Vice-Presidents, and the Group Safety and Environment and Sustainable Development Vice-Presidents;

- an annual environmental report and annual energy report for the Arkema Group, setting out the results for the reporting year and for the previous fiscal year along with historical environmental footprint data (excluding energy) for the past six years, are issued to all the departments concerned;
- each year, the Group Safety and Environment Vice-President sends the Executive Committee a summary of the Group's environmental results, and the Sustainable Development Vice-President sends a summary of the results for the Group's four key environmental footprint indicators included in the 2025 targets.

### Environmental culture: training and information for employees and regulatory monitoring

Training and awareness-raising on environmental issues acquaints Group employees with the main characteristics of their site and the tangible consequences of their everyday actions and activities. It also teaches them about the operational control of emissions of all types, operation levels during facility shutdown or start-up in terms of emissions, and waste sorting.

For the 62% of Group sites certified to ISO 14001 (or RCMS in the United States) in 2015, a specific environmental training program is rolled out after an environmental risk analysis has been performed at each workshop and the main feedback on environmental incidents has been examined in the tracking system for incidents and responses (impacts). The training program is repeated on a regular basis to maintain awareness of the importance of critical parameters.

The Group also ensures, through regular conference calls and monitoring reports, that EU regulations, such as Phase III of the European Union Emissions Trading Scheme (EU ETS), the Industrial Emissions Directive (IED) and environmental declaration rules, are properly understood by the HSE network through awareness-raising days. Programs for auditing regulatory compliance have been run at most of the Group's American sites. European sites can verify compliance with applicable texts using IT applications specific to regulations in each country.

Details on employee training, including induction of new hires, are given under "General HSE Training" in section 2.1.1.2 of this reference document. In 2015, training on environmental issues totaled 20,447 hours <sup>(1)</sup>, or an average of 7.2 hours per year per employee trained in environmental matters. A total of 2,841 employees (16% of the Group headcount) took at least one environment-related training course (excluding e-learning) during the year <sup>(1)</sup>.

(1) In entities in which the Group holds a stake of 50% or more, and which employ more than 30 people.

### 2.2.1.2 EMISSIONS MANAGEMENT

The Group has a policy of actively controlling and reducing the environmental impact of its business activities.

Accordingly, substance emissions are identified and quantified by type (air, water, waste) so that suitable measures can be implemented to control them.

#### Regulations on specific emissions

A number of regulations place strict limits on emissions from the Group's industrial facilities, such as the European Water Framework directive 2000/60/EC on emissions to water.

In accordance with European directive 2010/75/EU on industrial emissions, as transposed into national law, the industrial sites concerned are subject to authorizations to operate that include emission limit values in line with best-practice values in various business sectors, as set out in the Best REference (BREF) documents.

The United States Clean Air Act (CAA) sets federal standards relating to air pollution from stationary and mobile sources, and establishes national emission standards for 200 hazardous substances, based in particular on Maximum Achievable Control Technology (MACT) standards.

European directive 2003/87/EC, as amended by European directive 2009/29/EC of 23 April 2009, established a greenhouse gas (GHG) trading system within the European Union. The Group has applied for EU quota allowances (EUAs) for phase III, which runs from 2013 to 2020. Four new sites have been added to the scope for the new phase. As the Group's sites belong to sectors and subsectors deemed to be exposed to a significant risk of carbon leakage, they will benefit from free EUAs based on their emissions performance in relation to relevant standards. Total annual allowances amount to 665,769 EUAs. The Group does not expect to have to make significant purchases of additional CO<sub>2</sub> allowances.

#### Preventive measures

The Group mitigates the environmental impact of its industrial sites by optimizing the use of raw materials, energy and natural

resources like water, thereby reducing emissions into the natural environment and other waste production. As part of this, the Group has developed a method for environmental analysis in order to characterize significant environmental aspects and impacts related to the activities of a given site and to implement the necessary corrective programs.

The Group also regularly upgrades its existing production units, by adapting processes to reduce waste volumes and installing waste treatment units, for example.

#### Emissions to air

The Group is committed to minimizing emissions of the most polluting compounds, particularly volatile organic compounds (VOCs), substances responsible for air acidification (nitrogen oxides and sulfur dioxide) and dust.

The Group's production facilities reduce VOC emissions in several ways, including:

- collecting and treating effluents containing VOCs (the most widely used technology is based on the installation of thermal oxidizers or vent scrubbing);
- conducting regular campaigns to locate leaks and eliminate any identified emissions.

#### FOCUS

Improvements in plant performance and treatment system reliability at the Changshu site in China helped to reduce VOC emissions by around 40% from 2014 to 2015.

The Group is also reducing its emissions of substances contributing to air acidification by:

- using fuels with low or very low sulfur content, or replacing fuel oil with natural gas, in its boilers;
- installing new low nitrogen oxide burner technologies.

#### Absolute emissions to air indicators

The table below shows emissions to air indicators for the Group's activities in 2015, 2014 and 2013, calculated in accordance with the methodology detailed in section 2.6 of this reference document.

Emissions to air	2015*	2014	2013
All substances contributing to acidification (t SO <sub>2</sub> eq.)	4,430	4,750	5,330
Carbon monoxide (CO) (t)	1,900	3,030	8,850
Volatile organic compounds (VOCs) (t)	5,010	4,600	4,460
Dust (t)	520	430	400

\* The figures for 2015, but not for 2014 or 2013, include data for Bostik sites.

In 2014 and 2015, a number of Group sites took measures to reduce emissions of substances contributing to air acidification. Significant reductions were achieved by investments in boilers at some sites, involving either conversion from fuel oil to natural gas (La Chambre, France), or new emission treatment equipment (Carling, France). The fall in these emissions in 2015 is explained mainly by new operating procedures at the reconfigured Lacq site (France) following start-up of the Lacq 2014 project in late 2013, work to cut down flare gas burn-off at the Beaumont site (United States) and optimized boiler operation in favor of natural gas at the La Chambre site (France).

The reduction of around 1,100 tonnes in carbon monoxide (CO) emissions from 2014 to 2015 arises from changes at the Parentis site (France), which will come under further analysis in 2016. The significant reduction in CO emissions, of approximately 5,100 tonnes from 2013 to 2014, is related to the shutdown of activities at the Chauny site in France.

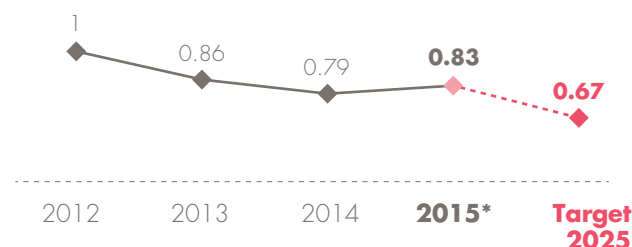
The rise in emissions of VOCs from 2014 to 2015 arises primarily from the consolidation of Bostik, acquired in early 2015. Progress in reducing VOC emissions at the Parentis and Changshu sites is offset by emissions arising from certain production increases at the Hengshui site. A significant increase in VOC emission figures for the Hengshui site in China, acquired in 2012, was seen as a result of improved reliability in data reporting in 2014. This apparent increase wholly offset improvements at other Group sites.

The increase in dust emissions seen in 2015 arises from the integration of Bostik, acquired in early 2015, and from more intensive operation of coal-fired boilers at the Hengshui site, coal being a traditionally important fuel in China. The investment in a new transportation system and a closed silo resulted in a reduction of five tonnes in dust emissions from the Changshu site in China from 2013 to 2014. Additional investments were made in late 2015, targeting further improvements in 2016.

#### Intensive indicator to air emissions

The diagram below shows the relative VOC emissions to air EFPI for the Group's activities in 2013, 2014 and 2015, calculated in accordance with the methodology detailed in section 2.6 of this reference document. Emissions from the largest VOC emitters among the Group's sites used for these computations account for over 80% of the Group's emissions.

#### VOC EFPI



\* The figures for 2015, but not for 2014, 2013 or 2012, include data for Bostik sites.

After major improvements in 2013 and 2014, VOC emission levels in 2015 reflect inclusion of data from the Hengshui, China site and Bostik sites in the indicator. Action plans are underway to improve performance through to the 2025 target date.

**The results achieved in recent years confirm the Group's confidence in its continuous improvement dynamic, and for 2025 the objective is to reduce VOC emissions by 33% compared to 2012 levels.**

#### Emissions to water

Reducing emissions to water is one of the Group's main environmental objectives. Particular attention is being paid to the issue of effluents with high chemical oxygen demand (COD), and to the discharge of suspended solids.

The Group conducts many actions to minimize its emissions to water. In particular, it systematically treats effluents to reduce high COD and suspended solid contents through measures such as:

- building its plants on inter-company platforms equipped with treatment units;
- gradually installing physico-chemical or biological treatment units to treat effluents on remote sites;
- optimizing treatment at effluent plants or more effectively controlling the effluents sent for treatment.

The Group also uses original water treatment techniques such as phytoremediation and phytodepuration, which are natural purification systems that reproduce the ecological balance of aquatic environments and wetlands. This kind of system is used at the Boretto site in Italy. This natural treatment reduces CODs and surfactants in the waste water.

### Extensive indicators to water emissions

The table below shows quantified emissions to water environmental indicators for the Group's activities in 2015, 2014 and 2013, calculated in accordance with the methodology detailed in section 2.6 of this reference document.

Emissions to water	2015*	2014	2013
Chemical oxygen demand (COD) (t O <sub>2</sub> )	3,200	3,870	3,800
Suspended solids (t)	870	3,030	2,950

\* The figures for 2015, but not for 2014 or 2013, include data for Bostik sites.

The integration of Bostik has no significant impact on these figures.

In the last few years, several initiatives have helped reduce COD emissions from certain sites. At the Carling site in France, improvements to a sensitive stage of the production process on an acrylate production unit, combined with the improved technological reliability of the equipment, helped significantly decrease the unit's COD discharges of the site in 2014.

The progress in 2015 arises from improved calculation methods at the Calvert City site in the United States, and improved operation of treatment techniques at the Rio Claro site in Brazil and the Spinetta site in Italy.

From 2013 to 2014, the Group's overall COD discharge increased despite the actions undertaken to decrease it. The rise is mainly a result of changes in the conditions for producing organic peroxides in Europe. The new processes optimize the consumption of raw materials and energy but gave rise to an increase of two thirds in COD emissions from this activity in 2014. The Group is studying ways to optimize its processes by recycling its liquid waste with the long-term objective of bringing COD emissions from this activity back to 2013 levels.

The significant fall in the suspended solids discharge indicator is explained by progress at the Pierre-Bénite site in France.

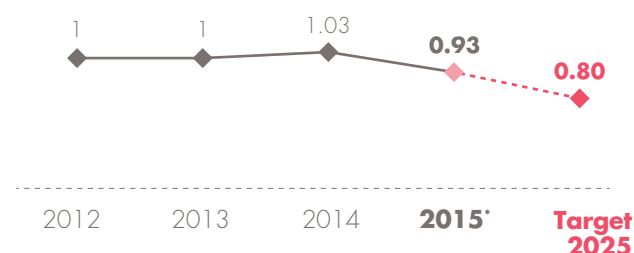
### FOCUS 90%

reduction in suspended solids was achieved by the Pierre-Bénite site in France in 2015, following installation of a wastewater treatment plant in late 2014.

### Intensive indicator to water emissions

The diagram shows the relative COD emissions to water EFPI for the Group's activities in 2013, 2014 and 2015, calculated in accordance with the methodology detailed in section 2.6 of this reference document. Emissions from the largest COD emitters among the Group's sites used for these computations account for over 80% of the Group's emissions.

### CHEMICAL OXYGEN DEMAND (COD) EFPI:



\* The figures for 2015, but not for 2014, 2013 or 2012, include data for Bostik sites.



Improved extensive value results contributed to a drop in the intensive indicator figure in 2015. In January 2016, the Group decided to run a water management project with a view to stepping up progress on this point through continuous improvement.

The Group has decided to adjust only the date for reaching the objective pending the results from this project.

**The Group's 2025 target is to reduce COD emissions, expressed in EFPI terms, by 20% compared with 2012.**

### Waste production

Waste production is inherent to the industrial activities of the Group, which nevertheless endeavors to control waste production at all stages in its activities.

This commitment is reflected in a number of areas:

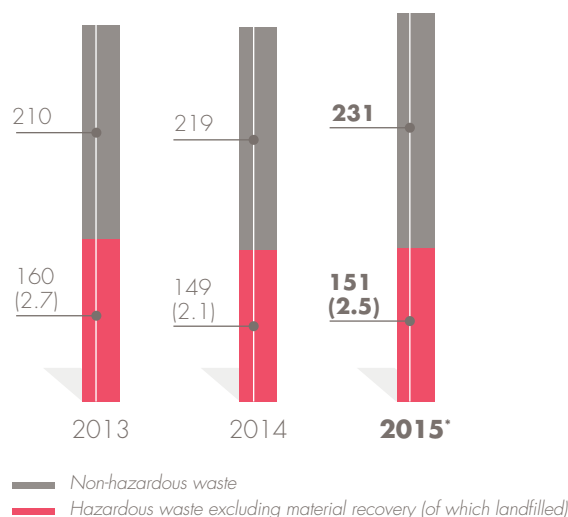
- reducing waste at the source, by designing products and processes that generate as little waste as possible;
- valorization of by-products to prevent them from becoming waste;
- using waste for energy recovery, whenever possible.

Recent years have seen various examples of progress in waste reduction and utilization in line with the Group's commitments, such as:

- research into new ways to valorize and reuse waste, using, for example, certain types of waste as replacement fuels in boilers instead of conventional fuels;
- a process for recycling cleaning solvents and optimizing cleaning cycles;
- installation of filters to reduce the volume of sludge.

The diagram hereafter shows the amounts of hazardous and non-hazardous waste generated by the Group's activities in 2015, 2014 and 2013, calculated in accordance with the methodology detailed in section 2.6 of this reference document.

Waste (in kt per year)



\* The figures for 2015, but not for 2014 or 2013, include data for Bostik sites.

In 2015, rising waste figures resulting from integration of the Bostik sites acquired in early 2015, and the inclusion of new production sites, with start-up of the Kerteh complex in Malaysia and the acquisition in Taixing in China, were very largely offset by site optimization efforts and by the use of a by-product as fuel at the Carling site in France.

In 2014, the shutdown of activities at the Chauny site made a significant contribution to the reduction in the tonnage of hazardous waste and offset increases related to the start-up of certain new units.

The Group's objective is not only to reduce its overall waste production, but also to recycle waste or recover its energy potential through combustion. Accordingly, in 2015, 15% of hazardous waste produced by the Group worldwide was recycled on or off the site at which it was produced, and 47% was used for energy recovery by combustion.

The table below shows the quantities of hazardous waste that was either recycled or used for energy recovery by combustion in 2015, 2014 and 2013, calculated in accordance with the methodology detailed in section 2.6 of this reference document.

Hazardous waste (kt per year)	2015*	2014	2013
Waste recycled into materials	26	29	26
Waste used for energy recovery by combustion	84	79	88
Total waste (including recycled into materials)	177	178	186

\* The figures for 2015, but not for 2014 or 2013, include data for Bostik sites.

The increase in the amount of waste used for energy recovery in 2015 arises mainly from the inclusion of Bostik data.

The reduced tonnage for waste burned for energy recovery in 2014 is chiefly the result of the shutdown of activities at the Chauny site.

Under applicable regulations, many by-products of manufacturing processes are sold as products rather than being declared as waste.

### Other pollution

A major focus of the Group's environmental policy is how pollution from its activities might affect people living near its industrial sites. Every year, work is undertaken to reduce this pollution, with examples including:

- odor reduction through incinerator upgrades that cut down SO<sub>2</sub> emissions;
- noise reduction through improved acoustic protection devices of air compressors;
- visual pollution reduction by replacing fuel oil with gas in boilers.

The Group has put in place real-time communication with its stakeholders on any event with a sound, visual or odor impact outside the boundaries of its industrial sites. Most sites now also have a system for receiving and processing complaints from local residents so that they can address the issues and minimize the nuisance where possible. Complaints are investigated and action plans defined accordingly in liaison with local authorities, as it was the case at the Lacq site in France in 2015.

#### 2.2.1.3 RESOURCE MANAGEMENT

Reducing the environmental impact of the Group's industrial sites also involves optimizing the use of raw materials, energy and natural resources such as water.

New manufacturing units incorporate environmental footprint consideration into the choice of processes and equipment from the design phase.

The Group also regularly improves operating conditions and makes development investments to reduce site consumption of water, energy resources and raw materials.

### Water consumption

The Group uses water in its industrial activities for:

- its manufacturing processes as reaction media, the cooling of production facilities and the cleaning of products and equipment;
- the production of steam;
- the use of hydraulic barriers for treating groundwater contaminated by historical pollution (at old sites, for example).

In a drive to optimize fresh water consumption, be it surface water or groundwater, the Group is changing its production practices, using systems for reducing water consumption, and developing closed circuits. Specific actions cover a wide variety of topics, including improved monitoring of consumption, installation of flowmeters, introduction of leak detection programs, changing of technologies, upgrading of fire-fighting circuits, recovery of rainwater, and recycling of water from scrubbing or boiler condensates.

#### FOCUS 2 million M<sup>3</sup>

The Memphis site in the United States decreased its water consumption by 2 million cubic meters from 2013 to 2015, following installation of a new cooling tower in late 2013. This is equivalent to the average annual water consumption of 13,000 families.

The table below shows environmental indicators corresponding to water withdrawn by the Group in 2015, 2014 and 2013, calculated in accordance with the methodology detailed in section 2.6 of this reference document.

Use of water	2015*	2014	2013
Total water withdrawn (million M <sup>3</sup> )	124	120	130

\* The figure for 2015, but not for 2014 or 2013, include data for Bostik sites.

The increase in the amount of water withdrawn in 2015 arises from integration of new production sites such as Kerteh in Malaysia and Taixing in China, and from pumping requirements at the Pierre-Bénite site in France. The inclusion of Bostik sites had no significant impact on this indicator.

In 2015, the Group investigated accessibility to water at its sites. It found that 9% of its sites worldwide were located in water-stress areas. This initial analysis strengthens the Group's decision to set up a Water project in 2016, with the purpose of listing the sites concerned by water-stress problems and drawing up an action plan accordingly.

### Consumption of raw materials

The Group wants to be a contributor in optimizing the consumption of non-renewable raw materials used in its manufacturing processes.

Optimization is sought by economizing raw materials through process control and by developing better operating practices.

To optimize its own and its customers' raw material consumption, the Group develops independently and with suppliers on such initiatives as recycling reaction solvents used in manufacturing, and offers to recycle spent activated carbon for customers.

The Group is also developing the use of renewable raw materials, and bio-based materials in particular, for use in production. The Group is the world's largest producer of specialty polyamides derived from castor oil. As well as being the world's only producer of polyamide 11, it also produces polyamides 10.10 and 10.12, using sebacic acid as the raw material. In 2015, the Group's new thiochemicals complex in Malaysia began supplying the Group's partner CJ CheilJedang (CJ) with a sulfur-based intermediate, methyl mercaptan, for the production of methionine using an innovative bio-based process.

Details on the use of renewable raw materials are given in section 2.3.4 of this reference document;

### Energy consumption

The Group uses various energy sources, most significantly in its industrial activities. With a view to optimizing energy use, **the Group has set an objective of reducing its energy consumption by an average of 1.5% per year over the 2012 to 2020 period and of 1% per year through 2025.**

To this end, the Group is rolling out Arkenergy program in all its subsidiaries through a network of Energy Leaders in businesses, facilities and the relevant procurement and technical departments. It focuses on the optimization of energies used in the Group's production facilities and processes, which account for 97% of the Group's overall energy consumption. The program's main priorities are:

- continuously seeking to optimize the consumption and cost of energy, from equipment design and procurement through to day-to-day operations in the Group's facilities;
- developing an energy management system to systematically embed best operational practices, define site-specific targets and periodically review them;
- complying with laws, regulations and other applicable requirements on energy efficiency.

As well as improving energy efficiency, the Arkenergy program also helps to enhance the competitive performance of the Group's industrial sites.

Since the Arkenergy program was strengthened in 2014, it has focused primarily on:

- rollout of energy efficiency evaluations worldwide, focusing on the facilities with the highest net energy purchase demands. The Group has begun or completed a total of 62 energy efficiency evaluations (including 37 in 2015), with 46 in Europe, 14 in North America and 2 in China. The facilities evaluated account for 67% of the Group's overall energy consumption;

- implementation of ISO 50001 as the energy management system in Europe and Asia. By the end of 2015, 17 Group sites had been ISO 50001-certified in Europe and 14 had begun the process, including 11 in Europe;
- allocation of a corporate capital expenditure budget specifically for initiatives under the Arkenergy program. In 2015, 42 capital projects were funded by this central Group budget, with 23 in Europe, 12 in America and 7 in Asia. In 2015, the total savings expected as a result of these investments are estimated at around 82 GWh on an annualized basis.

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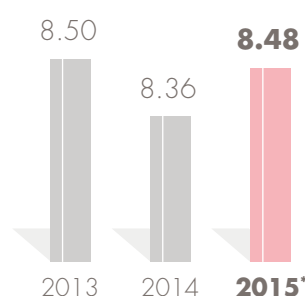
At the Shanghai site in China, patented advanced technology brought energy savings of 15% compared to the previous situation.

Investment at the Clear Lake acrylics facility in the United States minimized energy consumption of the facility's cooling water network, and at the Carling site in France, substantial energy savings were achieved by fitting a condensate recovery system.

Bostik was included in the Arkenergy program in 2015, and has defined the target of reducing its net energy purchases in line with the Group's objective of 1.5% per year. Rollout of the program has begun, and the initial investments made accordingly. Five energy efficiency audits have been carried out already.

#### Extensive indicator for energy purchases

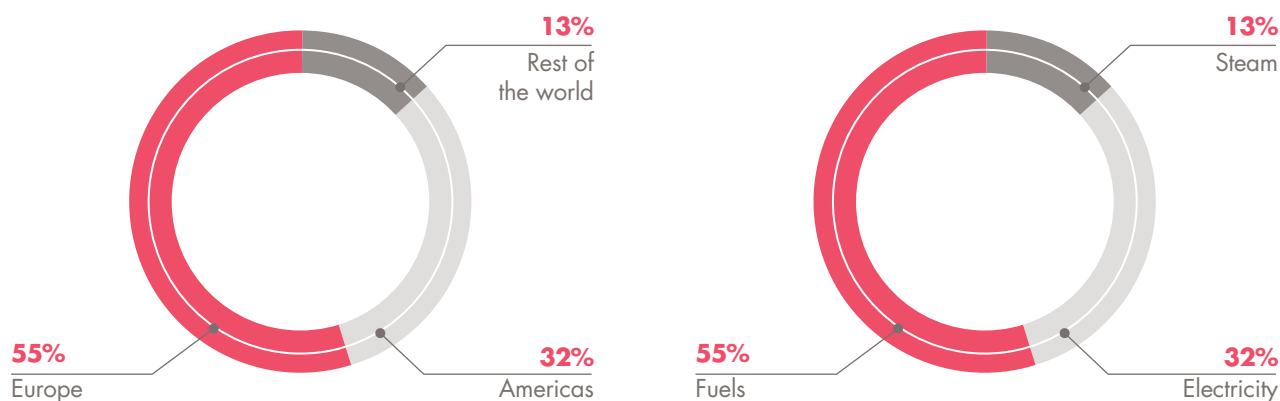
The diagram below shows the Group's net energy purchases in 2015, 2014 and 2013, calculated in accordance with the methodology detailed in section 2.6 of this reference document.



\* The figures for 2015, but not for 2014 or 2013, include data for Bostik sites.

Under the same reporting scope as 2014, net energy purchases in 2015 were 8.14 terawatt-hours (TWh).

Net energy purchases by region and by type of energy break down as follows:



89% of the terawatt-hours purchased in the fuels category result from natural gas.

17% of net purchases of terawatt-hours by the Group, all sources of energy combined, result from low-carbon emission electricity.

#### Intensive indicator for energy purchases

The table below shows the intensive net energy purchase EFPI for the Group's activities in 2013, 2014 and 2015, calculated in accordance with the methodology detailed in section 2.6 of

this reference document. Net energy purchases are calculated using the Group's biggest net energy purchasers, which account for more than 80% of the Group's total purchases.

Net energy purchases	2015*	2014	2013
Net energy purchases EFPI	0.98	0.99	1.02

\* The figures for 2015, but not for 2014 or 2013, include data for Bostik sites.

**The Group targets an average reduction of 1.5% per year in net energy purchases expressed in relative values (EFPI) from 2012 to 2020 and of 1% per year through to 2025.**

#### Land use

The Group seeks to minimize its footprint and use of land.

The first type of actions it uses to do so is soil remediation, where the Group is developing new techniques that stimulate bacteria naturally present in the soil to help with the degradation of chlorinated solvents remaining from past activities, as is the case at the Saint-Auban and Mont sites in France. The operations undertaken at the Mont site produced conclusive results and continued in 2015 following approval from the authorities. This program has built up to semi-industrial scale and should be extended for wide-scale use in 2016, under conditions set by a regional government decree, for treatment of groundwater at the Mont site.

Some of the Group's industrial sites, particularly those with a long history of manufacturing activity, have been (or are still)

responsible for polluting the soil or groundwater. Actions taken to manage this historical pollution are described in section 2.2.1.6 of this reference document.

The second type of action conducted by the Group concerns the management of sections of some of its sites which are not or no longer occupied by production units, in order to encourage the development of certain animal species. Some of these actions are described in section 2.2.1.5 of this reference document on biodiversity.

The last type of action concerns the regulatory restoration of Group subsidiary CECA's after usage diatomite quarries in Virargues and Saint-Bauzile, France. Following partial backfilling of the quarry sections that are no longer in use, remediation work was completed with a final backfill and the addition of a layer of topsoil to the remodeled land. Two regional government decrees determined the end use of these sites, with the Saint-Bauzile site being converted into natural, ecological parkland, and the Virargues site into agricultural use and parkland.



## 2.2.1.4 CLIMATE CHANGE

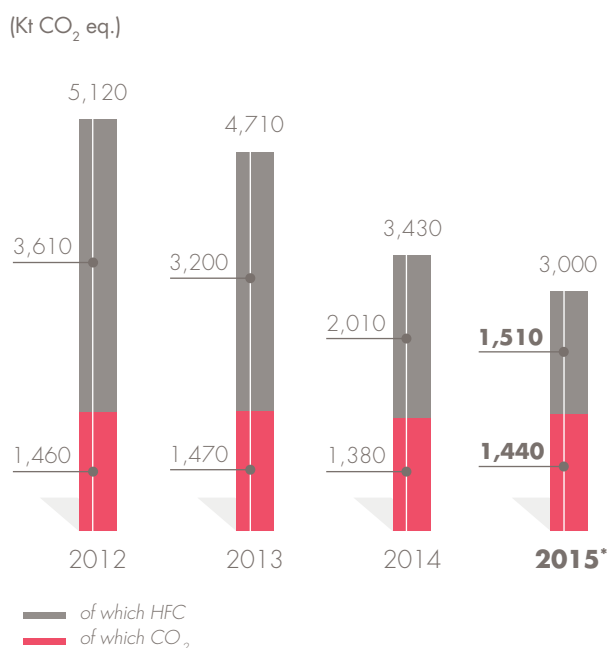
### Direct greenhouse gas emissions

The Group's direct emissions to air, known as Scope 1 greenhouse gas (GHG) emissions, arise from:

- operations requiring energy (burning of fuel oil and gas);
- emissions from processes that generate carbon dioxide (CO<sub>2</sub>), nitrous oxide (N<sub>2</sub>O) or methane (CH<sub>4</sub>) as a product, by-product, co-product or waste, and gas discharges as produced by processes such as thermal oxidation, which converts volatile organic compounds (VOCs) into CO<sub>2</sub>;
- hydrofluorocarbon (HFC) emissions from its production units for these products;
- fugitive emissions from cooling circuits using GHGs.

### Extensive indicator for direct greenhouse gas emissions

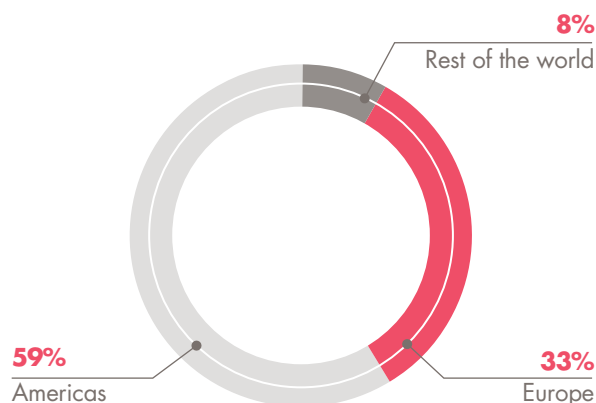
The diagram below shows quantified direct GHG emissions to air generated by the Group's activities in 2015, 2014 and 2013, calculated in accordance with the methodology detailed in section 2.6 of this reference document.



\* The figures for 2015, but not for 2014, 2013 or 2012, include data for Bostik sites.

The figures for 2015 include data for Bostik sites, the emissions from which are very low, corresponding to about 1% of total direct GHG emissions across all Group sites.

These direct GHG emissions, expressed in kilotons of carbon dioxide equivalent (kt CO<sub>2</sub> eq.), break down by region as follows:



The Arkema Group is taking actions to fight climate change by reducing GHG emissions from its production units.

To reduce its impact on global warming, the Group has undertaken a number of actions and deployed effective measures to minimize direct GHG emissions, including:

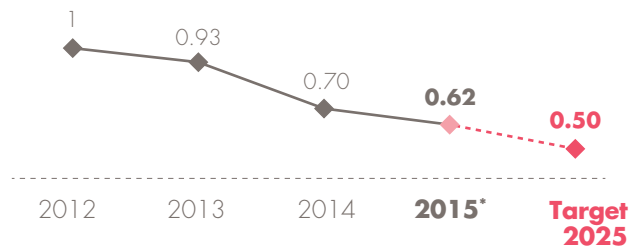
- replacing boilers with more efficient equipment and undertaking work on steam traps and steam circuit insulation at a number of sites under the Arkenergy program (see section 2.2.1.3 of this reference document);
- replacing air-conditioners and cooling units with more efficient models, as well as carrying out enhanced preventive maintenance work, which have helped reduce emissions from this type of equipment;
- installing systems for site emissions treatment, notably at Calvert City, USA, Pierre-Bénite, France and Changshu, China.

In 2013, the Calvert City site in the United States made a major contribution to lowering GHG emissions. In 2014, additional investment at this site brought further reductions of 1.2 Mt CO<sub>2</sub> eq. in site GHG emissions.

The sites contributing most to the fall in GHG emissions in 2015 are Calvert City in the United States (reduction of 275 kt, benefitting from a full year of the investments made in 2014), Zaramillo in Spain (reduction of 150 kt from plant closure), and Changshu in China (reduction of 130 kt from improved incinerator reliability).

**Intensive indicator for direct greenhouse gas emissions**

The diagram below shows the direct GHG emissions EFPI for the Group's activities from 2012 to 2015, calculated in accordance with the methodology detailed in section 2.6 of this reference document. Emissions from the biggest GHG emitters among the Group's sites used for these calculations account for over 80% of the Group's emissions.



\* The figures for 2015, but not for 2014, 2013 or 2012, include data for Bostik sites.

The Group's 2020 target of reducing direct GHG emissions by 30%, compared with 2012, was achieved in 2014, largely due to the investments made at the Calvert City site in the United States. The progress achieved in 2015 reflects the Group's dynamic on this matter and the effectiveness of its action plan, which extends to all sites.

**The Group's new target for 2025 is to reduce GHG emissions, expressed in EFPI terms, by 50% compared with 2012.**

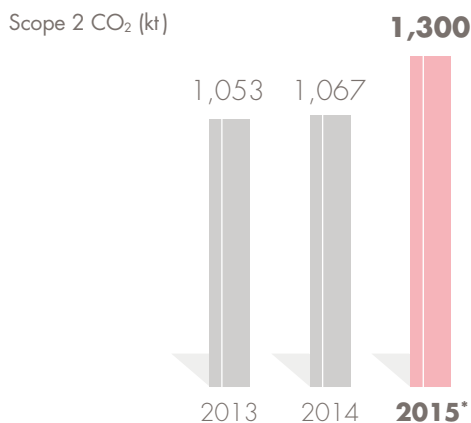
**Indirect greenhouse gas emissions**

The Group analyzes the following indirect GHG emissions:

- Scope 2 CO<sub>2</sub> emissions, related to the production by suppliers of the electricity and steam purchased by the Group;
- Scope 3 CO<sub>2</sub> emissions, resulting from the transportation of all Group products.

The table below shows Scope 2 and Scope 3 CO<sub>2</sub> emissions, as defined above, for the Group's activities in 2015, 2014 and 2013, calculated in accordance with the methodology detailed in section 2.6 of this reference document.

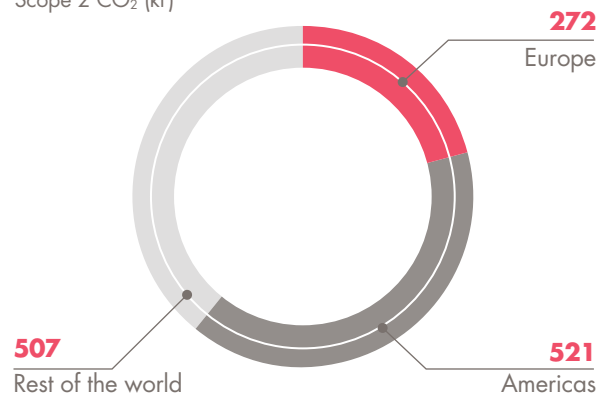
Scope 2 CO<sub>2</sub> emissions break down as follows:

**INDIRECT GREENHOUSE GAS (GHG) EMISSIONS**

\* In 2015, figures include data for Bostik sites. 2014 and 2013 exclude Bostik.

**INDIRECT GHG EMISSIONS BY REGION**

Scope 2 CO<sub>2</sub> (kt)



The rise in Scope 2 CO<sub>2</sub> emissions from 2014 to 2015 results from the inclusion of the Taixing facility in China and the Bostik sites.

The Group implements a range of actions to reduce Scope 2 CO<sub>2</sub> emissions under its Arkenergy program (see section 2.2.1.3 of this reference document) and its operational excellence strategy (see section 1.6.1 of this reference document).

In 2015, Scope 3 CO<sub>2</sub> emissions resulting from the transportation of all Group products are estimated at around 0.2 million tonnes (to within 20%). This breaks down as 175,000 tonnes across the Group's pre-2015 consolidation scope and 35,000 tonnes for Bostik.

The typology of Group shipments (excluding Bostik) as set out in the 2014 reference document did not change significantly from 2014 to 2015.

For Bostik, around 90% of emissions arise from non-bulk road transportation, compared with 30% for the rest of the Group. This difference in product transportation typology is explained by the fact that Bostik production sites tend to be located closer to their customers.

### Adapting to the extreme consequences of climate change

The Group operates a number of sites in Asia and in the United States, in particular near the Gulf of Mexico, that can experience extreme weather events such as tornadoes, tropical cyclones (typhoons, hurricanes), and flooding. The frequency and intensity of such events could be exacerbated by climate change.

The Group pays particular attention to the potential consequences of these extreme weather events, notably through analyses when acquiring new businesses. Where the potential climate impact is regarded as liable to have a particular incidence on personal safety or on the economic aspects of the acquisition, it may be the subject of a specific study by third-party experts.

When designing new production units, the Group applies the HAZard IDentification (HAZID) method to take account of the impact of external events, like natural disasters, on the mechanical strength of the construction.

The standards used for the construction of the Group's facilities comply with local regulations and data. Facility design therefore takes into consideration data on extreme wind speeds and flood risks (100-year floods) for the sites housing the new units.

Measures taken to protect sites that are potentially subject to such extreme events include installing raised units and control rooms, earth-filled dams and concrete walls around storage facilities.

Responses to these events are described in emergency response procedures for potentially impacted sites. In all cases of alert, sites comply with instructions from the authorities.

Emergency facility shut-down and protection procedures are applied to minimize the risk of chemical substances escaping into the environment when these extreme events occur.

Stocks of some products are also maintained in external storage facilities that are not at risk of impact in order to prevent supply shortages to the Group's customers.

The Group also indicates the exposure of its sites in some regions that are particularly exposed to these types of events. Extreme weather events do not include seismic risks, as described in section 1.7.2.3 of this reference document.

Twenty-one Group sites are exposed to the risk of severe storms (tornadoes and cyclones) and flooding, eleven of which are on the American continent and ten in Asia. This data is based on the 2015 update of reports compiled by the Group's property damage insurers and information on climate-related risks provided by a reinsurance company. These figures include three Bostik sites in Asia, not included in 2014.

The actions taken seek to reduce each site's emissions to water, soil, and air. Periodic environmental analysis is carried out at each site to identify its impact on the environment, identify the species liable to be concerned, define priority focuses for action plans on environmental protection, and measure the progress achieved. Additionally, new manufacturing units are designed to incorporate environmental footprint considerations into the choice of processes and equipment.

Actions conducted by the Group, including those required by applicable regulations, have succeeded in:

- reducing chemical oxygen demand (COD) in the effluents discharged into rivers, in order to preserve the dissolved oxygen gas that is essential to all aquatic life;
- reducing the amount of volatile organic compounds (VOCs) emitted into the air (under the 2014 reporting scope), to limit the formation of ground-level ozone, a super-oxidant harmful to flora and fauna;
- reducing the amount of sulfur dioxide (SO<sub>2</sub>) and nitrogen oxide (NO<sub>x</sub>) emissions (under 2014 reporting scope), to help prevent the formation of acid rain which, in addition to its direct effect on plant life, can also alter soil characteristics.

The Group has also acted within the framework of soil remediation laws and regulations to protect various species that depend on the soil or groundwater at sites with long-standing industrial activities.

### Measures to develop biodiversity

Despite occupying only a limited amount of land, the Group conducts a number of actions in Europe to contribute, at its level, to the development of biodiversity on sites where part of the land is not allocated to industrial activities. One of the purposes of these actions is to encourage the return of local species of plant life at, or in the vicinity of, the Group's industrial sites.

In France, rehabilitation and ecosystem restoration work has been carried out at several sites, including Pierre-Bénite (reed bed restoration and installation of flower meadows and pools to replace old buildings), Carling (ecology-focused rehabilitation of a former wastewater treatment lagoon), Saint-Bauzile and Virargues (quarry rehabilitation compliant with regulatory framework, then top-soiling to allow the return of local plant life).

In Italy, the Group tends hundreds of olive trees in the grounds of the Gissi site, thus helping to safeguard the plant and animal ecosystem in the vicinity of the facility.

## 2.2.1.5 PROTECTION OF BIODIVERSITY

### Measures to protect flora and fauna, and biodiversity in general

Protection of biodiversity involves protection of all flora and fauna species liable to be impacted by emissions due to the Group's activities.

### 2.2.1.6 MANAGEMENT OF HISTORICAL POLLUTION AND RELATED PROVISIONS

Some Group industrial sites, particularly those with a long history of manufacturing activity, have been (or still are) responsible for polluting the environment, particularly the soil or groundwater. Due to this, a number of sites that are (or were) operated by the Group, sites sold by the Group, adjoining sites and sites where the Group stored waste or had waste eliminated have been (or still are, or could later be) subject to specific demands for remediation from the relevant authorities.

Where there is a probable soil or groundwater contamination on a site, inquiries are launched to establish the extent of the area concerned and ascertain whether the pollution is likely to spread. The Group cooperates with the authorities to define appropriate measures when an environmental or health risk is identified.

The amount of provisions for environmental risk at 31 December 2015 is provided in note 20.3 to the consolidated financial statements in section 4.3.3 of this reference document.

## 2.2.2 Managing products responsibly (product stewardship)

### 2.2.2.1 POLICY AND GENERAL ORGANIZATION

The Group works to market products that are safe and useful to society and do not harm human health or the environment.

To do this, the Group relies on an organizational structure, teams of experts, IT resources and databases that enable it to meet regulatory requirements on product safety.

Product stewardship requires continuously improving knowledge of product characteristics and usages. Accordingly, the Group has for many years relied on a team of expert toxicologists and ecotoxicologists, who conduct product hazard studies and work closely with regulatory experts on risk assessments in normal conditions of use.

The Group expresses its commitment by complying with REACH, the European regulation covering registration, evaluation, authorization and restriction processes for chemical products. REACH is a highly ambitious regulation that aims to make in-depth changes to the management of chemical substances that are produced, imported and sold on the European market, by improving knowledge, analyzing environmental and health risks and defining measures to manage potential risks resulting from their manufacture or use. The Group endorses the objectives of REACH, which represents an additional means of continuously improving knowledge of its substances and their safe use and thus meets the legitimate expectations of civil society.

To carry out the work necessary for full compliance with REACH's many obligations, the Group has set up a project structure overseen by a steering committee at the Executive Committee level. The main competence is centralized at the Group level within the Product Safety and Environment department, which oversees product-related health, safety and environment matters and regulatory implications and has a team of experts in toxicology, ecotoxicology and regulations. These experts ensure the implementation of the REACH regulations by drawing on a network of correspondents that take part in drafting parts of the cases that concern business units, industrial sites, subsidiaries and R&D, for operational aspects; and the Procurement, IT, Legal, and Communication departments, for corporate issues. This

organizational structure has enabled the Group (including Bostik) to fulfill the following requirements of the REACH regulation:

- **Registration:** A total of 277 substances had been registered with the European Chemicals Agency (ECHA) by the first two registration deadlines, on 30 November 2010 and 31 May 2013 (2015 scope of business). The Group has already begun the substance registration process for the 2018 deadline. The Group plans to register 430 substances in all, and around ten of these are liable to require authorization. This figure was adjusted following the two previous registration stages and completed, on the basis of a survey to examine forthcoming developments in the business units' portfolios. The Group estimates that compliance with this new regulation will cost around 25 million euros over the period 2016-2020.
- **Evaluation:** The Group is involved in eight cases for which the evaluation has now been completed. They pertain to seven substances manufactured by the Group: carbon tetrachloride (CTC), which was manufactured until 1 July 2012 then used at the Mont site in France; diphenyl guanidine (DPG), for which the Group is acting as leader for the registration case; methyl chloride, which is manufactured at the Jarrie site in France; butyl acrylate, made at the Carling site in France; isophorone, made at the La Chambre site in France; tert-butyl perbenzoate, made at the Guntzbourg site in Germany; and propoxylated bisphenol A (BPA), made by CECA in Belgium. They also concern another substance, bisphenol A (BPA), used by the Arkema Group as a raw material and currently the subject of European risk studies and national bills, particularly concerning its use in materials in contact with foodstuffs.

At this stage, the decisions received from the European authorities on CTC, DPG, methyl chloride, butyl acrylate, isophorone, tert-butyl perbenzoate and propoxylated BPA go no further than requiring additional tests and risk assessments. On the other hand, BPA, and indirectly its derivatives, may be subject to restriction measures in certain markets, particularly the food market. French Act No. 2012-1442 of 24 December 2012 suspended, as from 1 January 2013, the manufacture, import and sale on the market of any packaging, container or utensil containing BPA and entering directly in contact with

foodstuffs for babies and small children. This ban was extended to all categories of people on 1 January 2015. The Group has little exposure to the market for food containers, and is working closely with its customers to substitute BPA-derived products. Five cases were evaluated in 2014 and six were undergoing evaluation in 2015. They concern ten substances produced by the Group (methyl methacrylate, 2-ethylhexanol, dimethyl disulfide, trimethylolpropane triacrylate, sodium perchlorate, 1,2,4-triazole, dicumyl and tert-amyl peroxides, [1,3(or 1,4)-phenylenebis(1-methylethylidene)]bis[tert-butyl] peroxide and the quaternary ammonium compounds, di-C16-18-alkyldimethyl, chlorides, plus one substance, nonyl phenol, used by the Group as a raw material. Draft decisions on the five substances evaluated in 2014 suggest that additional risk data is needed before final decisions can be made on the need for European measures (except for 2-ethylhexanol, for which the existing data would appear sufficient).

- **Authorization:** In terms of registering substances on the candidate list, the Group follows the proposals for registration and responds to consultations organized by ECHA for substances whose uses may be subject to authorization (note that substances used as synthesis intermediates are not subject to authorization). The potential implications are estimated then actions decided, such as a study of alternative substances for the intended uses, an application for authorization when falling under Annex XIV, unit conversion or planned cessation of the activity. At 31 December 2015, the industry candidate list contained 168 substances. These substances include: (i) hydrazine produced at the Lannemezan site in France, (ii) 2-imidazolidinethione (ETU) produced by MLPC, (iii) nonylphenol ethoxylates produced by CECA, (iv) dioctyltin bis (2-ethylhexyl mercaptoacetate) produced at Vlissingen in the Netherlands on behalf of another company, and (v) sodium dichromate, used as a processing aid at the Jarrie site in France. Sodium dichromate is registered under Annex XIV; in November 2015 the Group filed an application to have it authorized, as the search for an alternative solution has not yet been successful.
- **Restriction:** Cobalt chloride is expected to go from a recommendation for registration under Annex XIV with a view to authorization, to a recommendation for restriction that would in theory only target metal coatings. This application does not concern the Group, which uses it as a processing aid at the Jarrie site in France. Nevertheless, pending a formal proposal for restriction and as a precautionary measure, the Group is studying a substitute solution. For perfluorooctanoic acid (PFOA) and its salts, a draft restriction seeks to limit the PFOA concentration in products and articles. This concerns certain grades of the Group's PVDF, but because of its 2006 commitment to find alternatives for this kind of surfactant, and discontinue use on 31 December 2015, this restriction should not impact the Group.

The Group does not manufacture any persistent organic pollutants (POPs).

The Group discontinued production of diethyl hexylphthalate (DEHP) in the first quarter of 2014, and shut down the Chauny site in France, where DEHP was made, in the same year. For this product, an authorization process is underway with registration under Annex XIV of the REACH regulation and under various national regulations restricting its use owing to suspicions that it might cause disturbances to the endocrine system. The Group does not make or sell bisphenol A (BPA), but uses it as a raw material for making other products.

Outside Europe, the Group markets its chemicals in accordance with national and regional mandatory inventories, where relevant. Due to its history and global presence, the Group has products that are already notified in many inventories. Should a need arise for a new product notification, the Group has a major database on the characteristics of its products enabling it to file dossiers in a timely manner. Notifications are executed thanks to the work of experts at the Group level who rely on product HSE managers in country subsidiaries and/or a network of local specialist consultants. These experts are in constant contact within their own network. Every year, a seminar is held over several days in Asia devoted to discussions between product HSE managers in the Asian subsidiaries and their head office and American contacts. Country-specific product HSE roadmaps are decided during this seminar depending on changes in the local situation and regulations.

In 2015, three new sets of regulations similar to REACH were put in place in Asia (in South Korea, Taiwan and Turkey) concerning the obligation to register existing substances. And, in Malaysia and Turkey, rollout proceeded of the Globally Harmonized System of Classification and Labeling for Chemicals (GHS), set up by the United Nations Economic and Social Council.

In many countries, the Group records knowledge of product characteristics and usages in Safety Data Sheets (SDSs). SDSs are documents that are prepared in order to market chemical products classified as hazardous to human health or the environment. SDSs must contain prevention and safety data necessary for the use of a hazardous product. They are prepared in some forty languages using efficient IT infrastructure and information compiled from global databases grouping together all product compositions and their toxicological, ecotoxicological and physico-chemical data. This ensures information is consistent wherever the Group's products are marketed. The Group disseminates SDSs in accordance with regulatory requirements or makes them available on its website or via the online QuickFDS platform.

A combination of Group organization, allocated resources and motivated teams has enabled the release of extended safety data sheets (eSDSs, the latest format established by REACH), which now include a description of exposure scenarios for identified uses, thereby improving risk management.



The Group uses efficient IT systems to draft regulatory documents, and adapts them as required to include the latest formats and data. This is particularly true during implementation of the GHS, a common classification and labeling method, in participating countries.

The Group has also developed systems that use validated data from its central database to print labels to a consistent classification, regardless of the country in which the product is manufactured or marketed.

Thanks to its organization, scientific and regulatory expertise and expert teams assisted by efficient IT systems, the Group upholds its commitment to marketing chemical products in a safe and responsible manner over and above these regulatory requirements by informing its customers and the public in complete transparency.

#### 2.2.2.2 HEALTH, SAFETY AND ENVIRONMENT FOR CONSUMERS

Product stewardship goes beyond regulations by ensuring that products have no effect on people's health and safety or their environment. This approach involves every player in the product chain, from raw material suppliers to end customers. The Group works to market products that are safe and useful to society and do not harm the health, safety or environment of users and consumers. To this end, it takes actions that go beyond mere compliance with the regulations described in section 2.2.2.1 of this reference document, in line with the commitments set out in its Health, Safety, Environment and Quality Charter.

The Group has already demonstrated its commitment to product stewardship by endorsing the International Council of Chemical Associations (ICCA) Responsible Care® Global Charter as part of international projects, such as the High Production Volume (HPV) program led by the ICCA and the United States Environmental Protection Agency (EPA).

The Group has also extended its commitment by participating in the Global Product Strategy (GPS) program, which entails the creation of a dedicated web page and the regular publication of safety summaries on the ICCA website and its own website as and when REACH registration dossiers are filed. At end-2015, the Group had published 145 GPS safety summaries on its website (arkema.com) corresponding to finished products registered as part of REACH in 2010 or 2013.

In the interest of product stewardship of its own products, the Group goes beyond its regulatory obligations and supplies safety data sheets even for products that are not classified as hazardous.

The Group also carries out life cycle analyses (LCAs) to inform its customers of the environmental performance of certain products. LCAs are multi-criteria analyses that notably convert the full inventory of flows related to a product's production into environmental impacts.

The Group gives initial priority to LCAs for product ranges aimed at customers in industries that also use LCAs. This mainly concerns the Rilsamid®, Rilsan®, Pebax®, Kynar® and Forane® product ranges, as well as certain Bostik products.

These analyses are used to assess products' impacts in areas such as carbon dioxide emissions, ozone depletion potential, contribution to acidification, energy and water consumption, and land use during production.

The Group has developed in-house expertise at its Rhône-Alpes research center in France to help it apply this comprehensive approach, which has been recognized and standardized as part of customer relations.

The Group follows the recommendations of the International Reference Life Cycle Data System (ILCD) when conducting these analyses.

## 2.3 PLACE SUSTAINABLE DEVELOPMENT SOLUTIONS AT THE HEART OF THE GROUP'S INNOVATION POLICY AND PRODUCT RANGE

2

To address the major challenges of the future and contribute to sustainable development for the planet, the Group is committed to promoting the advancement and widespread use of environmentally sound technologies, and to developing an innovative range of technologies and products in the fields of new energies, climate change reversal, access to water, renewable raw materials, recycling and extended product lifespans. This proactive commitment is in line with the principles of the United Nations Global Compact and the Responsible Care® Global Charter, to which the Group is a signatory.

The Group develops new production processes and upgrades its manufacturing technologies to minimize the environmental risks arising from the activities of its industrial sites and the emission of potential pollutants.

These actions are outlined in section 2.2.1 of this reference document.

### FOCUS 61

In 2015, the Group filed 61 patents applications (including five from Bostik) for innovative solutions addressing sustainable development challenges. In 2014, 81 applications were filed. Since 2010, the average number is 60 per year.

### 2.3.1 Develop products for new energies

New energies are one of the Group's primary research areas. By proposing innovative solutions for new energies, the Group contributes to preserving the planet's fossil resources.

#### 2.3.1.1 CURRENT SOLUTIONS FOR SOLAR ENERGY AND ENERGY STORAGE

The Group develops and offers a range of solutions for the solar energy and energy storage markets that are crucial for discontinuous-flow alternative energies. In particular, the Group has developed applications for:

- lithium-ion batteries:
  - Kynar® PVDF, an excellent binder for battery electrodes and an excellent "separator" material (polymer film separating two electrodes),
  - polyamides used for forming batteries, multi-module assemblies and connector encapsulation;
- photovoltaic systems:
  - ethylene vinyl acetates (EVA), used as encapsulation materials for photovoltaic cells,
  - new Apolhya® resins, used for their high transmittance and UV resistance, in encapsulation and backsheet applications,
  - Kynar® PVDF, used along with other films for photovoltaic cell backsheets,
  - Bostik Vitel® polyester adhesives, used for binding backsheets (PVDF on PET). Some AEC Polymers adhesives are also used for binding cells in supports such as solar tiles.

### 2.3.1.2 NEW DEVELOPMENTS IN SOLAR AND WIND POWER AND ENERGY STORAGE

The Group is preparing for the future by developing new products for solar power, wind power and energy storage. Examples include:

- next-generation lithium salts, which are still at the experimental stage but should make lithium-ion batteries safer thanks to their thermal and chemical stability;
- Elium® thermoplastic composites, used for wind turbine blades.

The Group establishes partnerships with a variety of stakeholders as part of its research into how its existing and future products could potentially contribute to new energy applications. Since 2014, the Arkema Group and the Hydro-Québec utility's research

institute IREQ have been working together to develop a new, high-safety electrolyte using fluoride salts made by the Group, for use in electric batteries in cars and public transportation vehicles. In 2015, the Arkema Group and Hydro-Québec, Canada's biggest electricity producer, strengthened their partnership by founding a joint R&D laboratory specializing in energy storage. One of the missions of the new laboratory concerns the development of next-generation materials for making lithium-ion batteries.

The Arkema Group also participates in various projects led by ADEME, the French environment and energy management agency, such as the Isocel photovoltaic and Effiwind wind turbine projects, both of which have been selected for France's large-scale investment program, *Investissements d'avenir*.

## 2.3.2 Fight against global warming

The Group develops and manufactures technical products and solutions that contribute to reducing greenhouse gases (GHGs) and hence global warming. This is achieved by increasing the fuel efficiency of various means of transportation, decreasing the energy consumption of heating and cooling systems in the construction and public works industries, and providing alternative chemical substances with low global warming potential.

### 2.3.2.1 LIGHTER MATERIALS FOR TRANSPORTATION

The Group develops lightweight, resistant materials that can be used to reduce vehicle weight and, by extension, fuel consumption. In doing so, they also contribute to minimizing CO<sub>2</sub> emissions in the transportation sector.

The Group's main innovations in this area include:

- Altuglas® ShieldUp PMMA, a nanostructured resin used as a replacement for glass. Nanostrength® technology based on acrylic copolymers, which can organize themselves on a nanometric scale, increases the impact resistance of certain transparent polymers. Altuglas ShieldUp® technology is used in car windows as a replacement for glass and helps make vehicles lighter. A roof in Altuglas® ShieldUp instead of glass could result in a 0.4 liter decrease in fuel consumption per hundred kilometers and a 7 kilogram decrease in CO<sub>2</sub> over the same distance. Assuming that 100,000 vehicles driving 20,000 kilometers per year were equipped with this innovation, CO<sub>2</sub> emissions would be reduced by 140,000 tonnes per year;
- Rilsan® HT polyamide 11, used as a substitute for metal. This product, made from non-foodstuff vegetable raw materials, offers flexibility plus resistance to very high temperatures. It is used in the automotive industry to replace metal and rubber in

fluid pipes in the engine compartment. Six times lighter than steel and three times lighter than aluminum, it lightens vehicles and contributes to reducing fuel consumption and emissions;

- Kepstan® polyetherketone (PEKK), used as a substitute for metal in extreme conditions. PEKK is an ultra-high-performance polymer (the "extreme polymer"), with excellent mechanical properties and exceptional resistance to high temperatures (up to 260°C), chemical agents, abrasion and fire. These characteristics make it ideal for highly specialized applications, particularly offshore drilling and aerospace, where it replaces metal in fastening components, insulating parts and interior fittings;
- acrylic and polyamide thermoplastic composites, used to replace conventional composites. The Group launched its first line of liquid thermoplastic resins under the Elium® brand in 2014. These resins are made using the same equipment and processes as thermo-set composites. They offer a minimum 50% reduction in weight compared with parts traditionally made in metal, without compromising on strength. AEC Polymers and Bostik also supply adhesives for structural binding of composite materials;
- Bostik elastic adhesives, which are used for binding body panels and windows in industrial vehicles, such as coaches, buses and wagons. These semi-structural bonding techniques improve the torsional rigidity of vehicles, and thereby contribute to the development of lightweight vehicle structures.

Under its R&D program, the Group develops partnerships for sharing skills and accelerating innovation. One such partnership is with the *Pôle de Plasturgie de l'Est* in France.

The Group also coordinates the Compofast project, which brings together some 15 European partners for the development of thermoplastic composites suitable for use in vehicles and thus capable of reducing vehicle weight. Similar industrial partnerships lie behind the Group's Altuglas® ShieldUp technology, for applications in panoramic vehicle roofs, as with Renault and on Peugeot's Onyx concept car.

### 2.3.2.2 SOLUTIONS FOR REDUCING GREENHOUSE GASES

The Group develops enhancements and new applications for its existing products to help minimize greenhouse gas emissions.

The Group is pursuing the development of low global warming potential (GWP) refrigerant gases and has announced the launch of a new industrial project for producing 1234yf, a next-generation fluorinated gas, to serve the needs of automotive air-

conditioning. More generally speaking, the Group is pursuing its strategy of continuous adaptation to changes in global regulations, and developing competitive solutions to be a global participant in the drive to reduce GHG emissions.

The Group has also developed the Kynar Aquatec® PVDF resin, a water-based formulation for white paint used on reflecting roofs. Because it has a much longer lifespan than traditional paints, it helps reduce air conditioning needs in regions with high sunlight exposure. The use of reflecting roofs with Kynar Aquatec® bases reduces buildings' energy consumption in high-sunlight regions by 20%, or 20 kilowatt-hours per square meter a year. For ten buildings with a roof area of 15,000 square meters, this would represent a total annual reduction of 1,500 tonnes of CO<sub>2</sub> emissions, assuming an emission coefficient of 0.5 tonne of CO<sub>2</sub> per 1,000 kilowatt-hours.

Outside of the automotive industry, CECA has developed the Cecabase RT® line of warm mix asphalt (WMA) additives, which offer energy savings of 20% to 30% when paving roads.

## 2.3.3 Improve water quality and access to water

Water treatment is another of the Group's major sustainable development research focuses.

### 2.3.3.1 DRINKING WATER FILTRATION SOLUTIONS

The main products and solutions developed for this purpose are fluorinated polymer membranes and CECA's filtering agents.

Hollow-fiber membranes made with the Group's Kynar® PVDF are used for treating water by micro-filtration, which is more effective than conventional sand percolation filtration systems since it traps particles from 1 to 10 microns. In this kind of microfiltration system, now at the product engineering stage, Kynar® provides better resistance to the chlorinated products used for cleaning membranes.

The Group also works with innovative companies to develop ultrafiltration water treatment solutions. In 2014, the Group entered into a partnership with Polymem, a medium-sized French company specialized in manufacturing hollow-fiber membrane filtration modules. The goal of the partnership is to develop new hydrophilic ultrafiltration membrane technology using the Group's new Kynar® nanostructured polymer. This innovation increases the performance and energy efficiency of membrane water treatment. The partnership will make the technology accessible to water treatment players more quickly.

In another filtration stage, activated carbon marketed by Group subsidiary CECA under the Acticarbonyl® and Anticromos® brands eliminates micro-contaminants, odor and taste in wastewater treated for use as drinking water. As noted in section 2.3.5.2 of this reference document, CECA also offers its customers a service to regenerate microcontaminant-saturated activated carbon.

### 2.3.3.2 OTHER WATER TREATMENT SOLUTIONS

The Group markets a variety of other products for water treatment, including:

- acrylic acid, which serves to manufacture polyacrylates used in water treatment plants to ensure the flocculation of suspended solids;
- hydrogen peroxide, used as an agent to reduce chemical oxygen demand. A clean reagent, hydrogen peroxide only has water and oxygen as by-products and offers the benefit of generating neither wastewater sludge nor toxic by-products;
- Rilsan® fine powders, which have been chosen by many cities to coat their drinking water pipe networks and wastewater treatment plant equipment because of their strength, durability and flow properties.

The Group completed its range of Kynar® PVDF resins in 2014 with the launch of a grade suited for multilayer pipes used to transport drinking water without affecting the taste. The new grade also delays the growth of thin layers of bacteria due to its purity and the fact that its implementation does not require any

additives. It has received KTW certification from the German water and gas agency.

## 2.3.4 Develop the use of renewable raw materials

By developing products based on renewable raw materials, the Group is contributing to the conservation of non-renewable fossil fuels thanks to innovative solutions resulting from in-house and collaborative research.

This ongoing commitment is seen in the fact that products made using 20% to 100% of renewable raw materials account for close to 13% of the Group's net sales (excluding Bostik) in 2014.

### 2.3.4.1 THE GROUP'S CURRENT SOLUTIONS

The Group has been manufacturing the monomer used to produce Rilsan® polyamide 11 from castor oil in Marseille, France for over 50 years.

The Group acquired two companies in China in 2012: Hebei Casda Biomaterials Co. Ltd., which produces sebacic acid from castor oil, and Suzhou Hipro Polymers Co. Ltd., which makes polyamides 10.10 and 10.12 derived from this sebacic acid.

The Group also operates three other bio-facilities:

- the Parentis facility in France's Landes region uses local pine wood to produce activated carbon, which is used as filters in the food and pharmaceutical industries, as micro-contaminant filters in wastewater treatment, and as catalyst supports;
- the Blooming Prairie facility in the United States manufactures various additives for lubricants and the cosmetics industry via epoxidation of flaxseed oil, terpenes and limonenes;
- the Feuchy facility in France converts plant fatty acids into surfactants for fertilizers and warm mix asphalt.

As part of its coating resins activities, the Group also develops and sells alkyd resins derived from plant oils and diamide-type rheology additives for which a significant portion of raw materials are bio-based fatty acids.

### 2.3.4.2 NEW DEVELOPMENTS

The Group's R&D constantly works to increase the use of renewable raw materials in current and future Group products.

One of the preferred methods is to work with research partners as part of major collaborative projects that include customers, suppliers and university laboratories. For example:

- the Group was an active participant in the European FP7 Eurobioref bio-facilities project, which involved 29 partners and concluded in 2014. Its corporate research unit coordinated the industrial side of this project. As part of the project, the Group developed new methods for synthesizing monomers for polyamides and contributed to the development of a process for the production of aviation fuel. Results were also achieved in the areas of activated carbon, fatty amines, hydrogen peroxide and acrylics;
- since 2015, the Group has been involved in the H2020 Cosmos project, on industrial applications (including polymer production) using non-foodstuff, non-GM oil plants that can be grown in Europe, such as crambe and camelina;
- the Group is involved in the BIOMA+ project alongside Global Bioenergies and CNRS, the French national research agency. Global Bioenergies is developing a fermentation-based process for making isobutene, a product of interest to Arkema for use in selective oxidation applications;
- the Group is one of the six founding members of the Fimalin association, whose goal is to create, structure and promote a technical flax industry in France in order to develop eco-designed materials using high-performance flax fibers. The long-term objective is to make technical flax an alternative to glass and carbon fibers for strengthening composites, opening the way for eco-polymers, eco-composites and the creation of a new agro-industrial sector;
- the Group's coating resins business unit is working with its customers to research the use of partially bio-based raw materials as a substitute for fossil fuel-based raw materials in the production of "oil-free polyester";
- for flexible packaging applications, Bostik develops polyurethane adhesives containing more than 70% of raw materials of renewable origin.



## 2.3.5 Encourage recycling and the circular economy

The Group contributes to the conservation of non-renewable fossil based raw materials by reusing the by-products of its industrial processes, by helping to recycle its products and those of its customers, and by extending the lifespan of customers' products.

### 2.3.5.1 CIRCULAR ECONOMY

The Group sells many of the by-products created by the production of its main products by finding applications suited to their inherent properties.

In addition to selling by-products, the Group also transforms waste wherever possible into products that can be used by other industrial sectors, thereby preventing them from becoming industrial waste. In 2015, the Group set up an inter-business working group to step up these efforts and tighten coordination with partners.

As mentioned in section 2.2.1.2 of this reference document, 15% of hazardous waste produced by the Group (including Bostik) worldwide in 2015 was recycled on or off the production site (as raw materials).

For example, the sodium-bearing water produced at the Mont facility in France as part of the purification process of a monomer produced at the site has been recycled for many years. The water is used by the paper industry as part of the manufacturing process for Kraft paper and cardboard. This basic water, rich in organics, is used by paper manufacturers to minimize sulfur loss in their process regeneration loops.

At the Hengshui, China site of the Group's subsidiary Casda, the flow of residual sulfuric acid generated by the manufacturing process for sebacic acid is neutralized to obtain a sodium sulfate solution, which is then concentrated and crystallized. Instead of producing dilute sulfuric acid that has to be treated as waste, the new process produces 50,000 tonnes of sodium sulfate per year in solid form, as a marketable by-product.

### 2.3.5.2 GROUP AND CUSTOMER PRODUCT RECYCLING

The Group is developing a number of solutions that make it easier to recycle customers' products.

For example, Elium® liquid thermoplastics are made using the same equipment and processes as thermoset composites. Unlike parts made from thermoset resins such as epoxy, the parts made from these innovative resins are easy to recycle.

The Group has also developed technologies to protect glass bottles (Kercoat®) and hide scuffs (Opticoat®). These products significantly improve the appearance and lifespan of bottles by

tripling the number of times returned bottles, notably those of beer producers, can be reused.

CECA, a Group subsidiary, has developed a solution that increases the recycling rate of products from roadwork. Using Cecabase RT® additives in asphalt mix increases the aggregate recycling rate by 10% to 15% compared with conventional techniques. These additives also reduce the asphalt mix's workable heating temperature.

After being used for drinking water treatment as described in section 2.3.3.1 of this reference document, CECA-produced activated carbon is saturated with micro-contaminants. To prevent the carbon from being landfilled, the Group subsidiary has introduced a recycling service for customers. The used activated carbon is processed in high-temperature ovens, which completely eliminate the pollutants absorbed in its porous structure. Thanks to CECA's expertise, the absorption properties of the activated carbon are reactivated, enabling it to be reused in the same processing systems.

### 2.3.5.3 EXTENDING THE LIFESPAN OF CUSTOMER PRODUCTS

The Group endeavors to steadily increase the performance of its products over time.

It has developed a line of organic peroxides for crosslinking rubber, which is then used to manufacture parts, typically for the automotive industry. The parts meet manufacturer requirements for aging and extended use.

The Group has also developed new polymer grades which increase the lifespan of its customers' products. For example, Kynar® offers a coating with a particularly long lifespan. The Kynar Aquatec® product, used for reflective roofs (see section 2.3.2.2 of this reference document), keeps its white color over a very long time span, thus affording long-life, maintenance-free reflective properties.

In 2015, the Group launched its Glass Coating Academy training program for professionals in the glass bottle industry. The program draws upon the Group's thirty-year experience to raise awareness of the issues involved in proper use of glass coatings. Used optimally, Kercoat® and Opticoat® extend the service life of customers' bottles by increasing the number of reuse cycles supported by deposit-return bottles.

The Group's research policy and initiatives are detailed in section 1.4 of this reference document.

### 2.3.6 The Smart House: a project dedicated to sustainable construction

The Smart House by Arkema, the only house-laboratory of its kind in the world, is designed to muster forces industry-wide on innovation and sustainable development for the construction industry.

It was opened in 2015 at the Bostik R&D site in Venette, France, to test, develop and approve new solutions to major challenges facing the construction industry, particularly energy efficiency, sustainable development, and the health and comfort of residents.

The Smart House is designed as a multidisciplinary research platform enabling Group researchers, scientific partners and customers to develop a comprehensive R&D approach capable of yielding sustainable construction innovations through to 2030.

This original cooperative development initiative will help all players in the ecosystem bring innovative sustainable construction solutions to market faster. As well as countering climate change, the Smart House also helps customers accelerating their performance.

## 2.4 ENCOURAGE OPEN DIALOGUE WITH ALL GROUP STAKEHOLDERS

### FOCUS : Arkema's participation in COP 21

The Group took part in several events in connection with COP 21. It attended the Paris Business & Climate Summit during the run-up phase in June 2015. It played an important role in the French nationwide public awareness-raising operation "Noah's Ark for the Climate" run by the French Environment Ministry. Additionally it sat on several panels during the COP 21 conference. The Group was also involved in the "French Companies Act on Climate" publication outlining the ambitions of 39 major French groups in light of the COP 21 conference.

### 2.4.1 Regional, economic and social impact of the Group's activities

The Group approaches corporate citizenship in all its host regions from three priority angles:

- investment;
- revitalization of labor market areas;
- scientific support upstream of innovation.

#### Investment

The Group's activities generate tens of thousands of direct and indirect jobs worldwide, making it a contributor to the economic and social development of the regions where it operates.

Group investment in 2015 contributed to the creation of around 1,350 direct or indirect full-time equivalent (FTE) jobs. This

investment also had an extended impact on the economic fabric of the labor market areas to the equivalent of 2,750 FTE jobs.

### FOCUS

The new thiochemicals complex in Kerteh, Malaysia, which started up in 2015, represented an investment budget approaching 200 million euros. Construction work on the new complex, mostly commissioned from local companies, involved 1,400 people and more than five million working hours.

### Revitalization of labor market areas

The Group pays close attention to the possible consequences of business relocation. Where such reorganization is called for in France, the Group strives to compensate for job losses wherever possible, and helps to revitalize the impacted labor market areas. These actions are defined within the legal framework of revitalization agreements with public authorities and include a variety of measures, such as:

- financial support for company creation or takeovers;
- exploration for possibilities of setting up new activities and supporting their development.

More generally, the Group has a policy of supporting innovative small and medium-sized enterprises (SMEs) in related business areas through joint projects and equity investments. An example of this is when research centers work closely with neighboring schools or laboratories as part of clusters while creating possibilities for partnerships with local SMEs. The Group is a founding member of Axelera, a world-class competitiveness cluster in the field of chemistry and the environment that brings together and coordinates players from industry, research and education in the Rhône-Alpes region in France.

Through this kind of local partnership, the Group stimulates innovation and deepens its local integration. For example, at the Lacq site in France, the Group provides technical and infrastructure support to innovative young businesses setting up in the Chemstart'up business incubator.

It also takes a stance as a key early-stage player in strategically crucial industries such as thermoplastic composite materials, renewable raw materials and new energies.

For example, under a public-private partnership initiated by the Aquitaine region in France, the Group has signed a cooperation agreement with SCE France (a subsidiary of Hydro-Québec,

Canada's leading electricity producer), a recent arrival at the Lacq complex, on a joint R&D laboratory working on next-generation materials for making lithium-ion batteries. The aim is to develop very-high-performance materials for renewable energy and electric vehicle applications.

### Scientific support

Under its ambitious innovation policy, the Group maintains close ties with the scientific and educational ecosystems in its host regions worldwide, through many partnerships with universities and public and private research laboratories.

An example of scientific and technological cooperation in France is the Smart House project, in which the Compiègne Technology University is a stakeholder. The Smart House is a highly original house-laboratory designed as a multidisciplinary cooperative platform for developing innovations to address major sustainable construction challenges (such as reductions in greenhouse gas emissions and domestic energy consumption) through to 2030.

In Asia, the Group has partnerships with highly reputed and innovative universities in China, Japan and South Korea. By joining, in this way, the communities that drive innovation in Asia today, the Group also benefits from the region's strong development potential.

In the United States, in the field of composites, the Group is a member of the Oak Ridge Carbon Fiber Consortium, which liaises closely with the Oak Ridge national laboratory, and has become active in the Institute for Advanced Composites Manufacturing Innovation (IACMI). At this industrial innovation hub, announced by President Barack Obama in January 2015, there are 122 organizations (companies, associations, universities and research laboratories) working on next-generation composite materials in partnership with the US Department of Energy.

## 2.4.2 Relations with stakeholders

As a responsible economic player in an increasingly interconnected environment, the Group is particularly attentive to the need to forge close ties with all stakeholders. Worldwide, the Group develops grassroots communication to build quality, trust-based relations across its immediate environment. Open dialogue also helps the Group understand the expectations of local communities and ensure they are properly accommodated in its CSR strategy.

### 2.4.2.1 THE COMMON GROUND® APPROACH

The Arkema Group goes beyond regulatory requirements by actively developing dialogue with local communities. The Group's innovative community relations program, Common Ground®, has been running for more than ten years now. Used in all the Group's host countries, the program focuses on three main areas:

#### • Listening to understand expectations

One of the primary aims of the Common Ground® program is to understand the concerns of local communities. One way the Group develops this understanding is through opinion surveys addressing communities living near its industrial sites. Survey

input enables the Group to address specific concerns on issues such as industrial and chemical risks.

#### • Exchanging and informing

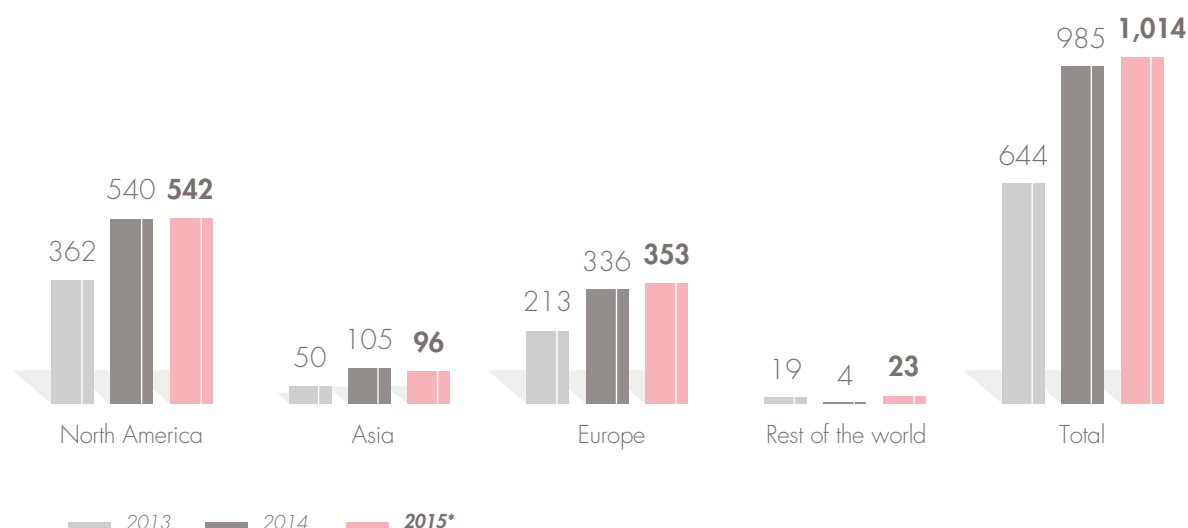
Industrial site managers run regular open-day events, at which people can find out about the site's activities, the products it makes and the processes it uses, and get a reassuring first-hand view of how the site runs and what its projects are. In 2015, around 80% of the Group's sites opened their doors to the public in this way.

#### • Preventing risk and ensuring progress

Continuous improvement to safety and environmental and health protection is a priority for all Group sites. The Group develops a strong risk prevention culture extending throughout all its organizations wherever they operate in the world. As part of a proactive approach, the Group regularly organizes incident and accident simulations in order to test the complementarity of on-site and external emergency response resources, procedures and methods aimed at protecting employees and the local community.

### 2.4.2.2 QUANTITATIVE ASSESSMENT OF COMMON GROUND® INITIATIVES

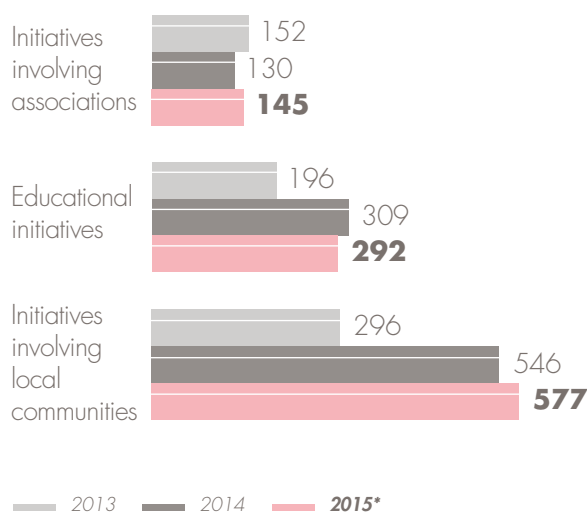
In 2015, more than 1,000 Common Ground® initiatives were carried out worldwide, with 82% of sites actively participating. The diagrams below show the breakdown of these initiatives by region, with Bostik sites included in the 2015 figures:



\* In 2015, figures include data for Bostik sites. 2014 and 2013 exclude Bostik.

In all, 90% of industrial sites took part in these initiatives in the United States, 88% in Europe, and 80% in Asia. In Europe, France, the Netherlands and Italy were the most active in organizing events. In Asia, China was the most active.

Operations under the Group's Common Ground® program address local communities, schools and associations. The breakdown by type of initiative is as follows:



The figures for 2015, but not for 2014 or 2013, include data for Bostik sites.

### 2.4.2.3 QUALITATIVE ASSESSMENT OF COMMON GROUND® INITIATIVES

#### Initiatives involving local communities and the public

To foster closer relations, employees at Group facilities and subsidiaries meet with members of the public to explain, for example, some of the everyday living improvements to which the chemicals industry has contributed.

In the United States and Asia, many sites take part in information meetings organized by local resident associations.

In France, the Group has partnered two important science and industry events for several years now:

- the *Fête de la Science*, an initiative of the French Ministry of Higher Education and Research to encourage interaction between research scientists and the general public;
- the *Semaine de l'Industrie* industry week event, which gives young people and career seekers insights into the world of industry and its job openings.

In the run-up to the 21st United Nations climate change conference (COP 21), held in Paris in 2015, the Group worked with UIC on the Climate Train, a public education campaign on global warming. The train stopped at 19 French towns from 6 to 25 October 2015, inviting members of the public to climb on board and discover some of the tangible innovative solutions developed by the chemicals industry to counter climate change. In all, the train welcomed 23,000 visitors on board.

#### Educational initiatives

Throughout the world, the Group gives priority attention to strengthening its ties with schools and universities.

The Group runs regular operations in cooperation with schools, to provide young people with information on careers in the chemicals industry and further the development of a scientific culture. Sites put on regular visits for school groups, take part in educational initiatives, and speak at conferences at higher education venues, such as Rho University in Italy.

The Group also offers opportunities for socially disadvantaged young people, and helps them obtain academic qualifications. To promote access to the prestigious ENSIC chemical engineering school, Fondation de France and the Arkema Group founded Fondation ENSIC to grant scholarships to students experiencing financial hardship. Since it opened, the foundation has provided support for around a hundred students.

The Arkema Inc. Foundation, set up in 1996, runs a number of disinterested initiatives with a priority on science and education at all levels. Its yearly Science Teacher Program has reached hundreds of researchers and teachers.

#### Initiatives involving associations

The Group's values of community spirit and responsibility show through in many initiatives addressing non-profit associations in all its host regions. Many examples around the world attest to the work done by Group employees to help those who are most in need and to actively participate in local life.

The Group runs or partners community-oriented actions on a regular basis:

- it supports various associations in their work on developing employment openings for disabled persons;
- the Group and its employees take part in many non-profit health and community initiatives;
- the Group is active in many environmental preservation initiatives, addressing biodiversity in particular (see section 2.2.1.5).

#### FOCUS

In 2015, the Group supported the Sail for Water association's initiative to hand out 1,000 filter cartridges, providing drinking water for around 100,000 people in various regions of the world.



### 2.4.3 Institutional affairs initiatives

As a responsible chemicals producer, the Group interacts with public authorities in all its host regions. It does this to help draw up legal and regulatory frameworks favorable to the development of its businesses in the strict respect of its values and commitments on social and environmental responsibility, and to take part in public debate on issues relevant to its activities.

Group experts are involved in various business federations and associations, such as the French association of large companies (AFEP), and chemical industry bodies such as the French chemicals industry union (UIC), the European Chemical

Industry Council (CEFIC), the American Chemical Council, and the European Chemicals Agency (ECHA).

Cooperative work within these organizations is a considerable driving force in the development of corporate social responsibility.

For example, the Group has set up a working group with other chemical companies in South Korea, where there are moves toward setting up regulations along the lines of REACH in Europe. Regular meetings are held with the ministries concerned, the chamber of commerce, chemical industry organizations and university chemical committees to discuss the matter and improve the management of chemical substance registration.

### 2.4.4 Fair practices, rejection of corruption

Beyond complying with international conventions and with legislation applicable in the countries where it operates, the Group is committed to complying with antitrust regulations and to rejecting all forms of corruption and fraud. The Group condemns fraud and corruption and works to prevent it in commercial transactions with partners.

Compliance with these rules and anti-corruption measures is based on two principles in particular: (i) the inclusion of these rules in the Group's Code of Conduct and Business Ethics, and (ii) the implementation of procedures for managing potential fraud and corruption risks.

#### The Arkema Group Code of Conduct and Business Ethics

In November 2013, the Group brought in a new Code of Conduct and Business Ethics to replace the initial May 2006 version, setting out rules that all Group employees are required to follow. The rules are rooted in the Group's ethical values, include the ten

principles of the United Nations Global Compact (one of which specifically covers the issue of corruption) and draw inspiration from the principles of other fundamental international texts <sup>(1)</sup>.

The Code can be accessed on the Group's website.

Essentially, the Code of Conduct and Business Ethics states that:

- employees may not offer, provide or accept, directly or indirectly, any unfair advantage, be it pecuniary or otherwise, whose purpose is to secure business relations or any other business advantage. The specific partners concerned are people in positions of public authority, agents or employees of customers, financial or banking bodies and political parties;
- employees must scrupulously comply with all applicable rules relating to antitrust legislation in all countries where Arkema operates;
- employees must comply with import and export regulations.

(1) Universal Declaration of Human Rights, fundamental principles of the International Labour Organization, and OECD Guidelines for Multinational Enterprises.

## Employee support

The Group has created a roadmap to assist employees in complying with all the requirements of its Code of Conduct and Business Ethics. It includes the following initiatives:

- accessibility of the Code on the Group's intranet sites;
- ongoing classroom training program on compliance, mainly addressing businesses;
- e-learning course on the Code of Conduct and Business Ethics put up during 2016 in parallel with employees' annual pledge to comply with the rules and principles of the Code.

## Processes for identifying and reducing the risks of non-competitive practices, corruption and fraud

A compliance and business ethics program based on the Code of Conduct and Business Ethics has been set up, covering issues such as antitrust legislation, export control and anti-corruption measures. There are rules and procedures on these issues applicable throughout the Group.

To ensure this program runs smoothly, the following resources have been implemented:

- awareness-raising activities in each business unit to increase the accountability of employees with respect to competition rules;
- a "Competition practice guide" on rules and required behaviors issued to employees;
- vetting of commercial intermediaries prior to appointment, to minimize the risks of corruption-prone situations arising;
- systematic approval required prior to any export to countries covered by sales or financial restrictions.

Application of the compliance program throughout the Group is overseen by the Compliance Committee and the ethics mediator.

The Compliance Committee, whose members are appointed by the Chief Executive Officer and which reports to the Executive Committee, consists of the Internal Audit and Internal Control Vice-President, a Human Resources department representative, the Sustainable Development Vice-President, the Group Safety and Environment Vice-President, a representative of the Legal department and a representative of the Finance/Treasury/Tax department.

This committee is responsible for monitoring the Group's compliance in the following areas: antitrust laws, commercial intermediaries, fraud, commercial practices and business integrity, work environment integrity and respect for the environment.

The ethics mediator is appointed by the Chief Executive Officer. This person is fully familiar with the Group's activities and professions and occupies a position that ensures independent judgment.

The ethics mediator is bound by an obligation not to disclose the identity of people raising ethics issues to third parties, or to disclose information likely to help identify such people. This obligation may be tempered and third-parties informed on a need-to-know basis as strictly required to address and solve the question raised or to handle the case concerned, the said third parties then also being bound by the same obligation on confidentiality.

In regions where the Group conducts its activities, the regional Vice-Presidents are appointed correspondents of the ethics mediator.

For all practical questions regarding an ethical issue in general, and particularly any problem in applying the Group Code of Conduct and Business Ethics, an application may be made to the Compliance Committee and the ethics mediator either by executive management or by any employee.

Finally, as part of the global risk management measures put in place by the Group, the Internal Audit and Internal Control department conducts regular audits in the Group's subsidiaries. These involve analyzing the various management processes in place to help identify possible risks of fraud and set out, where appropriate, the necessary corrective measures (for more information on global risk management measures, see section 1.7.1 of this reference document).

## 2.4.5 Subcontracting and suppliers

### Consideration of social and environmental issues in the procurement policy

The Group adopts responsible behavior towards suppliers and establishes balanced, sustainable, trust-based relations with them in order to build long-term relationships. Relations with suppliers must develop transparently in compliance with fairly negotiated contractual terms – including those related to intellectual property – and Responsible Care® principles.

The Group's approach is based on the ethical principles set out in its Code of Conduct and Business Ethics as described in section 2.4.4 of this reference document. The Group is also a signatory to the national inter-company charter of the French purchasing managers' organization (CDAF), and the state-sponsored inter-company mediation initiative *Médiation Inter-Entreprises*, which is based on ten responsible procurement commitments.

The procurement policy of the Group's Goods and Services Procurement department provides for all employees to be made aware of procurement ethics rules and the need to conduct their duties in compliance with both ethical principles and a sustainable development approach. Procurement officers are systematically reminded of these requirements during training and information events.

In some cases, goods and services buyers also approach suppliers of services or materials with a specific view to generating energy savings or optimizing waste treatment and recycling activities.

As regards raw material procurement, the Group favors a collaborative approach with certain strategic suppliers and works to jointly improve the safety and environmental impact of the supply chain.

In its logistics purchases, the Group includes, among other things, a "carbon footprint" dimension when selecting its suppliers and transportation methods. Generally speaking, when the technical and economic conditions are met, the choice of supplier and transportation method will favor slow and low-emission methods such as rail, barge, maritime bulk or container rather than road and air. These concerns also converge with the need to control transportation risks as mentioned in section 1.7.2.2 of this reference document.

### Consideration of social and environmental responsibilities of suppliers and subcontractors

As part of its endeavor to build and maintain long-term relations with suppliers, the Group expects them to behave responsibly, particularly in regard to social and environmental matters.

The Group's approach is based on the ethical principles set out in its Code of Conduct and Business Ethics as described in section 2.4.4 of this reference document. As well as being required to comply with all applicable legislation and regulations, suppliers are also encouraged to take up principles equivalent to those set out in the Group's Code of Conduct and Business Ethics. For this purpose, in September 2014 the Group brought in its Supplier Code of Conduct. This Code is accessible on the Group's website and included in all new tenders. In addition, a process for informing new and existing suppliers about the Code was completed and came into effect in 2015. The Group Supplier Code of Conduct is based on the United Nations Global Compact, which the Group has committed to supporting. It covers human rights and labor-related issues and, in particular, freedom of association, child labor, forced labor, discrimination, health, safety, hygiene, harassment and violence. These requirements also include the environment, quality and safety of supplied products and services. Within the context of business integrity and transparency, suppliers must also comply with laws governing competition, corruption, conflicts of interests, confidentiality and the transparency and accuracy of reported information.

In addition to performance, cost and quality criteria, the supplier selection process examines compliance with the Supplier Code of Conduct and with Responsible Care® principles.

In terms of safety, the Group Goods and Services Procurement department regularly analyzes the performance of its main suppliers regarding their personnel working at Group sites. The Group gives equal importance to the safety of on-site workers from external companies as to that of its own employees, and its accident-rate figures include both indifferently.

When selecting logistics services, the Group takes into account carrier performances in terms of safety, security and the environment. The procedures used to select road haulers for hazardous materials are based on third-party assessments, such as the Safety and Quality Assessment System (SQAS) in Europe. In China, the Group uses the same assessment criteria, gradually implemented in this country under the Road Safety and Quality Assessment System (RSQAS). Similarly, vessels used worldwide for the bulk transportation of Group products are first vetted by a third party.

For raw materials purchases, the Group generally uses pre-approval questionnaires to assess its suppliers. These questionnaires are designed to assess their management system, their compliance with the principles of the Responsible Care® program or their certification to ISO-type standards.

The Group uses subcontractors with regard to company restaurants. The Group will check in 2016 that action programs are in place to minimize food waste.

The Supplier Code of Conduct requires that suppliers comply with the Group's CSR expectations from the time of implementation. They commit to cooperating with audits on compliance with this Code.

To base its requirements on accepted standards and avoid the need for duplicate supplier assessment procedures, in 2014 the Group joined the Together for Sustainability (TfS) initiative, founded by six European chemical companies. This global program aims to develop corporate social responsibility throughout the entire chemical industry service chain, and is based on the principles of the United Nations Global Compact and the Responsible Care®

Global Charter. Through this program, chemical companies benefit from common supplier CSR assessments conducted by Ecovadis or by independent audit firms, with members of the TfS program sharing the findings. Ecovadis analyzes suppliers' documents and answers on CSR criteria in line with international standards, and ensures a 360° watch on information provided by external stakeholders.

In the coming years, the Group will regularly rely on supplier risk analyses when choosing which suppliers to assess and audit as part of the TfS program.

The Group has launched 146 supplier assessments, and 71 completed questionnaires have been returned.

In addition, the Group's Internal Audit and Internal Control department carries out annual audits of Group subsidiaries. During these audits, it conducts a range of tests on supplier approval and assessment processes and on the practices and risks associated with the raw materials procurement and goods and services procurement functions.

### The impact of subcontracting

The Group subcontracts for two main purposes: for maintenance operations, and, to a very limited extent, for production of certain finished products. Subcontracting thus accounts for part of the 203 million euros of expenditure on safety, environment and maintenance of industrial units.

Under the Group's procurement policy, subcontractors are bound by the Group's Supplier Code of Conduct and the associated general purchasing conditions.

## 2.5 PROMOTE THE INDIVIDUAL AND COLLECTIVE DEVELOPMENT OF ALL ITS EMPLOYEES

The Group conducts its operations at various industrial sites located essentially in Europe, America and Asia, and at sales subsidiaries in some forty countries.

The Group's human resources policy focuses on actions to further individual development and improve collective working conditions.

Individual development covers recruitment, training and career paths, with the aim of enabling employees to consolidate their skills and expertise. A career management policy helps build career paths that reinforce the expertise of employees and, by extension, that of the Group. This policy is backed up by a training policy designed to provide the necessary theoretical and

practical knowledge for a new post or a change in direction. Internally, individual development is underpinned by a policy of proper recognition and fair compensation. Benchmarking against other companies is conducted regularly.

Collective working conditions are enhanced as part of a continuous improvement drive, which covers initiatives to improve the working environment and preventative health care measures for employees. Efforts are made to foster good employee relations, while strengthening diversity by selecting employees representing a wide range of nationalities, profiles and backgrounds and also ensuring high quality employee feedback mechanisms and social dialogue structures are in place.

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### 2.5.1 Employment

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The figures given in the following paragraphs concern the Group headcount.

Every company records its employees under an employment contract. Interns and temporary workers are not included in the headcount. Employee numbers are recorded on a headcount basis, regardless of working hours.

For further details on the data collection and calculation methods used, and the constraints they may present, see note on methodology in section 2.6 of this reference document.

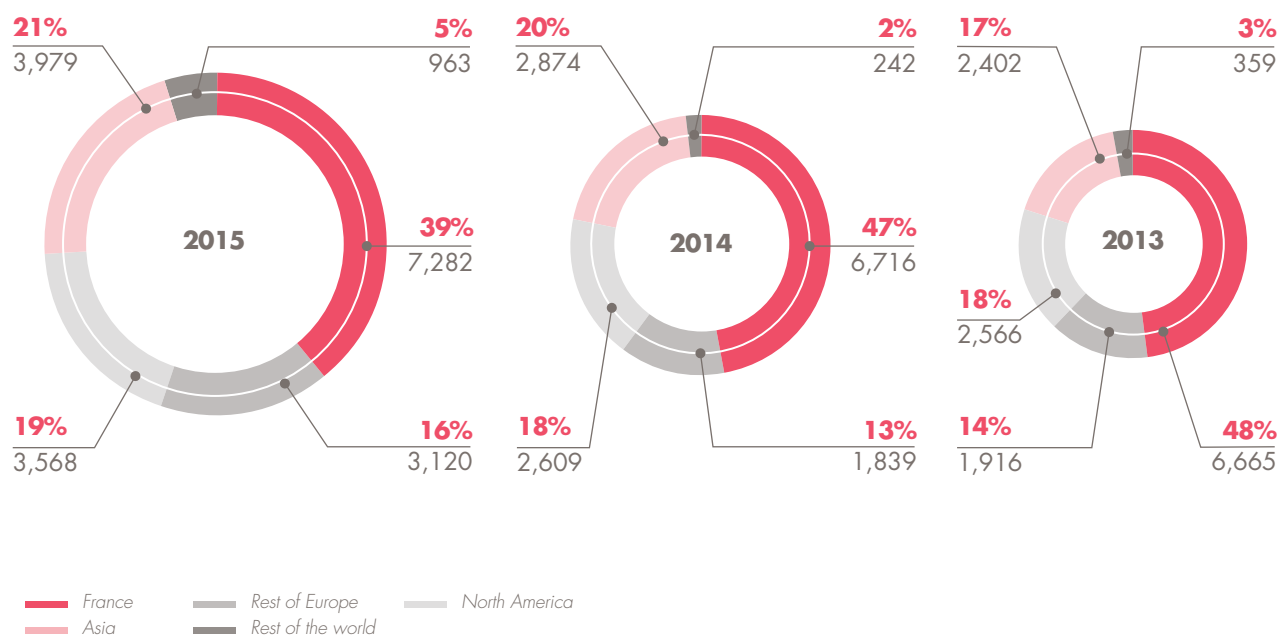
In September 2013, an agreement was signed with the CFDT, CFE-CGC and CGT trade unions on strategic jobs and skills management planning (SWP) and on intergenerational management in the Group's companies in France. This agreement notably lays down new targets in terms of the recruitment of young people (aged under 30) and "seniors" (aged 50 and over), and the number of people on work-study programs (see section 2.5.1.2 of this reference document).



### 2.5.1.1 TOTAL HEADCOUNT AND BREAKDOWN BY GENDER, AGE AND REGION

#### Change between 2013 and 2015

Changes to headcount over the past three years are given by region below.



Total headcount	31 Dec. 2015 <sup>(1)</sup>	31 Dec. 2014	31 Dec. 2013
<b>GROUP TOTAL</b>	<b>18,912</b>	<b>14,280</b>	<b>13,908</b>
of which permanent <sup>(2)</sup>	17,801	13,832	13,434
of which fixed-term	1,111	448	474

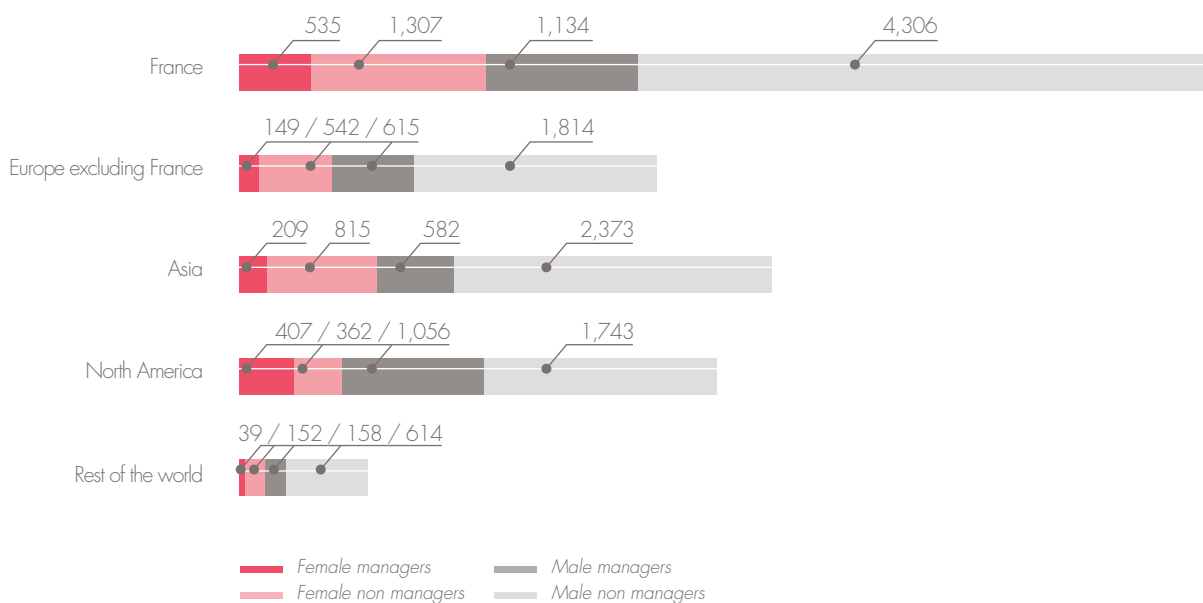
(1) The figures for 2015, but not for 2014 or 2013, include data for Bostik sites.

(2) See the note on methodology in section 2.6 of this reference document.

The headcount rose by more than 32% from 2014 to 2015. This increase is due mainly to the change in consolidation scope, with the acquisition of Bostik (plus 4,916) and Oxido in Italy (plus 44), and the divestment of Sunclear (minus 354).

### Breakdown by category, gender and region

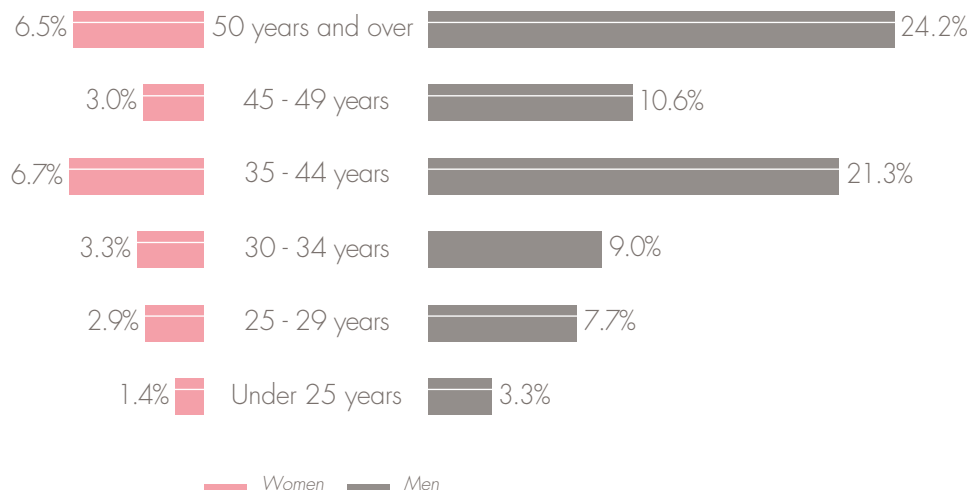
At 31 December 2015, executives accounted for 25.8% of Group employees, compared with 25.1% in 2014. Women represented 23.8% of Group employees, versus 23.7% in 2014.



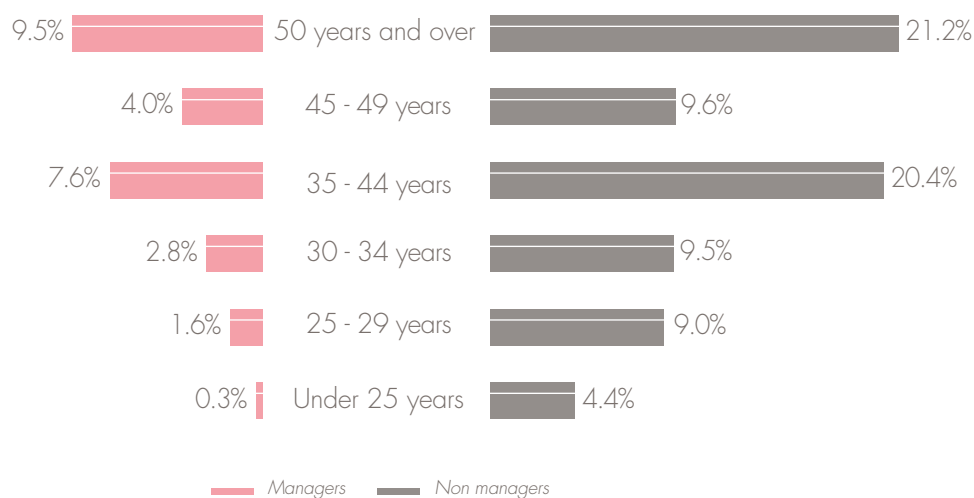
	Managers	Non managers	Male	Female	Total
<b>GROUP TOTAL</b>	<b>4,884</b>	<b>14,028</b>	<b>14,395</b>	<b>4,517</b>	<b>18,912</b>
<i>of which permanent*</i>	4,803	12,998	13,623	4,178	17,801
<i>of which fixed-term</i>	81	1,030	772	339	1,111

(\*) See the note on methodology in section 2.6 of this reference document.

## BREAKDOWN BY AGE GROUP AND GENDER



## BREAKDOWN BY AGE GROUP AND CATEGORY



### 2.5.1.2 CHANGES TO THE NUMBER OF GROUP EMPLOYEES: NEW HIRES AND DEPARTURES

The Arkema Group's recruitment policy is designed to attract the most skilled profiles in order to further its development.

In keeping with its founding values of simplicity, solidarity, performance and accountability, the Group attaches a great deal of importance to finding applicants with cultural openness, teamwork skills, a solution-driven approach and an entrepreneurial spirit.

The Group has drawn up a recruitment charter to help promote the principles of fairness and non-discrimination when selecting job applicants, and will be stepping up its diversity program in 2016. Bostik's HR policy, applicable across its subsidiaries, is set out in its Corporate Employee Handbook, which can be downloaded from its intranet.

In 2015, the Group began work on updating its employer brand to accommodate the Bostik identity, which involved carrying out a study to determine convergences. A new brand will be defined and rolled out in 2016, through various Group communications materials. Along with the update, there are also plans for a revamp of the careers website on [www.arkema.com](http://www.arkema.com).

As regards recruitment, the Group signed an agreement on jobs and skills management and intergenerational management in September 2013. Under the agreement, all Group companies in France agree that 30% of annual permanent new hires will be young people under 30, and 10% will be seniors (aged 50 and over).

#### Relations with educational institutions

Mindful of enriching recruitment, the Group fosters special relations with the best educational and training institutions for all its Business Lines.

In France, the Group takes part in many school events, such as recruitment forums, presentations and site visits. These initiatives seek to promote the Group and its Business Lines among the students of non-specialized engineering schools (Mines de Paris,

Centrale Paris and Polytechnique), chemistry schools (such as ESPCI, Chimie Paris, ENSIC and ENSIACET), business schools (including HEC, ESSEC and ESCP-Europe), and technical schools in the fields of safety and maintenance. An example of one such initiative is Arkema France's three-year sponsorship of the ESPCI school. The École Polytechnique sponsorship, which began in 2014, continued in 2015.

The Group launched the "Campus" program in October 2013 to further strengthen its relations with schools and give them greater visibility. Campus pairs second-year students from the above target schools, known as Campus Students, with Group employees, or Campus Managers, who graduated from those schools. The role of Campus Students is to inform the Campus Managers of student expectations and together to organize events with the Arkema Group recruitment team. Examples of events include visits to industrial sites, round tables on careers with the Group, and presentations on Arkema Group R&D.

Each year, the Group also offers many opportunities for internships, apprenticeships, graduation projects and international volunteer programs. In 2015, it was running eight international volunteer programs, in the USA, Asia and Europe. Final-year internships, international volunteer programs and graduation projects are managed at the corporate level to ensure closer monitoring of the Group's recruitment pool.

In 2012, Arkema France adopted a proactive policy toward work-study programs for executive and non-executive positions. This policy was confirmed in the agreement signed in September 2013 on jobs and skills management and intergenerational management in Group companies in France, which includes an undertaking to increase the number of work-study trainees above the statutory minimum of 5% of the workforce in 2015.

In the United States, the Developing Engineer Program enables the Group to take on four to six engineering students from top American universities every year for internships at its industrial sites over five years.

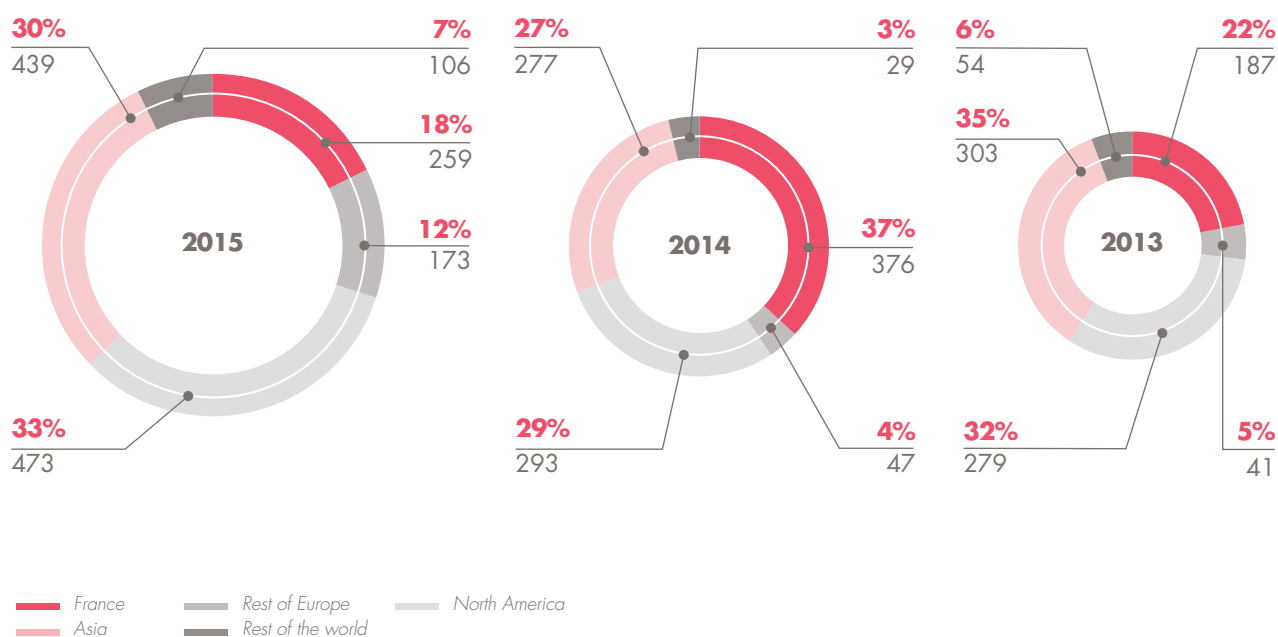
### Permanent new hires between 2013 and 2015

The Group hired 1,450 permanent employees in 2015 versus 1,022 in 2014. Increased recruitment is in line with the increase in Group headcount.

This figure covers all the Group's recruitments worldwide.

Permanent employee new hires	2015*	2014	2013
<b>GROUP TOTAL</b>	<b>1,450</b>	<b>1,022</b>	<b>864</b>

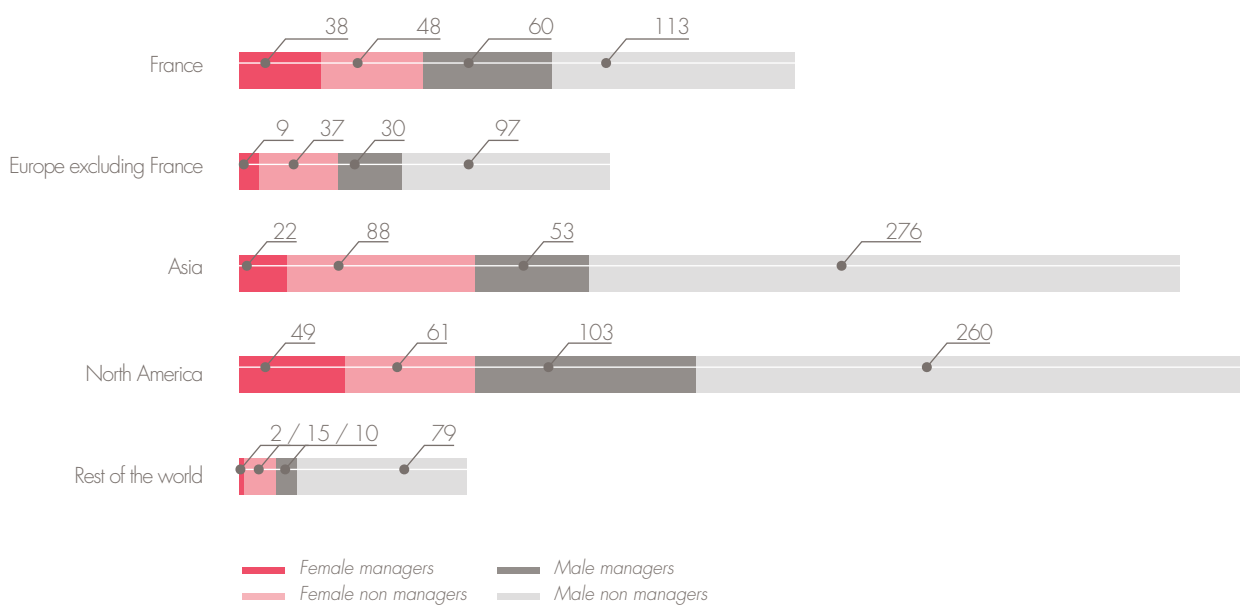
\* The figures for 2015, but not for 2014 or 2013, include data for Bostik sites.



### Geographic breakdown of permanent new hires by category and gender

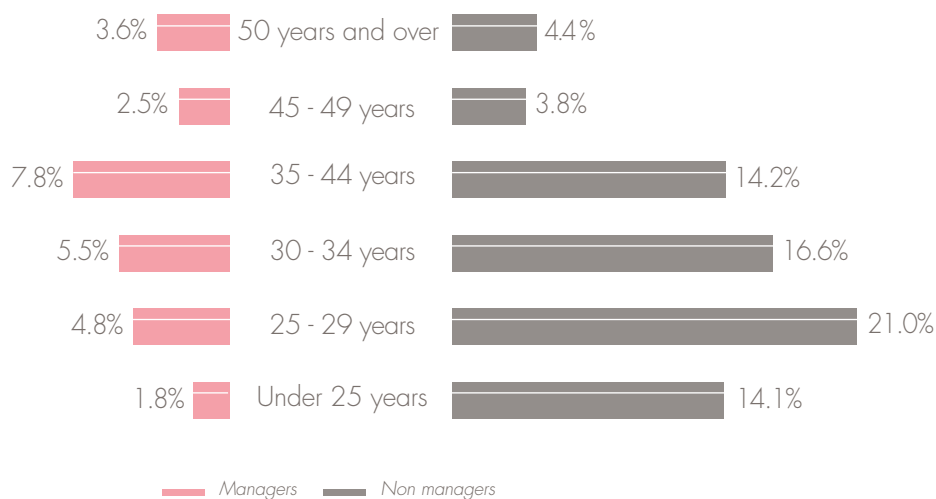
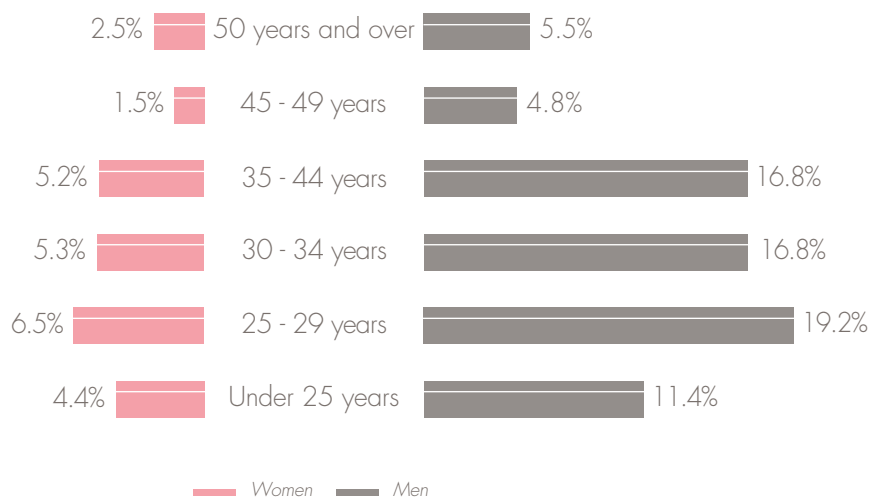
In 2015, management profiles accounted for 25.9% of new hires, compared with 27.6% in 2014. Women totaled 25.4% of new hires versus 25% in 2014, and 31.9% of management-level new hires versus 30.9% in 2014.

	Managers	Non managers	Male	Female	Total
<b>GROUP TOTAL</b>	<b>376</b>	<b>1,074</b>	<b>1,081</b>	<b>369</b>	<b>1,450</b>





## BREAKDOWN OF PERMANENT NEW HIRES BY AGE GROUP, CATEGORY AND GENDER IN 2015



In 2015, people aged under 30 accounted for 41.6% of permanent new hires (compared with 41.5% in 2014), whereas seniors (aged 50 and over) totaled 8% (versus 9.8% in 2014).

## Departures

In 2015, the Group recorded 2,753 employee departures, compared with 1,905 in 2014.

Departures by region	France	Rest of Europe	North America	Asia	Rest of the world	Total
<b>Total departures</b>	<b>1,136</b>	<b>492</b>	<b>406</b>	<b>496</b>	<b>223</b>	<b>2,753</b>
<i>of which resignations</i>	52	143	221	296	46	758
<i>of which dismissals</i>	18	49	69	36	81	253
<i>of which departures following a divestment*</i>	308	46	-	-	-	354

\* Sale of Sunclear (France, Spain and Italy).

### 2.5.1.3 COMPENSATION AND CHANGES TO COMPENSATION

Overall compensation is a key component of the Group's human resources policy. It aims to promote each employee's contribution to the Group's success and reward them fairly for their efforts.

Implemented by management, the compensation policy represents a key tool for recognizing employee performance and commitment in areas that are essential to the Group's development, such as growth, innovation, safety, industrial reliability, and competitiveness.

To strengthen the link between contribution and compensation, all management positions are classified in accordance with the Hay method. This initiative is also gradually being rolled out to all non-management positions, notably in France.

The compensation structure comprises a fixed component, an individual variable component and a collective variable component, which apply differently depending on the position and the country. The compensation structure fulfills a number of objectives:

- compensate individual and collective performance;
- develop employees' individual sense of responsibility and involve all employees in the achievement of goals;
- ensure competitiveness in the market;
- provide fair compensation and ensure internal consistency;
- manage costs.

In the majority of the Group's companies, 22% of employees receive some form of individual variable compensation that depends on personal performance and contribution to the collective performance of a business, a country or the Group.

Collective variable compensation components give some 60% of employees a stake in the Group's growth and in its economic and financial performance. In France, incentive schemes and profit-sharing plans are part of this framework.

In addition to fixed and variable compensation components, Group employees also benefit from deferred compensation in the form of employee shareholding, employee savings schemes and, for some employees, performance shares.

Nearly all the Group's employees (99.5%) benefit from guarantees in respect of minimum compensation.

#### Incentives and profit sharing

In addition to the profit sharing required under French law, all the Group's French companies have set up an incentive scheme that gives all employees both a share of Group profits and incentives to meet certain performance targets that promote the Group's growth. These schemes vary from subsidiary to subsidiary but most are based on the same principles. Incentive schemes consist of (i) a bonus based on economic results, and (ii) a performance bonus defined by each facility in line with its specific objectives.

#### Employee share ownership

Since its 2006 stock market listing, the Arkema Group has conducted a dynamic employee shareholding policy. Every other year, it has offered employees in twenty or so countries, representing some 95% of its headcount, the opportunity to purchase Company shares with preferential terms.

For further details, see section 5.2.7 of this reference document.

#### Employee savings schemes

A Group savings plan (*Plan d'Épargne Groupe*) and a collective pension savings plan (*Plan d'Épargne pour la Retraite Collective*) allow employees of Group companies in France to make voluntary contributions and invest their profit-sharing and incentive income.

These sums are matched by the employer up to an annual maximum of 1,000 euros for the Group savings plan and 400 euros for the collective pension savings plan.

The investment structures available are the Arkema Actionnariat France corporate mutual fund (*Fonds Commun de Placement d'Entreprise – FCPE*), a Group savings plan invested entirely in the Company's shares; a range of multi-company FCPE funds offering the choice of investment in different asset classes (equities, bonds and money market instruments); and structured funds offering capital guarantees.

On consolidation in the Group, Bostik SA also joined the Group savings plan under a collective bargaining agreement.

### Performance shares

Performance share plans, which were set up in 2006, complement the deferred compensation packages described above.

Performance share allocation plans are compensation and retention tools for employees whose responsibilities influence the Group's results, as well as employees with outstanding performance or participation in a project.

Each year, nearly 6% of the global headcount receives performance share allocation rights.

Following a vesting period of four years for the performance share plan decided in 2015, the beneficiaries are granted the Arkema shares definitively provided they meet presence and performance requirements.

Further information on these compensation tools may be found in section 3.5 and section 5.2.6 of this reference document, as well as in note 28 to the 2015 consolidated financial statements in section 4.3.3 of this reference document.

#### 2.5.1.4 PENSION AND HEALTH AND WELFARE BENEFITS

In most countries in which the Group is present, employees benefit from a mandatory public scheme covering risks related to death, disability, work incapacity, pensions and health costs.

In addition to these statutory requirements, the various Group entities in France and abroad are responsible for putting in place and keeping up to date social security and employee benefit provisions within the constraints of the agreed annual budgets,

and in keeping with requirements and local practices. Over 85% of Group employees receive supplementary life and disability cover.

As regards life insurance cover, the aim is to put in place a guarantee representing at least 18 months' salary. Some 75% of the global headcount has this level of cover.

Concerning retirement pensions, the Group's policy is to favor defined contribution plans over defined benefit plans, and to limit very long-term liabilities. Accordingly, the relevant entities have gradually closed their defined benefit plans to new entrants and replaced them with defined contribution plans.

This is the case in the United States, the United Kingdom and Germany, where defined benefit plans have been closed to employees hired between 2002 and 2006 and defined contribution plans have since been put in place.

Under this policy, in October 2015 the Group announced plans to close the acquisition of new rights in the defined benefit plan at Bostik Ltd. in the United Kingdom, following similar measures in other Group companies in 2013.

Negotiations have also been undertaken to close remaining defined benefit plans in the Netherlands.

Defined contribution plans are offered to all Group employees in both countries.

For more information, please see note 19.3 to the 2015 consolidated financial statements in section 4.3.3 of this reference document.

## 2.5.2 Training and individual development

### 2.5.2.1 TRAINING AND INDIVIDUAL DEVELOPMENT POLICIES

Professional training concerns every employee regardless of their profession, level of responsibility or age. It allows employees to develop or acquire the necessary skills to hold a position, move to a new position and fulfill the Company's expectations in terms of technical expertise or management practice. For this reason, the Group is affirming its commitment to providing all employees with access to training throughout their careers.

Within the Group, 97% of companies carry out Annual Performance Reviews. These meetings provide a special opportunity for employees and managers to discuss and set objectives for the coming year and to review the employee's career path and the training completed over the past year. The

resulting joint analysis provides a starting point to decide on training for the following year in order to round out the employee's knowledge and expertise.

In 2015, the number of training hours (excluding e-learning) recorded in companies with more than 30 employees in which the Group had at least a 50% interest (i.e., 96.5% of the Group's workforce) amounted to 463,065 hours, or slightly more than 27 hours of training per employee per year (versus 334,278 hours, or 26 hours per employee, in 2014). The number of permanent employees who took at least one training course during the year (excluding e-learning) amounted to 17,062, or 93% of the Group headcount (versus 11,534, or 89%, in 2014).

In addition, 8,218 people undertook e-learning courses, representing 45% of employees (compared with 4,442 people, or 33% of employees, in 2014).

### 2.5.2.2 CAREER MANAGEMENT

Career management is one of the cornerstones in the development of human resources in the Group. It helps diversify the experiences that employees accumulate throughout their careers and thereby ensures that they regularly improve their skills, which is essential to the Group's development.

Career management therefore focuses on both:

- ensuring that the Company has the expertise that it needs to meet its development requirements today and in the medium-term;
- helping employees build their careers, thereby enabling them to increase their skills and implement their projects based on the potential and opportunities available in the Group.

Employee career management is provided by career managers, whose responsibilities include:

- overseeing career management at the corporate level for managers in France and level 15 jobs and higher internationally;
- working in collaboration with other career managers in their country or their site for non managers employees.

The Group has a single career management policy, meaning that it is based on the same principles regardless of the employee's status (manager or non manager), country, age or gender. These policy's objectives are as follows:

- providing each employee with the means to manage their career and with the necessary assistance at each step;
- implementing a proactive internal promotion policy;
- identifying and developing potential to promote increased responsibility and career development;
- promoting functional and geographic mobility;
- enabling all employees to advance in the Company and enrich their experience and skills while ensuring organizational flexibility.

The Annual Performance Reviews described in section 2.5.2.1 of this reference document provide management with an opportunity to appraise employees' suitability for promotion. In addition to these reviews, meetings with career managers provide an opportunity to review the employee's career path, their expectations and how they could advance their career in other Group Business Lines.

In addition to the recruitment targets for young people and seniors (see section 2.5.1.2 of this reference document), the jobs and skills management planning and intergenerational management agreement signed in September 2013 for Group companies in France includes measures for recognizing experts through skills/profession charts that complement the Hay classification. The agreement also provides for specific measures such as knowledge transfer, a retirement advice service, and the possibility of working 80% of full-time equivalent at 85% of the pay for the 24 months preceding retirement in order to facilitate the transition.

In the United States, HR teams have taken up the Success Factor system to back Talent Management operations. This system will be rolled out Group-wide in 2016.

A Talent Management function was set up in China in 2015. In liaison with HR departments in each country, this function covers employees across the whole of the Asia region.

A career development program has been rolled out Group-wide, covering high-potential employees in all countries. It is based on feedback to employees of comparative results from self-assessment and assessment by L+1 and L+2 line managers. This program provides input for drawing up individualized action and progress plans involving coaching, new experience and training.

### 2.5.2.3 INTERNATIONAL EXPERIENCE

The Group conducts its activities essentially in Europe, North America and Asia. It implements an international mobility policy to guarantee that the level of expertise required at all sites is met and to enhance the skills of employees by posting them to different environments.

This policy consists of five programs (including one set up in 2015) suited to the different international mobility objectives.

#### Expertise

This program allows Group employees to develop strategic Group projects in a foreign country that does not have the required skills locally, and therefore to actively participate in skills transfer to local employees.

#### Development

This program is designed to allow Group employees to develop their careers for a specific period of time (on average three years) by taking on a job in their area of expertise in another country where there is similar local expertise. Here they round out their knowledge then return to their country of origin with their newly acquired experience.

#### International

This program is for Group employees whose career is exclusively international with no further reference to their country of origin.

#### Expatriation in Europe

This program enables French employees of the Group to work on strategic projects or develop their careers in another European country.

#### Talent Program

This new program was set up in 2015 to offer international experience within the Group to talented young employees in initial job positions or on international volunteer programs.

### 2.5.2.4 SPECIAL PROFESSIONAL TRAINING PROGRAMS FOR EMPLOYEES

The Group's training policy aims to boost employees' skills in the areas of safety, health, professions of the Group, and management.

Actions along these lines in 2015 included the following:

- International rollout continued for the Group's Arkema Safety Academy training program, launched in 2014. As part of this, the program's Safety Culture module, which covers safety issues, policy and systems, was rolled out across the whole of the Group workforce. All of the Group's sites in Asia and the United States and most of its sites in Europe have been covered. The program will be rolled out at Bostik sites in 2016.
- New Group e-learning modules have also been developed on CSR issues and policy, the Group Code of Conduct and Business Ethics, personal protective equipment, and accident prevention through peer observation.
- Regional initiatives:
  - In Europe, the Share Strategic Challenges training program addressing new hires was rolled out across the new Group scope. This provided the fifty or so participants with a valuable

opportunity to develop their networks and meet members of the Group Executive Committee. The program has now been extended to Asia. The first courses in the Finance for Non-Specialists program were also given.

- In the United States, a wide range of training programs were rolled out covering objectives in organization, teamwork efficiency, leadership and career development. Throughout 2015, courses were run under the Arkema Manufacturing Program addressing key production positions at industrial sites, and under the Arkema Cornell Leadership Program addressing key functional, marketing and business positions.

Bostik is pushing ahead with its Bostik University program, which comprises courses in communications, leadership, marketing and innovation for key and high-potential positions.

In 2015, Arkema and Bostik employees attended joint training programs to develop interaction between the two groups. Exchanges will continue in 2016, along with discussions on program mergers.

A further session of the Arkema Executive Program, run by INSEAD, will be run in 2016. This two-yearly program is attended by forty or so high-potential men and women from different functions and countries across the Group.

## 2.5.3 Work organization

### 2.5.3.1 ORGANIZATION OF WORKING TIME

In every country, the Group implements working times that comply with the relevant statutory and professional requirements.

Employees work full time, and to a lesser extent part time. At Arkema France, for example, working time amounts to 1,575 hours per year for a full-time employee, while the number of working hours for part-time employees ranges from 50% to 80% of the full-time equivalent. In the United States, working time amounts to 1,960 hours per year for a full-time employee, while the number of working hours for part-time employees ranges from 50% to 90% of the full-time equivalent. For the Group overall, part-time employees accounted for 3.1% of the total workforce at 31 December 2015, compared with 3.7% in 2014.

Given the specific features of the Group's industrial activities, the organization of working times for some employee groups may involve continuous, discontinuous or semi-continuous work regimes.

In the event of additional workload or particular problems, the Group can make use of fixed-term employment contracts, overtime, subcontracted work, or temporary staff agencies in accordance with local legislation and depending on the job market.

### 2.5.3.2 ABSENTEEISM

The number of hours lost to absenteeism in the Group in 2015 (excluding authorized leave) was 3.4% of hours worked, compared with 3.5% in 2014. Absences on medical grounds accounted for 71.7% of the total number of hours of absence, compared with 70.7% in 2014.

## 2.5.4 Dialogue with social partners

The Group is committed to developing two-way feedback and consultation with its employees, either directly in the form of internal surveys or via employee representatives. In countries where the law does not provide for employee representation, specific bodies can be set up locally. A consultation and dialogue structure has been implemented at the European level with the European Works Council.

### 2.5.4.1 ORGANIZATION OF SOCIAL DIALOGUE

As part of its labor relations policy, the Group develops ongoing dialogue with employee representatives across all Group entities, in accordance with cultural norms and local laws and regulations.

The Group Human Resources policy is accessible on the intranet. It explains the principles for implementing social dialogue, which is in full compliance with the provisions of the Code of Conduct and Business Ethics.

The social dialogue body at the European level is the European Works Council, which consists of 26 members. It holds a one-day plenary meeting once a year to discuss issues within its remit, including:

- economic issues, such as changes in markets, sales position, activity levels, main strategic priorities, development prospects and goals;
- financial issues, including the Group's consolidated financial statements, annual report and investments;
- labor issues, like the Group's labor policy, the employment situation and any changes it may have undergone;
- environmental issues, such as the Group's policy and changes to European regulations;
- organizational issues, for example material changes to the Group's organization, changes to its activities and the creation or termination of activities affecting at least two European Union countries.

The 2015 plenary session was held on 3 July at the Arkema head office.

The European Works Council's liaison office, consisting of 11 members appointed among employee representatives within the council, meets yearly with management for updates on the Company's progress. A liaison office meeting was held on 19 March 2015.

In the United States, employees at sites with union representation are covered by collective bargaining agreements negotiated with local and central trade unions. With an average three-year term, these agreements notably cover compensation, the safety of people and processes, and quality of life at work.

In the People's Republic of China, members of the first Employee Representatives Congress (ERC) of Arkema China Investment, the

Group's main structure in China, were elected on 20 December 2007 and began operations in January 2008. The body currently comprises 34 members who elected among themselves the four members of the "Presidium". The ERC has a number of rights, ranging from pay negotiations to safety and training. It complements the labor unions already in place at the Group's industrial sites in China.

At all Bostik sites in China, there are employee representative bodies comprising elected or appointed employees. The rights of these bodies are similar to those at Group sites.

### Employee relations with regard to the Group's development

The Group acts within the framework of a structured, permanent consultation approach with employee representative bodies that aims to accommodate changes in the Group.

In particular, the various reorganization projects decided and implemented within the Group involve in-depth discussions with the employee representative bodies as part of information and consultation procedures, both centrally and locally. Much attention is paid to the treatment of the social consequences of these changes. The social support measures implemented during reorganization projects are focused on offering redundant employees the opportunity of internal or external redeployment under the best possible conditions and in line with national regulations.

On 9 September 2014, the Group presented employee representative bodies with a plan for shutdown of the Zaramillo site and the Madrid office in Spain, under its plan to improve the profitability of its fluorogases activity. Following several months of negotiations, an agreement was signed on 17 April 2015 with the ELA trade union and the Basque region's labor authorities. Shutdown of the Zaramillo site resulted in the loss of 59 jobs. An employment preservation plan with a number of different measures was implemented to ensure internal redeployment (functional or geographic) and external mobility (search for an external position or self-employment). An early retirement scheme was negotiated for employees in the upper age groups, consistent with the possibilities offered by Spanish legislation on the matter. To date, 6 employees have benefited from internal redeployment, 12 have found positions elsewhere, and 19 have opted for early retirement. At 31 December, 14 employees were still assigned to site safety duties.

On 11 February 2015, a procedure for information and consultation with employee representative bodies was begun regarding a project for reorganizing the Villers-Saint-Paul site in France following the very substantial decline in results for solventborne resin activities over several years. The project involved shutdown of the Coatings production sector and reorganization of the support services accordingly, leading to the loss of 26 jobs. Management took a full range of measures on redeployment, retraining and alternative employment for all the



employees concerned, setting up an employment mobility unit on completion of the information and consultation procedure with the employee representative bodies. At 31 December 2015, solutions had been found for 92% of the employees, more than 66% of whom were redeployed within the Group in France.

At the Central Works Council meeting on 29 May 2015, Altuglas International announced its project to shut down the Bernouville site. Altuglas International will be implementing support measures compliant with Group practices, to help all the employees concerned find appropriate individual solutions. Shutdown of the Bernouville site resulted in the loss of 39 jobs.

Under its program to sell non-strategic businesses worth a total of 700 million euros, announced in 2014, and to push ahead with its strategy of refocusing on its core businesses, in June 2015 the Group announced a project for selling the Sunclear group, a distributor of plastic and composite sheets with sites in France, Spain and Italy. In France, following the information and consultation procedure with employee representative bodies, Sunclear was sold to the Aramis group (owned by BF Invest) on 10 November 2015. This sale forms part of a coherent business development project and has no impact on headcount or employee status.

#### 2.5.4.2 OVERVIEW OF EMPLOYEE REPRESENTATION IN 2015

Percentage of Group employees, by region, with employee representation and/or trade union representation

	2015
France	100%
Rest of Europe	90.1%
North America	78.5%
Asia	82.1%
Rest of the world	50.5%
<b>GROUP TOTAL</b>	<b>88.2%</b>

#### 2.5.4.3 COLLECTIVE AGREEMENTS SIGNED IN 2015

Since the Group was founded, it has signed several collective agreements as part of its contract policy.

In France, some agreements were signed at the Group level and are, therefore, applicable to all Group companies in France. They are supplemented by company and facility agreements negotiated within these entities.

Outside of France, collective bargaining within the Group and its subsidiaries is carried out based on national customs regarding employee representation and relations with social partners.

The main topics for negotiation relate to overall compensation (salaries, health and welfare schemes, health cover, employee savings and other company benefits), employment and skills management, quality of life at work, health and safety at work and social dialogue.

The main agreements signed in France in 2015 were:

- Arkema France:
  - framework agreement on solidarity leave at Arkema France, 10 February 2015;

- agreement on support measures for arduous working conditions for shift workers, 26 March 2015;
- agreement on professional equal opportunity and diversity, 16 July 2015;
- agreement on annual collective bargaining for 2016, 18 December 2015.
- Coatex
  - agreement on compulsory annual collective bargaining for 2015, 14 January 2015.
- CECA
  - agreement on compulsory annual collective bargaining, 9 January 2015;
  - agreement on support measures for arduous working conditions for shift workers, 31 March 2015;
  - agreement on gender equality, 10 April 2015;
  - agreement on the composition of the Central Works Council, 10 December 2015.

- Altuglas International
  - agreement on extended deadlines for the Central Works Council information and consultation procedure on projects for shutting down activities at the Bernouville site and merging the accounting, payroll and customer credit functions of Altuglas International SAS and Arkema France, 4 September 2015;
  - agreement on compulsory annual collective bargaining, 21 December 2015.
- MLPC International
  - agreement on gradual work dispensation for shift workers, 9 July 2015;
  - agreement on health insurance coverage, 22 December 2015;
  - agreement on health and welfare insurance coverage, 22 December 2015.
- Bostik SA
  - 2015 pay agreement, 28 January 2015;
  - agreement on gender equality, 17 December 2015;
  - agreement on supplementary health insurance coverage, 17 December 2015;
  - agreement on supplementary health and welfare insurance coverage, 17 December 2015.

As part of Bostik's integration, Bostik SA signed four agreements to join the Group's employee savings schemes.

Outside of France, the social dialogue policy within the Group and its subsidiaries is carried out based on local customs applicable to employee representation and relations with social partners. The main developments include:

- in the United States, Arkema Inc. signed three agreements on compensation, retirement, and working hours and conditions;
- in Germany, Bostik GmbH and Arkema GmbH (Leuna, Günzburg, and Zwickau) signed several agreements on health and safety at work, working conditions and compensation;
- in Mexico, Arkema Mexico Servicios Sa De Cv and Bostik Servicios Mexico Sa De Cv signed agreements on union representation and social dialogue; working hours and conditions; compensation; training; and health and safety at work;
- in Japan, Arkema KK signed an agreement on working hours and conditions;
- compensation agreements were also signed in India (Bostik India Private Ltd.), Australia (Bostik Australia Pty Ltd.), Korea (Arkema Korea Ltd.), Argentina (Bostik Argentina SA), Denmark (Altuglas International Denmark A/S) and the United Kingdom (Bostik Ltd., Leicester and Stafford sites);
- profit-sharing agreements were signed in Brazil by Arkema Quimica Ltda, and in Italy by CECA Italiana Srl (Rho) and Arkema Srl.

## 2.5.5 Health at work

### 2.5.5.1 HEALTH AT WORK: AGREEMENTS AND INITIATIVES

In terms of health at work, the Group has undertaken continuous improvement initiatives to prevent arduous working conditions, stress and risks at workstations.

#### Agreements and initiatives to prevent arduous working conditions

In France, the February 2012 agreement on the prevention of arduous working conditions expired in 2015. Arkema France accordingly began renegotiation of the agreement, and this work will continue in 2016.

Initiatives to prevent arduous working conditions and improve ergonomics continued throughout 2015 in France, as outlined below:

- through work conducted with the Technical department since this program was begun, ergonomics considerations have been integrated in the Golden project (investments at the CECA facility in Honfleur), which makes specific allowance for operator feedback and for the ways in which the project

impacts the extent of arduous working conditions. Ergonomics considerations are also integrated in the Group's project methodology (Agate);

- the work situations library, listing the 150 situations analyzed by ergonomics specialists along with best practices implemented at sites to improve working conditions, has been supplemented with data on situations observed in the field. This database provides a highly valuable service when designing new plant;
- a full assessment of actions undertaken at sites was performed in 2015. Specific actions carried out at sites include workstation layout adaptation, development of handling assistance tools, analysis of work organization and skills development;
- discussions took place on a long-term program extension involving the appointment of site ergonomics correspondents. These correspondents would: (i) take part in site projects and studies requiring allowance for ergonomics and working conditions, (ii) take part in the various stages of projects managed by the Technical department, (iii) monitor actions requiring intervention on ergonomics, and (iv) take part in the work group managing prevention of accidents by peer

observation. The site ergonomics correspondents will be trained in these missions in 2016.

Bostik also invests, on a permanent basis, in reducing arduous working conditions at its production units. Many improvements were made in 2015, at sites worldwide. Examples include:

- Guangzhou, China: new sack handling arm for loading raw materials (around 100,000 to 150,000 per year);
- Wauwatosa, USA: new equipment replacing manual operation for turning sheet metal rolls (weighing 30kg) on the lamination line (10,000 to 15,000 rolls per year);
- Coubert, France: reformulation of three different master batches into a single product, the manufacture of which can be mechanized. Since the new product is in liquid form, there is no more need to handle sacks of powder;
- Stafford, UK: equipment confinement to reduce operators' exposure to noise.

In the United States, the Wellness Matters program developed by Arkema Inc. provides a formalized approach to "health culture", the aim being to raise awareness among employees and their families on health and wellbeing at work. The program includes information campaigns on issues such as healthy living and compliance with safety instructions, for enhanced efficiency and minimum call on medical care. At each site there is at least one Wellness Champion promoting wellbeing activities, health education, check-ups and preventive health measures such as influenza vaccination. Employees receive quarterly health and safety bulletins at their homes. There are also regular training seminars on stress management.

### Agreements and initiatives for stress prevention

Arkema France launched a voluntary individual medical workplace stress prevention initiative in 2008. It is based on a diagnosis of employee stress levels established during a medical check-up with the French occupational health observatory, OMSAD. In 2009, the Group also launched a voluntary collective workplace stress prevention initiative designed to take action in the work environment when it is identified as a potential risk based on relevant indicators, such as an overly high rate of "excess-stress".

This collective workplace stress prevention initiative was included in an agreement with Arkema France signed by four out of five unions in May 2010. Under the agreement, the Group reaffirmed its goal of providing all of its employees with a working environment that promotes well-being.

The agreement covers collective preventive actions (such as training, communication and personal support) and the introduction of a procedure for identifying potential risk areas, analyzing them with a view to identifying stress factors, and putting in place corrective actions.

The primary stress prevention actions carried out in this area in 2015 include:

- new mapping of OMSAD results on the basis of input from questionnaires from mid-2013 to end-2014;
- start of qualitative studies on populations at risk identified from the OMSAD mapping;
- update of database of organizations capable of carrying out qualitative studies;
- awareness-raising and prevention sessions on burnout, addressing directors, HR managers, the central observatory on stress, and head office and Cetia employees; issue of a questionnaire on burnout prevention for Cetia employees;
- ongoing awareness-raising operations on information and communications technologies (ICT) usages and behaviors, with a week-long campaign on the mental workload entailed by digital practices;
- development of local initiatives on quality of life at work, with conferences at the head office and Pierre-Bénite sites.

In 2016, Bostik France plans to implement the stress measurement system used at other Group units in France. A management education program on the issues of burnout and harassment will be rolled out across all Group sites in France.

### Initiatives to protect health at the workstation level

To consolidate its occupational health and safety initiatives at the workstation level, the Group is developing STARMAP, a workstation health and safety risk assessment tool.

STARMAP takes over from the Franco-American MRT (Management of Risks and Tasks) tool, with a centrally managed library of best practices and data to promote health and safety risk prevention worldwide.

### Agreements on early employee retirement at sites with asbestos

In France, five Group sites in operation were included by ministerial decree on a list of sites qualifying for early retirement provisions for asbestos workers available to people still in employment. The Group cannot exclude the possibility that other sites will be added to this list in the future.

Accordingly, on 30 June 2003, Arkema France concluded an agreement with all representative trade unions aimed at improving the retirement terms of its employees as part of these measures, and at adjusting the retirement date for those employees concerned in order to facilitate skills and knowledge transfer within the Group. These measures were extended to all Group companies in France by a Group agreement concluded on 1 September 2007 with all trade unions. For more information, see note 20 to the 2015 consolidated financial statements in section 4.3.3 of this reference document.

### 2.5.5.2 MEDICAL CARE

Regular medical check-ups were available in 95.5% of the Group's companies in 2015, representing 95.2% of the Group's employees.

### 2.5.5.3 OCCUPATIONAL ILLNESSES

The Group has used toxic or hazardous substances in the manufacture of its products, and continues to do so. Despite the safety and monitoring procedures that have been instituted at the Group and production site levels, Group employees may have been exposed to such substances and may develop specific illnesses as a result of such exposure.

In this respect, like most industrial companies, the Group used a variety of insulating or heat-proofing materials containing asbestos at its industrial facilities in the past. Consequently, certain employees may have been exposed to such materials before these were gradually phased out and replaced with substitute products by the Group.

Claims for occupational illnesses related to past asbestos exposure have been filed against the Group, mostly for periods before 1980. Risks related to occupational illness are described in section 1.7.2 of this reference document.

As regards industrial hygiene, the Group requires the implementation of assessments of exposure risks at workstations and ensures that residual exposure by employees to hazardous chemical products is regularly measured. These measures are in addition to the introduction of enclosed industrial processes limiting emissions as much as possible, collective protective measures such as source capture of residual emissions, general improvement work designed to minimize exposure risks, and personal protective measures adapted to each task. The aim of these measures is to prevent future risks of occupational illnesses where possible. Measurement data are kept in conditions that guarantee their long-term integrity.

In 2015, 79 occupational illnesses were reported at the Group level, of which 13 were related to exposure to asbestos and 5 to exposure to chemical products.

In France, the Group is also developing a traceability policy for potential exposure to arduous working conditions identified on its sites, including chemical risks, as part of its single risk assessment document, in accordance with French regulations. The Group has been working since 2012 to digitize these data, while adapting them to the requirements of the 2010 and 2014 laws on arduous working conditions. The STARMAP tool (see section 2.5.5.1) will manage internal traceability and track arduous working conditions in line with the Group's international scope.

## 2.5.6 Diversity and equal opportunity, equal treatment

Equal opportunity is one of the priorities of the Group's human resources policy, along with the prevention of discrimination in general. The Group notably takes steps aimed at ensuring gender equality, promoting the integration of disabled employees, and observing the principle of non-discrimination as regards age and nationality. Measures put in place to ensure equal opportunity and obtain quantifiable results include:

- a program of regular job description reviews to ensure that they accurately reflect the required duties and responsibilities, and an annual review of positions, their titles and the profiles required, department by department, in order to safeguard equality and consistency within the professions;
- a recruitment policy based on the sole criterion of suitability for the job. In the United States, for example, Arkema Inc. gives training to the people involved in the recruitment process, provides them with descriptions of the job and the profiles required, and remedies any situations where there is an underrepresentation of minorities or women at Company facilities.

### 2.5.6.1 MEASURES TAKEN TO PROMOTE GENDER EQUALITY

Over recent years, the Group has developed a policy of gender equality and equal pay.

Initiatives in this respect concern the following four areas:

- strengthening the principle of non-discrimination in access to employment;
- ensuring that the principle of equal pay is implemented;
- promoting and facilitating career development;
- promoting parenting within the Company.

An agreement on gender equality and diversity was signed in 2015 at Arkema France.

The main points in the Arkema France agreement cover recruitment and induction, compensation and promotions, access to training and work/life balance. The agreement also restates Arkema France's objectives on recruitment of young people and seniors as set out in the strategic jobs and skills management planning agreement, and the main measures on employment for disabled persons.

In 2016, the Group will strengthen its policy on recruitment and promotion for women at grade 15 and higher. Specific actions are planned, including the development of a mentoring program. This program, run by senior executives, seeks to develop female employees' access to positions of responsibility. It will begin with the appointment of a steering committee in early 2016. Bostik has also been running a diversity promotion program since 2011. A diversity council, with delegates from each region, meets regularly to discuss development focuses and specific actions. Communications campaigns on diversity are also run regularly.

The Group ensures that female employees are offered the same career development opportunities as their male counterparts. At Arkema France, women accounted for 5 of the 13 promotions to executive positions in 2015 (38%, compared with 22% in 2014).

In the United States, Arkema Inc. created an affirmative action plan supporting gender and pay equality between all employees and job applicants with similar qualifications, regardless of origin, ethnicity, nationality, religion or gender. Site-specific plans are updated each year for the period from 1 June to 31 May. To make proper allowance for diversity in recruitment, all Arkema Inc. vacancies inviting applications from outside the Company are posted or released on various recruitment sites designed to reach women, disabled persons and former members of the armed forces. Information on vacancies is also posted to local community organizations that help people in these categories find employment.

In 2015, women accounted for 17% of employees at level 15 positions and higher.

### 2.5.6.2 MEASURES TO PROMOTE THE EMPLOYMENT AND INTEGRATION OF PEOPLE WITH DISABILITIES

#### A disability agreement for the period 2014-2016

The agreement covering the period from 2014 to 2016 is the third on the subject signed by Arkema France with unanimous approval from the trade unions. It confirms the following commitments by the Company:

- maintaining disabled people in employment and guaranteeing them access to training and career development;
- conducting an open recruitment and integration policy;
- hosting young people in training;
- developing partnerships with the protected sector;
- raising awareness within the Company.

It also includes the following new recruitment objectives:

- achieving an overall employment rate for people with disabilities of 4.45%;
- recruiting at least 16 people on permanent contracts;
- training at least 16 people as part of work-study programs;

- contracting 14 full-time equivalent employees on fixed-term or temporary assignments;
- signing 40 internship/trainee agreements;
- increasing the amount spent before tax on the labor component of subcontractor contracts by 5% compared with the average amount for the period from 2011 to 2013.

The following actions were taken in 2015:

- work continued on the appointment and training of volunteer local disability correspondents, with two training sessions in 2015. Disability correspondents take charge of facilitating the integration of disabled employees;
- Group nurses were trained to assist in sustained employment for disabled employees;
- partnerships with education were stepped up, with support for the Science Po Accessible campaign;
- a program on digital accessibility was begun, covering (i) accessibility for key communications materials (HR and disability), (ii) accessibility instructions for internal and external use, (iii) awareness-raising operations addressing communications agencies and HR and communications teams, and (iv) communications on accessibility during disability week;
- a program was begun for the support and integration of disabled persons referred to the Group by ESAT, French centers that help people with disabilities enter the workforce. A number of measures were identified, including provision of employees, work by Group employees at ESAT centers, inclusion of ESAT users on the Group payroll, and funding for training and equipment for ESAT centers.

#### Implementation of suitable training programs

Executive management and employee representative bodies are especially attached to the notion of promoting employability through special training programs, a key point in the Group's policy on disability. The first training session qualifying chemical industry manufacturing operators, designed in 2012 in partnership with the INTERFORA training institute and other chemical industry companies, was completed in 2014. The operation will be continuing for its third year in partnership with chemical industry companies and institutions in the Rhône-Alpes region.

### 2.5.6.3 ANTI-DISCRIMINATION POLICY

The action plan for the employment of seniors, which took effect on 1 January 2010 for a period of three years, ended on 31 December 2012. It resulted in the recruitment of 697 employees on permanent contracts, 54 of whom (7.74%) were aged 50 and over.

In 2013, the issue of employment of seniors was included in the agreement on strategic jobs and skills management planning and intergenerational management in Group companies, signed on 12 September 2013 by the CFDT and CFE-CGC trade unions (see section 2.5.2.2 of this reference document).



For the purposes of this agreement, “seniors” are defined as people aged 50 and over. The Group committed to the following actions in the agreement:

- a recruitment target of 10% of permanent contracts for people aged 50 and over;
- efforts to keep seniors in employment;
- end-of-career assistance;
- retirement planning;
- knowledge transfer.

In 2015, there were 259 new hires on permanent contracts in the Group in France, 31 of whom were aged 50 or over, amounting to 12% of all new hires compared with 11% in 2014.

Legislative changes in France in relation to retirement and senior employment resulted in a modification to corresponding employee-related liabilities as described in note 19 to the 2015 consolidated financial statements in section 4.3.3 of this reference document.

## 2.5.7 Promotion and compliance with the provisions of the fundamental conventions of the International Labour Organization

The Group endeavors to scrupulously comply with the constitutional texts, treaties, conventions, laws and regulations in force in its host countries and regions.

Accordingly, the Group confirms its adherence to:

- the principles of the Universal Declaration and of the European Convention on Human Rights;
- the fundamental conventions of the International Labour Organization;
- the OECD Guidelines for Multinational Enterprises.

Through its official participation in the United Nations Global Compact, the Group supports the ten principles and particularly those related to human rights and international labor standards.

To confirm this support, the Group introduced a Group Code of Conduct and Business Ethics, which sets out the requirements imposed on the Group wherever it operates, vis-à-vis its shareholders, customers, employees and any other stakeholders. The Code also lays down the individual behavior principles and rules which employees are required to observe within the Group.

As indicated in section 2.4.3 of this reference document, the Group has implemented a number of different training and awareness-raising initiatives directed at employees. The aim is to ensure that they comply with the rules and principles of the Code and, in particular, that they respect the right to freedom of association and expression and human rights, that they oppose all forms of forced labor and child labor and that they reject all forms of discrimination.

### 2.5.7.1 FREEDOM OF ASSOCIATION AND THE RIGHT TO COLLECTIVE BARGAINING

The Group is committed to respecting the fundamental freedoms of its employees, such as the freedom of association and expression, to protecting the personal data of its employees and to respecting their privacy, as defined in the Code of Conduct and Business Ethics.

Among the fundamental principles and rights at work, the right to freedom of association and to collective bargaining is a vector of social progress that the Group encourages wherever it operates.

Accordingly, over and above compliance with statutory and regulatory provisions in its host countries, the Group facilitates and promotes employee representation in order to allow suitable collective bargaining processes to be developed.

The organization of social dialogue and a review of the collective bargaining agreements signed within the Group are provided in section 2.5.4 of this reference document.

### 2.5.7.2 ELIMINATION OF EMPLOYMENT AND OCCUPATION DISCRIMINATION

The Group is committed to promoting the elimination of discrimination of all kinds as part of its policy of non-discrimination and promotion of gender equality and diversity.

The Group undertakes to promote diversity, which is an asset for its global business, and to hire employees based solely on its needs and their abilities, as defined in the Code of Conduct and Business Ethics.

The Group's diversity, equal opportunity and equal treatment policy is detailed in section 2.5.6 of this reference document.

### 2.5.7.3 ELIMINATION OF FORCED OR COMPULSORY LABOR AND ABOLITION OF CHILD LABOR

The Group fully supports the elimination of forced labor and opposes any type of labor which involves forcing people to work against their will or in violation of their personal freedom, as defined in the Code of Conduct and Business Ethics.

The Group commits to never using child labor under any circumstances, regardless of the country in which the Group operates, as defined in its Code of Conduct and Business Ethics.



## 2.6 METHODOLOGY NOTE

### 2.6.1 Methodology note on environmental and safety indicators

#### 2.6.1.1 ENVIRONMENTAL REPORTING TOOLS AND SCOPE

##### Extensive data

The Group's extensive quantitative environmental data are compiled by its Reporting of Environmental and Energy Data system (REED), which is accessible worldwide via the web platform of a service provider.

The values of the extensive indicators, once published after verification by the Independent Third-Party auditor, are not amended in the REED system. Any subsequent retroactive modifications made, whether due to a change in the estimation method or to a correction, are addressed in section 2.2 of this reference document.

The data are entered by site Health, Safety and Environment (HSE) departments and validated at the geographic level then the Group level.

The scope of consolidation for environmental reporting covers all Group sites for which operations (and emissions) permits were held in the name of the Group or a majority-owned subsidiary at 31 December 2015.

The activities sold or terminated in 2015 are not included in the scope of reporting for 2015, but are still included for previous years.

For activities that were acquired in 2015 (Bostik in particular), all operations for the year are included in the scope of reporting. Throughout this reference document, mention is made wherever relevant on how Group results are affected by the inclusion of data for Bostik sites, and on any particularities arising from this inclusion.

The Taixing Sunke Chemicals site in Taixing, China, run jointly by Arkema and Jurong Chemical since 2014, reported partial environmental indicator data in 2015. All indicators were included except: "Substances contributing to acidification", "Carbon monoxide", "Dust", and "Volatile organic compounds (VOCs)". This is indicated in note (18) to the table of indicators (section 2.7). All indicators for the Taixing site will be included in Group reporting from 2016.

Activities started in 2015 are reported from their start-up date.

##### Intensive data (EFPIs)

In order to manage its environmental performance more accurately and provide a consolidated Group data report that better

describes changes to this performance, the Arkema Group has adopted a methodology allowing its facilities to report intensive indicators, known as Environmental Footprint Performance Indicators (EFPIs). This methodology is used by the Group to calculate the intensity of emissions or resource consumption relative to production volumes, compared with a baseline year. It minimizes the impact of any changes to the Group's business base and production from its plants, as well as any changes to the method used to estimate or calculate environmental footprint variables.

The Group's intensive quantitative environmental data are compiled by the same REED environmental reporting system, which is accessible worldwide via the web platform of a service provider.

EFPI data are entered by site Health, Safety and Environment (HSE) departments and validated by the Industrial Vice-President then at the Group level. They are subject to a large number of consistency tests.

The scope of consolidation for EFPI reporting covers Group sites for which operations (and emissions) permits were held in the name of the Group or a majority-owned subsidiary at 31 December 2015 and which are among the biggest contributors of the Group's sites. These sites account for a minimum of 80% of the Group's emissions or consumption from the previous year.

Any activities sold or terminated in 2015 are not included in the scope of EFPI reporting for 2015, but are still included for previous years.

Activities started up in the course of 2014 will be included in the scope of EFPI reporting in 2016 compared with their 2015 performance.

Activities that were acquired in 2015 will be included in the 2017 scope of EFPI reporting for all 2017 operations as compared with their 2016 performance.

The Group nevertheless decided that Bostik data should be included in its scope of EFPI reporting for 2015. Throughout this reference document, mention is made wherever relevant on how Group results are affected by the inclusion of data for Bostik sites, and on any particularities arising from this inclusion.

The Hengshui, China site of Hebei Casda Biomaterials Co. Ltd. and the Zhangjiagang, China site of Suzhou Hipro Polymers Co. Ltd., acquired in 2012, are included in the scope of EFPI reporting for 2015, comparative with 2014 performance, consistent with the Group's reporting methodology.

American sites that began reporting their emissions to water, expressed in terms of chemical oxygen demand (COD), in 2013 will only be included in the scope of COD EFPI reporting from 2014 or 2015 onward.

The methodology used to calculate EFPIs allows for new reporting sites to be included within the scope of the Group's previous performance. Should the inclusion of a large number of new sites result in a significant change to the confidence interval in this calculation of the Group's EFPI, consideration will be given to whether an adjustment factor should be applied or whether the use of a new baseline year be required.

### 2.6.1.2 SAFETY REPORTING TOOLS AND SCOPE

Quantitative data concerning safety:

- are recorded in the SafetyLog application accessible on the Group's intranet;
- are entered by the sites and validated by head office;
- cover all industrial sites operated by the Group or by majority-owned subsidiaries, head offices and research and development centers;
- did not include vinyl-producing sites sold in 2012 in the 2012 data;
- cover Bostik from 2015 unless specified otherwise.

### 2.6.1.3 CHOICE OF INDICATORS, MEASUREMENT METHODS AND INFORMATION TO USERS

The Group has defined these indicators in order to monitor various emissions and consumption levels that are relevant to its activities in accordance with the French law on new reporting requirements and the associated decree of 20 February 2002.

These indicators were set out at the time of the Group's creation and have been monitored since the 2006 reporting year.

They also comply with the regulatory requirements of Article 225-I of the French "Grenelle II" Law No. 2010-788 of 12 July 2010 and its application decree of 24 April 2012.

Environmental reporting is covered by an Environmental Reporting directive, an EFPI Reporting directive and an Energy Reporting directive, which are issued by the Group Safety and Environment (DSEG), Sustainable Development (DDD) and Energy Procurement departments (DAMPE) and accessible to all employees via the Arkema Group's intranet.

Calculation and estimation methods are subject to change, for example due to changes to national or international regulations, measures to improve consistency between regions, or problems arising out of their application.

The directives may then be adapted into guides, which are accompanied by training sessions per region as required.

Safety reporting is the subject of a Monthly Safety Reporting directive issued by the Group Safety and Environment department and accessible to all employees via the Group's intranet.

### 2.6.1.4 DETAILS ON ENVIRONMENTAL AND SAFETY INDICATORS

The following information is provided to clarify the definition of the indicators applied by the Group.

#### Total substances contributing to acidification

This indicator is calculated using sulfur oxide (SO<sub>x</sub>), ammonia (NH<sub>3</sub>) and nitrogen oxide (NO<sub>x</sub>) emissions converted into tonnes of sulfur dioxide (SO<sub>2</sub>) equivalent.

#### Volatile organic compounds (VOCs)

The list of products regarded as VOCs may vary from country to country, in particular between Europe and North America.

The VOC definitions used by the Group are those recommended in Europe by directive 2010/75/EU on industrial emissions, known as the Industrial Emissions directive (IED).

Emissions from American sites are therefore obtained by adding products such as fluorinated organic compounds to national reported data.

#### Chemical oxygen demand (COD)

For reporting purposes, COD emissions are those emitted into the natural environment.

In cases where water from a Group facility is treated in an external treatment plant, the reported data takes into account the effectiveness of treatment by the external treatment plant.

In cases where a Group site takes in external COD-laden water, the Group's reported data concerns the COD load effectively introduced by the Group (outgoing minus incoming).

#### Waste

The distinction between hazardous and non-hazardous waste may vary from one region to another. The definitions used by the Group are those of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal.

By-products that are sold to third parties for reuse without processing at a Group site are not counted as waste.

#### Water consumption

All sources of water are included in the reported data, namely groundwater/wells, rivers, the sea, public or private networks and drinking water, excluding rainwater collected in separate networks.

#### Energy consumption

Reported consumption corresponds to net energy purchases.

This indicator does not include self-generated energy, which corresponds to the energy produced by exothermic chemical reactions and therefore does not deduct from the planet's energy resources.

Sales of energy are deducted from purchases of energy. This is the case, for example, for sites fitted with cogeneration facilities that generate steam and electricity from purchased gas (reported), then sell the electricity (deducted).

In cases where sites do not have any December data due to late reporting by energy providers, the values for the year are extrapolated from the data at end-November.

### Direct greenhouse gas (GHG) emissions

For reporting purposes, direct GHG emissions correspond to those defined in the Kyoto Protocol.

Their impact is calculated in equivalent tonnes of carbon dioxide (t CO<sub>2</sub> eq.).

In this report, 2012 emissions have been calculated using the Global Warming Potential values published in 2007 by the Intergovernmental Panel on Climate Change (IPCC).

For intensive data, EFPI calculations include fluorinated greenhouse gases that are not listed in the Kyoto Protocol but are listed in the Montreal Protocol.

### Indirect greenhouse gas (GHG) emissions

For the purposes of this report, indirect Scope 2 CO<sub>2</sub> emissions were calculated using electricity and steam consumption and emission factors in tonnes per kilowatt-hour (KWh) or tonnes of steam provided by Group site suppliers. Where this was not possible, they were calculated using figures provided by local authorities, such as those available in the EPA-2012 database in the United States, the 2013 Baseline Emission Factors for Regional Power Grids issued by China's National Development & Reform Council (NDRC) for China, SEMARNAT data issued by Mexico's Federal Environmental Agency for Mexico and data issued by the French environment agency, ADEME, on several countries.

In 2015, an error was detected in the steam emission factors used for the Changhsu site in 2014. This reference document uses corrected values for 2015 and 2014.

For the purposes of this report, Scope 3 indirect CO<sub>2</sub> emissions were estimated using internal Group company logistics data, which account for 99% of Group shipments. These data are made

up of measurements of tonnes transported, number of shipments, weight transported per shipment and average mileage for each type of transportation. The measurements are then converted into tonnes of CO<sub>2</sub> emitted during transportation using the emission factors for the different modes of transportation defined in the "Guidelines for Measuring and Managing CO<sub>2</sub> Emissions from Freight Transport Operations". Published by the European Chemical Transport Association (ECTA) and the European Chemical Industry Council (CEFIC) in March 2011, these guidelines are based on the work of Professor Alan McKinnon of Heriot-Watt University in Edinburgh, UK.

Because of an enterprise resource planning (ERP) change, 2015 data for world liner shipping and European road transportation (Arkema France, Spain, Germany, Netherlands and Italy) had to be estimated by extrapolation from the 2014 figures. For liner shipping, estimated values are taken for the volume transported (estimated on the basis of variation in the number of containers shipped from 2014 to 2015) and for the shipping mileages (estimated on the basis of average distances between departure and arrival zones). For road transportation, CO<sub>2</sub> impact in 2015 was estimated on the basis of volumes transported in 2015 and average transportation mileages in 2014.

### Accidents

Total recordable injury rates (TRIR) and lost-time injury rates (LTIR) are calculated for all of the Group's own employees as well as for subcontracted workers on Group sites on the basis of US standard 29 CFR 1904.

### Process safety

The safety performance of the processes in use at industrial sites is evaluated by means of performance indicators that measure and analyze process safety incidents. The Group reports on and classifies process safety indicators to CEFIC (European Chemical Industry Council) guidelines.

## 2.6.2 Methodology note on social and societal information/indicators

### 2.6.2.1 SCOPE AND REPORTING TOOLS

The Group's quantitative social data are taken from several different reporting processes.

The headcount data in sections 2.5.1.1 and 2.5.1.2:

- are recorded in the AREA 1 application accessible via the Group's intranet;
- are entered by the human resources managers or the managers of Group companies (depending on their size);

- are validated at the Arkema, Altuglas International, Bostik, CECA, Coatex and Sartomer group levels;
- cover all companies in which the Group has at least a 50% interest;
- cover Bostik from 2015 unless specified otherwise.

The quantitative and qualitative data concerning other social and societal information:

- are recorded in the AREA 2 application accessible via the Group's intranet;

- are entered by the human resources employees of regional companies and subsidiaries;
- are validated by the regional human resources directors or subsidiary managers;
- cover all companies of 30 or more employees in which the Group has at least a 50% interest, which amounts to 96.5% of the Group's total headcount;
- cover Bostik from 2015 unless specified otherwise.

Any modifications or corrections to previous years' data are noted in section 2.6.2.3 of this reference document.

### 2.6.2.2 CHOICE OF INDICATORS, DETERMINATION METHODS AND INFORMATION TO USERS

The Group has defined indicators that are relevant to its activities and its social policy.

Indicators concerning employees and the safety performance were put in place at the time of the Group's creation, and have been monitored since 2006.

Additional social information and indicators, and societal data, were made part of a new reporting process in 2012 via the AREA 2 compilation system. Their use was gradually extended in 2013, in particular with regard to the monitoring of reported training hours.

The information and indicators also comply with the regulatory requirements of Article 225-I of the French "Grenelle II" Law No. 2010-788 of 12 July 2010 and the application decree of 24 April 2012.

Social reporting is covered by different procedure documents in the form of AREA 1 and AREA 2 guides, which have been provided to all people in charge of reporting and validating data.

The calculation methods may have limitations and be subject to change, for example due to national social regulations and practices varying from one region to another, difficulties reporting certain information in some areas, or unavailability of information in some countries.

### 2.6.2.3 DETAILS ON SOCIAL INFORMATION AND INDICATORS

#### Headcount

For the purposes of reporting, headcount includes employees on the Group's payroll (employees present and employees whose employment contract – regardless of its nature – has been suspended) at 31 December of the reporting year.

Permanent employees are defined as employees that have signed an employment contract for an indefinite period of time. Outside of France, employees engaged on fixed-term contracts for periods of more than 12 months and renewed more than once are also included among permanent employees.

#### Categories of employees

Data are presented by professional category. In France, manager status (*cadre*) is determined by the collective bargaining agreements governing the Company. Outside of France, employees with a Hay job level of 10 or more are considered managers.

#### New hires

These data cover the recruitment of employees on permanent contracts (permanent headcount) only.

#### Compensation

Collective variable components are defined as components that vary depending on overarching economic criteria and the economic and financial results of the employee's Company. In France, these take the form of incentive schemes and profit-sharing plans.

#### Health and welfare

Health and welfare cover refers to benefits from a collective or mutual insurance scheme providing cover for incapacity/disability/death risks.

#### Training

Training hours are defined as the hours spent in training by Group employees on permanent contracts (excluding e-learning).

During verification by the Independent Third-Party auditor for 2015 reporting, an error was detected in the 2014 data reported by Arkema Inc. The figure of 136,992 training hours reported under "education assistance" should have read 13,692 hours. The corrected Group value for 2014 is therefore 334,000.

This correction does not impact Group data on environment and safety training in 2014.

#### Absenteeism

The absenteeism rate corresponds to the total number of hours of absence in the year (due to sickness, injuries, maternity leave, strikes and unpaid leave but excluding paid leave) divided by the total number of hours worked in the year.

## 2.7 INDICATORS

		2015	2014	2013
<b>SAFETY</b>				
Total recordable injury rate (TRIR) <sup>(1)</sup>		1.5	1.9	2.8
Lost-time injury rate (LTIR) <sup>(1)</sup>		1.1	1.1	1.6
Quota of AIMS-audited sites <sup>(2)</sup>	%	61	78	62
Quota of Sites implementing peer observation	%	57	77	62
Quota of Safety, environment and maintenance expenditure	€m	203	211	195
Quota of OHSAS 18001-certified sites	%	52	60	54
Quota of OHSAS 18001-certified sites in Europe	%	51	62	
Quota of OHSAS 18001-certified sites in the Americas	%	60	63	
Quota of OHSAS 18001-certified sites in Asia	%	45	50	
Number of Process Safety Incidents (PSIs)		27	33	33
<b>ENVIRONMENT</b>				
Quota of ISO 14001-audited sites <sup>(3)</sup>	%	62	70	59
Quota of ISO 14001-audited sites <sup>(3)</sup> in Europe	%	69	68	
Quota of ISO 14001-audited sites <sup>(3)</sup> in the Americas	%	60	84	
Quota of ISO 14001-audited sites <sup>(3)</sup> in Asia	%	41	50	
<b>Emissions to air</b>				
Substances contributing to acidification <sup>(18)</sup>	t SO <sub>2</sub> eq.	4,430	4,750	5,330
Carbon monoxide <sup>(18)</sup>	t	1,900	3,030	8,850
Volatile organic compounds (VOCs) <sup>(4)</sup> <sup>(18)</sup>	t	5,010	4,600	4,460
Dust <sup>(18)</sup>	t	520	430	400
<b>Emissions to water</b>				
Chemical oxygen demand (COD)	t O <sub>2</sub>	3,200	3,870	3,800
Suspended solids	t	870	3,030	2,950
<b>Waste</b>				
Hazardous waste (excluding material recovery)	kt	151	149	160
• of which landfill disposal	kt	2.5	2.1	2.7
Hazardous waste recycled into materials	%	15	16	15
Hazardous waste utilized for energy recovery	%	47	46	49
Non-hazardous waste	kt	231	219	210
<b>Resources</b>				
Total water withdrawn	Mm <sup>3</sup>	124	120	130
Net energy purchases	TWh	8.48	8.36	8.50
• of which in Europe	TWh	4.66	4.65	
• of which in the Americas	TWh	2.69	2.78	
• of which in the Rest of the world	TWh	1.12	0.93	
Net energy purchases by type				
• fuel	TWh	4.69	4.52	
• electricity	TWh	2.70	2.44	
• steam	TWh	1.08	1.40	

		2015	2014	2013
Natural gas in net purchases of fuel	%	89	90	
Low-carbon electricity in net energy purchases	%	17	17	
Direct greenhouse gas (GHG) emissions <sup>(5)</sup>	kt CO <sub>2</sub> eq.	3,000	3,430	4,710
• of which CO <sub>2</sub>	kt CO <sub>2</sub> eq.	1,440	1,380	1,470
• of which HFC	kt CO <sub>2</sub> eq.	1,510	2,010	3,200
Direct greenhouse gas (GHG) emissions <sup>(5)</sup> by region				
• Europe	%	33	30	
• Americas	%	59	60	
• Rest of the world	%	8	10	
Scope 2 indirect greenhouse gas (GHG) emissions of CO <sub>2</sub>	kt	1,300	1,067	1,053
• of which in Europe	kt	272	284	
• of which in the Americas	kt	521	545	
• of which in the Rest of the world	kt	507	239	
Scope 3 indirect greenhouse gas (GHG) emissions of CO <sub>2</sub> (at more or less 20%)	Mt	0.2	0.2	
Number of energy diagnostics in progress or completed		37	20	
• of which in Europe		28	14	
• of which in North America		8	5	
• of which in Asia		1	1	
Number of Arkenergy investments		38	47	
• of which in Europe		21	31	
• of which in North America		10	12	
• of which in Asia		7	4	
Number of ISO 50001-certified sites		17	5	
Number of sites where ISO 50001 certification is in progress		14	10	
<b>Adaptation to the consequences of climate change</b>				
Number of sites exposed to a severe risk of storms and/or flooding		21	18	
Sales from products made in full or in part from renewable raw materials	%	N/A	13	
<b>SOCIAL</b>				
<b>Headcount</b>				
Total headcount at 31 December <sup>(6)</sup>		18,912	14,280	13,908
• of which permanent employees		17,801	13,832	13,434
• of which fixed-term employees		1,111	448	474
Headcount in management positions	%	25.8	25.1	26.3
Women employees	%	23.8	23.7	23.3
Women in management positions <sup>(7)</sup>	%	17	17	19
New hires <sup>(8)</sup>		1,450	1,022	864
Women new hires	%	25.4	25.0	20.0
New hires aged 50 and over	%	8	9.8	8.2



		2015	2014	2013
New hires aged under 30	%	41.6	41.5	39.5
Departures <sup>(9)</sup>		2,753	1,905	1,352
• of which resignations		758	379	362
• of which dismissals		253	252	224
• of which departures following a divestment/merger		354	213	0
Part-time employees	%	3.1	3.7	3.3
<b>Training</b>				
Number of training hours <sup>(10)</sup>	thousands	463	334	307
Number of training hours per employee		27	26	23
Number of permanent employees who received training <sup>(11)</sup>		17,062	11,534	10,082
Number of employees who undertook e-learning courses		8,218	4,442	3,585
Number of safety training hours	thousands	173	150	
Number of safety training hours per employee		12	17	
Number of employees who received safety training (excluding e-learning)		14,582	8,776	
Number of employees who undertook safety-related e-learning courses		5,538	4,263	
Number of environment-related training hours		20,447	15,837	
Number of environment-related training hours per employee		7.2	7.6	
Number of employees who received environment-related training (excluding e-learning)		2,841	2,070	
Work-study students <sup>(12)</sup>	%	4.2	4.6	4.5
Group companies conducting Annual Performance Reviews	%	97	95.6	
<b>Health and welfare</b>				
Absenteeism <sup>(13)</sup>	%	3.4	3.5	3.4
Hours off work on medical grounds	%	71.7	70.7	73.5
Employees benefiting from medical follow-up	%	95.2	83	84
Employees benefiting from supplementary disability cover	%	86	95	95
Employees benefiting from supplementary life insurance cover	%	92	95	95
Employees benefiting from death benefit cover <sup>(14)</sup>	%	75	80	80
<b>Compensation</b>				
Employees benefiting from minimum compensation guarantees	%	99.5	99	98
Employees benefiting from collective variable compensation components	%	60	65	60
Employees benefiting from individual variable compensation components	%	22	18	15
<b>Representation</b>				
Employees benefiting from employee and/or trade union representation <sup>(15)</sup>	%	88.2	94.2	94.9

		2015	2014	2013
<b>SOCIETY</b>				
Number of Common Ground® initiatives <sup>(16)</sup>		1,014	985	644
Group industrial sites taking part in Common Ground®	%	82	90	81
European industrial sites taking part in Common Ground®	%	88	85	
North American industrial sites taking part in Common Ground®	%	90	93	
Asian industrial sites taking part in Common Ground®	%	80	94	
<b>Product stewardship</b>				
Number of substances with REACH registration		277	274	
Number of GPS sheets voluntarily published		145	145	
<b>INNOVATION</b>				
Number of patent applications filed for solutions to sustainable development challenges <sup>(17)</sup>		61	81	79

(1) Number of injuries per million hours worked.

(2) Arkema Integrated Management System (AIMS) audit, which combines ISO 9001, ISO 14001 and OHSAS 18001 requirements.

(3) Or Responsible Care Management System (RCMS) in the United States.

(4) 2012 data revised as indicated in section 2.2.1.2 of this reference document.

(5) GHG emissions concerning gases covered in the Kyoto Protocol.

(6) Breakdown by region, age group, job category and gender, as detailed in section 2.5.1.1 of this reference document.

(7) Level 15 job or higher according to the Hay classification.

(8) Breakdown by region, age group, job category and gender, as detailed in section 2.5.1.2 of this reference document.

(9) Breakdown by region, as detailed in section 2.5.1.2 of this reference document.

(10) Recorded in companies with at least 30 employees and in which the Group has at least a 50% interest, which amounts to 96.5% of the total headcount.

(11) Excluding e-learning.

(12) Percentage of work-study students in relation to total headcount (scope: Arkema France).

(13) Total number of hours off work (excluding authorized leaves of absence) divided by the total number of hours worked.

(14) Guarantee representing at least 18 months' salary.

(15) Breakdown by region, as detailed in section 2.5.4.2 of this reference document.

(16) Initiative started by the Group as part of its relations with its industrial site and research center stakeholders.

(17) Filed by the Group, excluding the Coatex and Arkema Inc. subsidiaries.

(18) For 2015, the Taixing site did not report on "Substances contributing to acidification", "Carbon monoxide" or "Dust". The impact of these omissions on Group figures is estimated at under 1%. "Volatile organic compounds (VOCs)" from the Taixing site are estimated to account for around 2% of the Group total in 2016.

## 2.8 INDEPENDENT THIRD PARTY OPINION PURSUANT TO ARTICLE L. 225-102-1 OF THE FRENCH COMMERCIAL CODE

### REPORT OF ONE OF THE STATUTORY AUDITORS, APPOINTED AS INDEPENDENT THIRD PARTY, ON THE CONSOLIDATED SOCIAL, ENVIRONMENTAL AND SOCIETAL INFORMATION INCLUDED IN THE MANAGEMENT REPORT

Year ended 31 December 2015

*This is a free English translation of the original report issued in French and is provided solely for the convenience of English-speaking readers. This report should be read in conjunction with, and construed in accordance with, French law and professional standards applicable in France.*

To the Shareholders,

In our capacity as Statutory Auditor of Arkema, appointed as independent third party and certified by COFRAC under number 3-1049 <sup>(1)</sup>, we hereby report to you on the consolidated social, environmental and societal information for the year ended 31 December 2015 (hereinafter the "CSR Information"), presented in the Management report included in the Registration document, pursuant to article L. 225-102-1 of the French Commercial Code.

#### Company's responsibility

The Board of Directors is responsible for preparing a management report including the CSR Information required by article R. 225-105-1 of the French Commercial Code prepared in accordance with the guidelines and procedures used by the Group (hereinafter the "Guidelines"), summarised in the Management report and available on request from the Group's head office.

#### Independence and quality control

Our independence is defined by regulatory texts, the French Code of ethics of our profession and the requirements of article L. 822-11 of the French Commercial Code. In addition, we have implemented a quality control system including documented policies and procedures designed to ensure compliance with the ethical requirements, French professional standards and applicable legal and regulatory requirements.

#### Statutory Auditor's responsibility

On the basis of our work, our responsibility is to:

- attest that the required CSR Information is included in the management report or, in the event of non-disclosure of a part or all of the CSR Information, that an explanation is provided in accordance with the third paragraph of article R. 225-105 of the French Commercial Code (Attestation of completeness of CSR Information);
- express a limited assurance conclusion that the CSR Information taken as a whole is, in all material respects, fairly presented in accordance with the Guidelines (Conclusion on the fairness of CSR Information).

Our work involved twelve persons and was conducted between October 2015 and March 2016 during a twelve weeks period. We were assisted in our work by our CSR experts.

(1) For which the scope is available on the site [www.cofrac.fr](http://www.cofrac.fr)

We performed our work in accordance with the French professional standards and with the order dated 13 May 2013 defining the conditions under which the independent third party performs its engagement and with the international standard ISAE 3000 <sup>(1)</sup> concerning our conclusion on the fairness of CSR Information.

## 1. Attestation of completeness of CSR Information

### Nature and scope of our work

On the basis of interviews with the individuals in charge of the relevant departments, we obtained an understanding of the Group's sustainability strategy regarding social and environmental impacts of its activities and its societal commitments and, where applicable, any resulting actions or programmes.

We compared the CSR Information presented in the Management report with the list provided in article R. 225-105-1 of the French Commercial Code.

For any consolidated information that is not disclosed, we verified that explanations were provided in accordance with article R. 225-105, paragraph 3 of the French Commercial Code.

We verified that the CSR Information covers the scope of consolidation, i.e., the Group, its subsidiaries as defined by article L. 233-1 and the controlled entities as defined by article L. 233-3 of the French Commercial Code within the limitations set out in the methodological note, presented in the Management report (2.6. section of the Registration document).

### Conclusion

Based on the work performed and given the limitations mentioned above, we attest that the required CSR Information has been disclosed in the management report.

## 2. Conclusion on the fairness of CSR Information

### Nature and scope of our work

We conducted around thirty interviews with the persons responsible for preparing the CSR Information in the departments in charge of collecting the information and, where appropriate, responsible for internal control and risk management procedures, in order to:

- assess the suitability of the Guidelines in terms of their relevance, completeness, reliability, neutrality and understandability, and taking into account industry best practices where appropriate;
- verify the implementation of data-collection, compilation, processing and control process to ensure the completeness and consistency of the CSR Information and obtain an understanding of the internal control and risk management procedures used to prepare the CSR Information.

We determined the nature and scope of our tests and procedures based on the nature and importance of the CSR Information with respect to the characteristics of the Company, the social and environmental challenges of its activities, its sustainability strategy and industry best practices.

Regarding the CSR Information that we considered to be the most important, listed in the following table:

- at parent entity level, we referred to documentary sources and conducted interviews to corroborate the qualitative information (organisation, policies, actions), performed analytical procedures on the quantitative information and verified, using sampling techniques, the calculations and the consolidation of the data. We also verified that the information was consistent and in agreement with the other information presented in the Management report;
- at the level of a representative sample of sites and entities <sup>(2)</sup> selected by us on the basis of their activity, their contribution to the consolidated indicators, their location and a risk analysis, we conducted interviews to verify that procedures are properly applied and to identify potential undisclosed data, and we performed tests of details, using sampling techniques, in order to verify the calculations and reconcile the data with the supporting documents. The selected sample represents on average 29% of headcount, between 16% and 99% of quantitative environmental data and 100% of quantitative societal data disclosed.

(1) ISAE 3000 – Assurance engagements other than audits or reviews of historical financial information.

(2) Social information: Arkema France; Changshu (China). Safety information: Arkema France including the sites of Carling, Jarrie, Lacq and Pierre Bénite (France); Calvert City (USA); Porto Marghera (Italy). Environmental information: Carling, Jarrie, Lacq and Pierre Bénite (France); Rio Claro (Brazil); Changshu (China); Shanghai H2O2 ASHP (China); Calvert City (USA); Porto Marghera, Rho (Italy).

## SOCIAL AND SAFETY INDICATORS

Total headcount as at 31/12 and breakdown by age, gender, geographical area and type of contract (regular or fixed term)

Percentage of women in management position

Recruits and leavers

Percentage of employees benefiting of personnel representation and/or trade union representation

Absenteeism (including absences for medical reason)

Percentage of employees benefiting from regular medical check-ups

Number of training hours (including safety training)

TRIR (Total Recordable Injury Rate)

LTIR (Lost Time Injury Rate)

Percentage of OHSAS 18001 certified sites by area

Percentage of sites implementing peer observation

Percentage of AIMS (Arkema Integrated Management System) audited sites

## ENVIRONMENTAL INDICATORS

Number of patent application filed during the year for solutions to sustainable development challenges

Percentage of ISO 14001 and ISO 50001 certified sites by area

VOC emissions (Volatile Organic Compounds)

Chemical Oxygen Demand (COD) in water

All substances contributing to acidification

Hazardous waste

Water withdrawn

Net purchases of energy by area and type (including share of net fuel purchases from gas)

Direct greenhouse gas emissions including CO<sub>2</sub>

HFC emissions

**SOCIETAL INDICATORS**

Number of "Common Ground®" initiatives

**QUALITATIVE INFORMATIONS**

Social topic	Working time organisation Social dialogue Occupational health and safety conditions Employee development and in particular the implementation of annual individual interviews Measures implemented to promote gender equality in particular in the Board
Environmental topic	The organisation of the company to integrate environmental issues in particular certification process regarding environmental issues Resources allocated to prevention of environmental risks and pollution Measures of prevention, reduction or repair of discharges into the air, water and ground, impacting severely the environment Measures regarding waste prevention, recycling and disposal Water consumption and water supply adapted to local constraints Consumption of raw materials and measures implemented to improve efficiency in their use Energy consumption and measures implemented to improve energy efficiency especially energy audit and Arkenergy investments Adaptation to consequences of climate change and especially share of sites exposed to risks.
Societal topic	Territorial, economic and social impact of the company activity on the local populations Importance of subcontracting and consideration, in the relationship with subcontractors and suppliers of their social and environmental responsibility Measures implemented to promote consumers health and safety

For the remaining consolidated CSR Information, we assessed its consistency based on our understanding of the company.

We also assessed the relevance of explanations provided for any information that was not disclosed, either in whole or in part.

We believe that the sampling methods and sample sizes we have used, based on our professional judgement, are sufficient to provide a basis for our limited assurance conclusion; a higher level of assurance would have required us to carry out more extensive procedures. Due to the use of sampling techniques and other limitations inherent to information and internal control systems, the risk of not detecting a material misstatement in the CSR information cannot be totally eliminated.

**Conclusion**

Based on the work performed, no material misstatement has come to our attention that causes us to believe that the CSR Information, taken as a whole, is not presented fairly in accordance with the Guidelines.

Paris - La Défense, 2 March 2016

French original signed by one of the Statutory auditors

**KPMG S.A.**

Jacques-François Lethu  
Partner

François Quédiniac  
Partner

Anne Garans  
Partner  
Climate Change & Sustainability Services







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