

SOCIAL RESPONSIBILITY

COMMUNICATION ON PROGRESS

EXTRACT FROM THE 2019 UNIVERSAL
REGISTRATION DOCUMENT

2019



ARKEMA
INNOVATIVE CHEMISTRY

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MESSAGE

FROM THIERRY LE HÉNAFF

CHAIRMAN AND CHIEF EXECUTIVE OFFICER



Dear stakeholders,

I am pleased to renew Arkema's support for the UN Global Compact. Our commitment to this initiative and its 10 principles, together with the Responsible Care® initiative and the contribution to the SDGs, drive our sustainability approach and continuous improvement programs.

In the context of the Covid-19, driving actions that benefit society is more than ever a priority for Arkema. While taking care of employees' safety and well-being, we are active to fulfil customers' essential needs across the world, in particular with solutions used in protective equipment which help combat the pandemic.

Supporting our customers in their quest for sustainable performance is a centerpiece of our strategy. Our innovation platforms echo social and environmental challenges. We intensify our efforts and partnerships to develop new technologies notably for clean mobility, 3D printing, sustainable construction, water and energy management as well as circularity. By end-2019, nearly half our sales portfolio had been assessed in light of sustainability criteria and SDGs

contribution. We intensively pursue this assessment program to assertively drive our product range evolution towards sustainable solutions.

Reducing our environmental footprint and acting for the climate have long been priorities when managing our activities. Following the early achievement of several 2025 Group targets, we have set new, more ambitious, KPIs for the environment and we have committed to the Paris agreement by reducing our greenhouse gas emissions by 2030 following a Science Based Target trajectory well below 2°C.

To update and refine our understanding of stakeholders' expectations, we conducted in 2019 a second materiality analysis, covering the Group's three key regions. This active listening to stakeholders has strengthened our CSR policy and highlighted the rising areas of the circular economy and well-being at work, which are both subject to global programs.

Arkema is committed to pursuing value creation for society and to promote the 10 principles across its entire value chain together with its suppliers, partners, employees and customers. Participating in the Together for Sustainability initiative is a key part of our sustainable purchasing management. In 2019, suppliers assessed according to CSR criteria accounted for more than 50% of the Group's expenditure and 57% of our reassessed suppliers improved their performance.

Through internal surveys conducted in the three main regions in the last two years, employees expressed their strong engagement to Arkema's values and long-term vision. Maintaining this high level of engagement, developing its 20,500 employees and promoting gender and nationality diversity are key objectives for Arkema.

In early 2020, Arkema joined the WBCSD, reflecting its willingness to work in partnership and to accelerate the transition to a more sustainable world.

This report details our ambitions, commitments and management systems in the field of Corporate Social Responsibility, as well as our achievements in this area.

I sincerely thank you for your continued support and valuable contribution to improving our sustainable performance.

A handwritten signature in black ink, appearing to read 'Thierry Le Hénaff', written over a white background.

Thierry Le Hénaff

Chairman and Chief Executive Officer



PROFILE, AMBITION AND STRATEGY

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PROFILE

Arkema at a glance



20,500
EMPLOYEES



A PRESENCE IN
55 countries



144
PRODUCTION SITES



€607M
CAPITAL EXPENDITURE ⁽¹⁾



€249M
R&D EXPENDITURE



3
regional
R&D HUBS

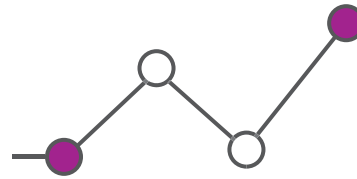
2019 data

(1) Recurring and exceptional capital expenditure.

ARKEMA AT A GLANCE

ARKEMA IS A MAJOR PLAYER IN SPECIALTY CHEMICALS AND IN ADVANCED MATERIALS, WITH A LEADING INDUSTRIAL AND COMMERCIAL PRESENCE, AND A BALANCED GEOGRAPHICAL FOOTPRINT WITH STRONG POSITIONS IN EUROPE, NORTH AMERICA AND ASIA.

€8.7 bn
2019 SALES



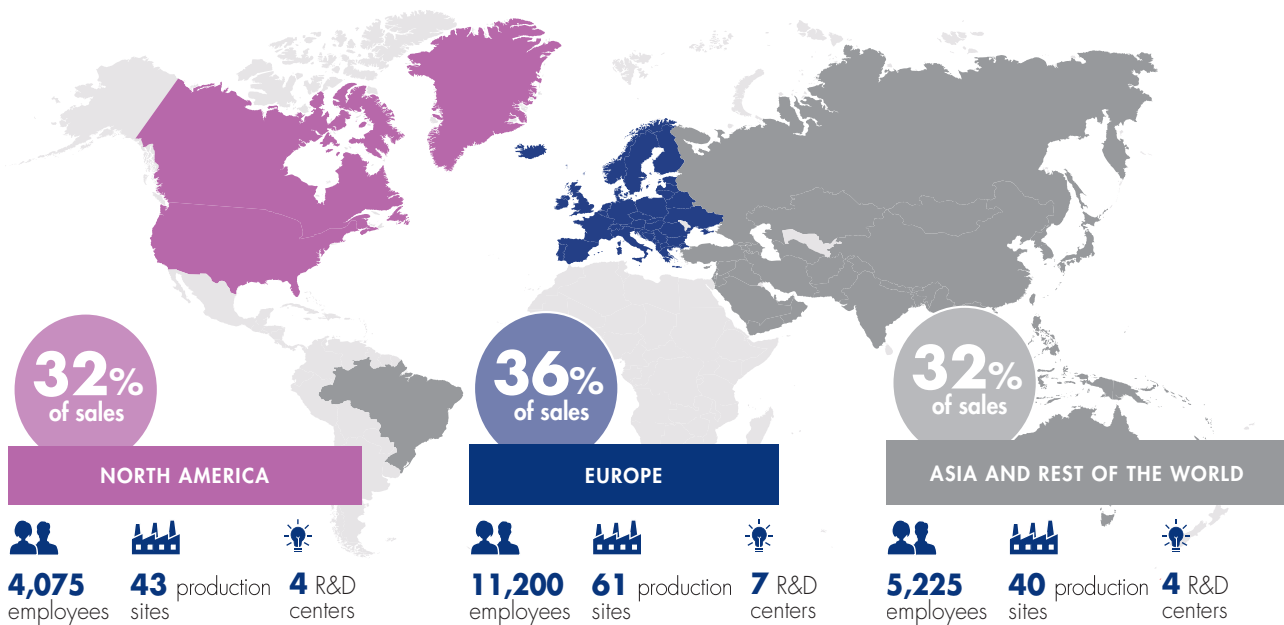
Thanks to the innovative solutions developed by its three divisions - High Performance Materials, Industrial Specialties and Coating Solutions – Arkema contributes to addressing the world's current and future challenges in areas such as lightweight materials, new energies, access to drinking water, home comfort and bio-based products. With leading positions in its main product lines, the Group supports its customers in their quest for sustainable performance and their long-term development.

As a responsible industrial company with a global footprint, Arkema is committed to achieving continuous improvement and operational excellence, driven by the collective energy of its 20,500 employees.

Drawing on its solid entrepreneurial culture, Arkema engaged in a strong transformation process toward specialties since its stock market listing in May 2006, thanks to a strategy based on three key growth drivers: innovation for sustainable development, targeted acquisitions in high value-added businesses and industrial investments in high-growth regions. Thanks to this transformation, the Group has multiplied its EBITDA by four and its EBITDA margin has nearly tripled.



A GLOBAL INDUSTRIAL COMPANY

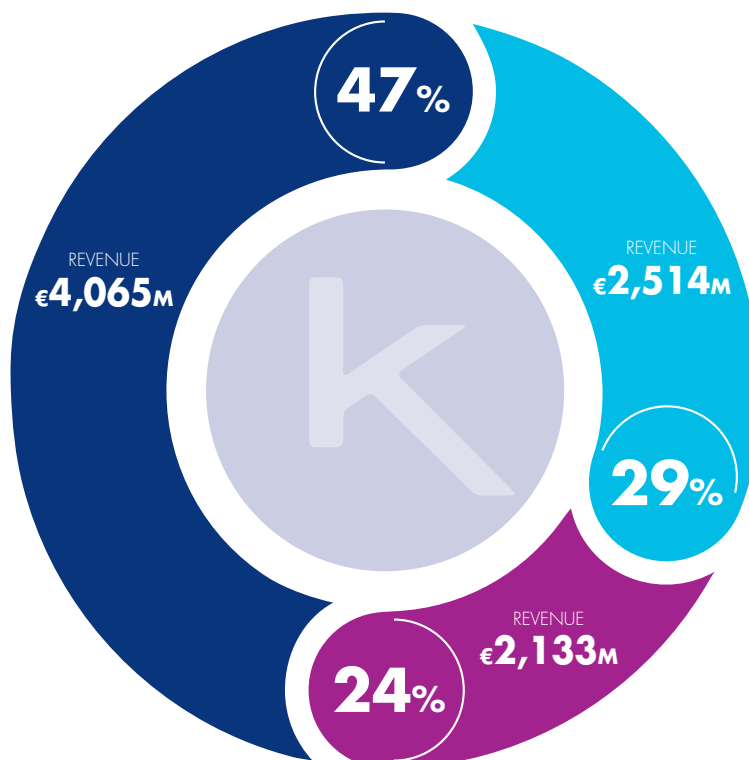


THREE DIVISIONS



HIGH PERFORMANCE MATERIALS

Innovative, high value-added solutions to address sustainable development challenges and its clients' technical challenges



INDUSTRIAL SPECIALTIES

High-profitability, competitive integrated industrial niches with global leading positions



COATING SOLUTIONS

Performance resins, notably for decorative paints and industrial coatings, with extensive, global product ranges that are integrated upstream

2019 data

Arkema will provide a strategic update on 2 April 2020. Therefore, please also refer to the documents (presentation and press release) that will be presented on this occasion for the most recent information regarding the Group's organization.

PROFILE

Strong assets

STRONG ASSETS

ARKEMA CAN LEVERAGE SOLID ASSETS TO ROLL OUT ITS STRATEGY AND CARRY OUT ITS NUMEROUS PROJECTS, ENABLING THE GROUP TO STRENGTHEN ITS POSITION AMONG THE WORLD LEADERS IN SPECIALTY CHEMICALS.

IN THE TOP 3 GLOBALLY ON 90% OF TOTAL SALES

RECOGNIZED BRANDS

Contributing to customer loyalty.



STRONG CUSTOMER PARTNERSHIPS

With leading industrial customers in areas such as 3D printing, composites, water treatment and batteries.



EXPERIENCED, COMMITTED TEAMS

Who contributed to shaping Arkema into a leading industrial group, thanks to their ability:

- **to carry out complex industrial projects** such as the construction of a thiochemicals platform in Malaysia, in a new country for the Group, with a new partner and based on an innovative process;
- **to ensure smooth integration** of major acquisitions such as Bostik; and
- **to adapt** to the different macro-economic environments that Arkema has faced over the last 14 years, and to strongly improve its financial performance.

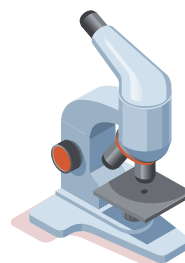




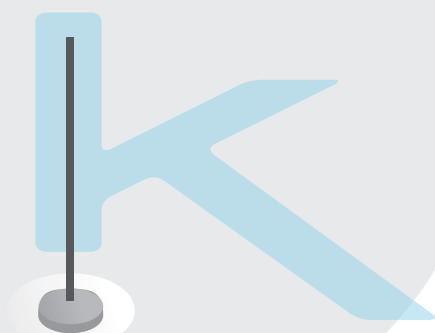
STRONG R&D CAPABILITIES

Enabling us to launch new products, provide our customers with the technical support they need, and further improve the efficiency of our manufacturing processes, thanks to:

- the **expertise of our 1,600 researchers** at our 15 research centers worldwide;
- a portfolio of **over 10,000 patents**; and
- 222 new patent applications filed in 2019.



ARKEMA
INNOVATIVE CHEMISTRY



A SOLID FINANCIAL STRUCTURE

- **Excellent cash generation** and a high EBITDA to cash conversion rate.
- **Tightly-controlled net debt**, representing, at end-2019, 1.1 times annual EBITDA and a 31% gearing.

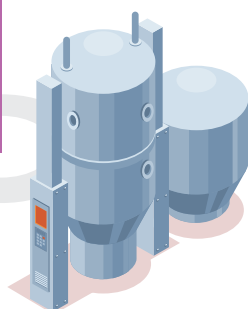


Giving us the financial flexibility needed to carry out our ambitious investment and targeted acquisitions policy while ensuring regular dividend growth.

A COMPETITIVE AND GLOBAL PRESENCE

To support our customers in their geographical expansion thanks to:

- a **strong manufacturing footprint** in Europe, North America and Asia;
- complex, **proprietary manufacturing processes**; and
- proven **expertise in large-scale investment projects** that optimize costs, timing, and superior technical implementation.



KEY FIGURES

KEY FINANCIAL DATA

<i>(In millions of euros unless otherwise stated)</i>	2019	2018	2017	2016	2015
Sales	8,738	8,816	8,326	7,535	7,683
EBITDA	1,457	1,474	1,391	1,189	1,057
EBITDA margin	16.7%	16.7%	16.7%	15.8%	13.8%
Recurring operating income (REBIT)	926	1,026	942	734	604
REBIT margin	10.6%	11.6%	11.3%	9.7%	7.9%
Net income – Group share	543	707	576	427	285
Adjusted net income	625	725	592	418	312
Net income per share (euros)	6.45	8.84	7.17	5.24	3.42
Adjusted net income per share (euros)	8.20	9.51	7.82	5.56	4.23
Dividend per share (euros)	2.70 ⁽¹⁾	2.50	2.30	2.05	1.90
Shareholders' equity	5,324	5,028	4,474	4,249	3,949
Net debt	1,631	1,006	1,056	1,482	1,379
Gearing	31%	20%	24%	35%	35%
Net debt/EBITDA	1.1	0.7	0.8	1.2	1.3
Capital employed	7,917	6,996	6,554	6,829	6,466
Return on average capital employed	12.4%	15.1%	14.1%	11.0%	11.0%
Working capital on sales	13.8%	13.4%	13.1%	14.5%	14.6%
Free cash flow	667	499	565	426	442
EBITDA to cash conversion rate	52%	38%	41%	36%	42%
Recurring capital expenditure	511	500	420	423	431
Exceptional capital expenditure	96	61	10	0	0

Definitions of the main financial indicators are given in the glossary and in note C.1 "Alternative performance indicators" to the consolidated financial statements at 31 December 2019, presented in section 5.3.3 of the 2019 Universal Registration Document.

(1) Dividend proposed at the annual general meeting on 19 May 2020.



KEY EXTRA-FINANCIAL DATA



INNOVATION

	2019	2018	2017	2016	2015
R&D expenditure (in €M)	249	237	235	222	209
Number of patent applications filed	222	244	239	196	193
Number of patent applications filed relating to sustainable development	149	154	150	116	121
Percentage of sales that significantly contribute to the United Nations' Sustainable Development Goals ⁽¹⁾	46%	43%			

(1) On the basis of an assessment of 44% of the Group's third-party sales in 2019



EMPLOYMENT

	2019	2018	2017	2016	2015
Headcount	20,507	20,010	19,779	19,637	18,912
Percentage of women in senior management and executive positions	23%	21%	19%	18%	17%
Percentage of non-French nationals in senior management and executive positions	40%	39%	37%	39%	N/A



SAFETY

	2019	2018	2017	2016	2015
Total recordable injury rate (TRIR) ⁽¹⁾	1.4	1.3	1.6	1.5	1.5
Process safety event rate (PSER)	3.7	4.4	3.9	N/A	N/A

(1) The TRIR includes injuries to both Group and subcontractor employees.



CLIMATE AND ENVIRONMENT

	2019	2018	2017	2016	2015
Greenhouse gas emissions	0.87	0.90	0.96	0.99	1.00
Volatile organic compound (VOC) emissions	0.60	0.62	0.66	0.80	0.83
Chemical oxygen demand (COD)	0.50	0.59	0.70	0.78	0.93
Net energy purchases	0.91	0.88	0.89	0.92	0.98

In EFPI terms compared with 2012 except for greenhouse gas emissions and in absolute terms compared with 2015 for greenhouse gas emissions.



AMBITION

Global trends, a constantly changing world

GLOBAL TRENDS A CONSTANTLY CHANGING WORLD

AS A RESPONSIBLE INDUSTRIAL COMPANY, ARKEMA CONTRIBUTES TO ADDRESSING THE CURRENT AND FUTURE MAJOR CHALLENGES THROUGH ITS INNOVATIVE, SUSTAINABLE SOLUTIONS AND THE OPTIMIZATION OF ITS INDUSTRIAL OPERATIONS.

TRENDS



Global consequences



INCREASING URBANIZATION

By 2050, the world population is expected to reach around 10 billion people, an increase of nearly 30%, driven mainly by emerging countries.

Growth is concentrated in urban areas, with urban populations expected to rise by around 2.5 billion people between now and 2050. This trend is accompanied by a gradual increase in living standards.

- Strong demand for the construction and renovation of buildings and infrastructure
- Increased demand for transportation, energy, water and services
- Changing lifestyles and consumer behavior
- Increasing concern about housing quality, comfort and energy efficiency



RESOURCE SCARCITY

The growth in the world population, increasing living standards and the rapid pace of industrialization are all driving an increase in the use of the world's resources. Based on current conditions, the consumption of raw materials could therefore triple by 2050.

- Scarcity of non-renewable resources
- Increasing difficulties in accessing safe drinking water



CLIMATE CHANGE

Increasing urbanization, the increase in the number of cars and air travel, and industrialization all contribute to global warming and climate change.

To address these issues, the Paris Agreement aims to keep the global temperature rise by the end of the century to well below 2°C.

- Increase in the global temperature and its human and environmental consequences
- Increase and intensification of extreme weather events
- Need to speed up the transition to more sustainable lifestyles and economic models (decoupling)



NEW TECHNOLOGIES

New technologies, such as artificial intelligence, material sciences and robotics are growing fast, creating new commercial and industrial possibilities.

- Changing lifestyles and consumer behaviour (e.g., percentage of the population equipped with connected objects)
- Significant increase in available data
- Increased production rates



OUR SOLUTIONS TO CURRENT AND FUTURE CHALLENGES

Key challenges where Arkema is making a difference



ARKEMA'S SOLUTIONS



INCREASING URBANIZATION

- Facilitate the transportation of energy and water, as well as access to high-quality water.
- Treat domestic and industrial wastewater and other waste.
- Meet changing demand for consumer products.
- Improve thermal and acoustic insulation, comfort and air quality in housing

- **Advanced materials** for water ultrafiltration (Kynar® PVDF) and transportation (Rilsan® polyamides)
- **Hydrogen peroxide and acrylics** to disinfect water and treat wastewater
- **Acrylics and adhesives** for hygiene, **thiochemicals** for animal feed and **advanced materials** for sport, cosmetics and packaging
- **Adhesives and sealants** by Bostik for insulation and sealing and **low-VOC coating resins** for paints



RESOURCE SCARCITY

- Contribute to the development of new energies, such as lithium-ion batteries for electric vehicles, photovoltaics and wind power.
- Promote eco-design:
 - Develop products made from bio-based, renewable or recycled raw materials
 - Extend products' lifespan
 - Recycle end-of-life products.
- Optimize the consumption of energy, raw materials and water.

- **Advanced materials** for new energies: Kynar® PVDF for batteries and solar power, Apolhya® for solar power, Elium® recyclable resin for wind power
- **Bio-based** Rilsan® polyamides 11 and 10, made from castor oil plants
- Kynar® PVDF and Kynar Aquatec® coatings for reflective roofs. Kercoat® and Opticoat® coatings for glass bottles
- Elium® recyclable resin for composites and the Cecabase RT® additive for asphalt, and specialty surfactants for mining



CLIMATE CHANGE

- Make vehicles and aircraft lighter, to limit their fuel consumption and reduce their CO₂ emissions.
- Improve buildings' energy performance to reduce energy, heating and air-conditioning needs.
- Reduce greenhouse gas (GHG) emissions across the whole value chain.

- **Lightweighting solutions:**
 - **Advanced materials used as substitutes for metal:** Rilsan® HT, Kepstan® PEKK and thermoplastic composites (Elium®)
 - Altuglas® ShieldUp as a substitute for glass
 - **Adhesives** for the assembly of metal parts, as a substitute for mechanical bonding
- **Thermal insulation solutions:**
 - Adhesives and sealants by Bostik
 - Kynar Aquatec® coatings for reflective roofs
- Development of HFO refrigerants with a very low global warming potential
- 2030 target to reduce Group-wide GHG emissions to 2,950 kt CO₂ eq. consistent with the Paris Agreement



NEW TECHNOLOGIES

- Contribute to the development of new markets (e.g., consumer electronics and sensors).
- Speed up the expansion of new production technologies such as 3D printing.
- Leverage digital technologies to support operational and commercial excellence.

- **Advanced materials** for digital mobility devices (technical polymers for smartphones and tablets and Kynar® PVDF for batteries)
- **Full range of resins for 3D printing:**
 - Sartomer's N3xtDimension®, Kepstan® PEKK, Rilsan® polyamides
 - for major additive manufacturing technologies
- **Digital plant** thanks to the deployment of predictive maintenance tools and 3D and 4D technologies

AMBITION

A Group undergoing in-depth transformation

A GROUP UNDERGOING IN-DEPTH TRANSFORMATION

ARKEMA AIMS TO CONSOLIDATE ITS POSITION AMONG THE GLOBAL LEADERS IN SPECIALTY CHEMICALS BY ACCELERATING THE DEVELOPMENT OF THESE BUSINESSES, ESPECIALLY ADHESIVES, ADVANCED MATERIALS AND PERFORMANCE RESINS, WHILE CONTINUING TO REBALANCE ITS GEOGRAPHIC EXPOSURE. THIS REPOSITIONING IS SUPPORTED WITH AMBITIOUS FINANCIAL TARGETS.



Following the stock market listing in May 2006, Arkema shifted toward a significantly higher proportion of high value-added specialty businesses, which are more resilient, close to end customers, and offer substantial growth potential. Arkema's target is for these businesses to account for **more than 80% of Group sales by 2023** compared with 72% currently and 44% in 2005.

Adhesives would therefore account for over one-third of the Group's total sales, which are expected to more than double. Arkema intends to participate fully in the consolidation of this attractive but still fragmented market and continue its expansion into new regions and high-growth niche markets.

Given the Group's many industrial projects, advanced materials that offer significant opportunities for innovation in such areas as lightweight materials, bio-based polymers, new energies and consumer goods design, are expected to account for over 25% of sales.

Together with its in-depth profile change, Arkema rebalanced its geographic exposure by developing its activities in North America and high-growth countries, primarily in Asia.

In 2019, Group sales by region broke down as follows: 36% in Europe (57% in 2005), 32% in North America (25% in 2005), 32% in Asia/Rest of the world (18% in 2005).

Arkema aims to finalize, by 2023, this geographic rebalancing with Europe, North America and Asia and the Rest of the world, each accounting for one-third of total sales.

For 2023, Arkema is aiming to achieve a REBIT margin of between 11.5% and 12.5% – with a target of 12.5% to 13% for adhesives and of 14% to 15% for advanced materials – and a high EBITDA to cash conversion rate of 35%.

This ambition will be achieved with strict financial discipline, notably a net debt to EBITDA ratio of less than 2 and a return on capital employed⁽¹⁾ of at least 10%, while preserving a solid investment grade rating.

Defined in normalized market conditions.



(1) $(REBIT - \text{current taxes}) / (\text{net debt} + \text{shareholders' equity})$.

A STRONG CSR AMBITION

THE GROUP HAS DEFINED A WELL-ESTABLISHED ROADMAP WITH A TARGET TO BE AMONGST THE TOP PERFORMERS IN THIS AREA. THIS INCLUDES NON-FINANCIAL TARGETS FOR 2025 WHICH DEMONSTRATE ARKEMA'S COMMITMENT TO CONTINUOUS PROGRESS IN SAFETY AND DIVERSITY. HAVING MET THREE OF ITS FOUR TARGETS ON ENVIRONMENTAL ISSUES IN 2018, THE GROUP HAS DEFINED NEW, MORE AMBITIOUS TARGETS FOR 2030.

CSR TARGETS

SAFETY

BY
2025



Total recordable injury rate

TRIR < 1,2

(including subcontractor employees)

Process safety event rate

PSER < 3

CLIMATE AND ENVIRONMENT

BY
2030



Climate⁽¹⁾

Greenhouse gas emissions

-38%

Environment⁽²⁾

-20%

Net energy purchases

-65%

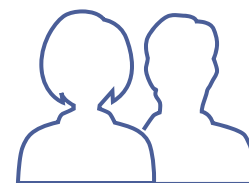
Volatile organic compound emissions

-60%

Chemical oxygen demand

EMPLOYMENT

BY
2025



23% to 25%

Percentage of women in senior management and executive positions

42% to 45%

Percentage of non-French nationals in senior management and executive positions

(1) Absolute target compared with 2015 for Scope 1 and Scope 2 emissions as defined in the Kyoto Protocol + substances listed in the Montreal Protocol, consistent with the Paris Agreement.

(2) In EFPI terms compared with 2012

AMBITION

A strong CSR ambition

**ARKEMA IS ENGAGED
IN A STRONG
TRANSFORMATION
PROCESS TOWARD
SPECIALTIES**

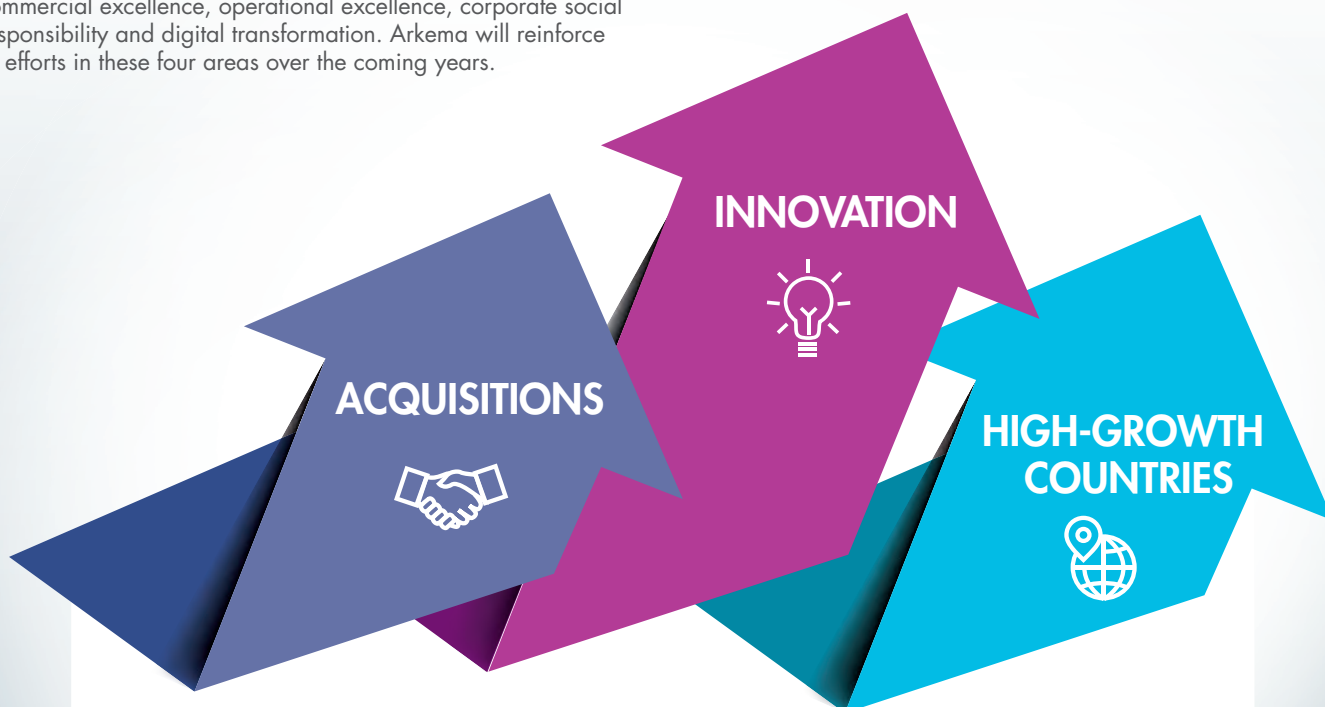




OUR STRATEGY

TO ACHIEVE ITS AMBITION, ARKEMA CONTINUES TO IMPLEMENT AN AMBITIOUS TRANSFORMATION STRATEGY BASED ON THREE STRONG GROWTH DRIVERS: INNOVATION FOR SUSTAINABLE DEVELOPMENT, TARGETED ACQUISITIONS IN HIGH VALUE-ADDED SPECIALTIES, AND CUTTING-EDGE INDUSTRIAL INVESTMENTS TO SUPPORT CUSTOMERS AND PARTNERS IN HIGH-GROWTH REGIONS.

To grow further, the Group benefits as well from very solid foundations and is implementing initiatives in four cross-functional areas: commercial excellence, operational excellence, corporate social responsibility and digital transformation. Arkema will reinforce its efforts in these four areas over the coming years.



COMMERCIAL EXCELLENCE



OPERATIONAL EXCELLENCE



DIGITAL TRANSFORMATION



CORPORATE SOCIAL RESPONSIBILITY



STRATEGY

First strategic priority: innovation for sustainable development

FIRST STRATEGIC PRIORITY

INNOVATION FOR SUSTAINABLE DEVELOPMENT

TECHNOLOGICAL INNOVATION IS AT THE HEART OF ARKEMA'S STRATEGY AND A KEY GROWTH DRIVER, FOSTERING THE DEVELOPMENT OF SUSTAINABLE SOLUTIONS IN PRODUCTS, PRODUCT APPLICATIONS AND PRODUCTION PROCESSES.



Supporting customers in addressing today's challenges

Arkema develops new products and applications to meet customers' increasingly demanding needs in leading-edge sectors such as aerospace, automotive, consumer electronics, new energies and oil and gas. Thanks to its 15 R&D centers across the world, the Group adapts its solutions to customers' specific expectations in each region.

Anticipating future trends

Arkema anticipates technological and market changes and is developing today, through a dedicated incubator structure, the breakthrough innovations that will meet society's needs in the years to come. For example, Arkema developed Kepstan® PEKK – a material for extreme environments that can withstand temperatures of up to 260°C – following ten years' R&D work, for which a production unit started operating in early 2019 in the United States.

Contributing to operational excellence

The Group's R&D department provides innovations to production facilities to allow them to produce safely and competitively, while reducing their environmental footprint.

Assessing the sustainability of our solutions

Since 2018, the Group has implemented a process to analyze and assess its portfolio of solutions in light of sustainability criteria and contribution to the United Nations' Sustainable Development Goals. At end-2019, 44% of sales had been assessed, of which 46% significantly contribute to the Sustainable Development Goals.

KEY FIGURES (2019)



Over **1,600**
RESEARCHERS



€249M
IN EXPENDITURE



3.8%
OF ADVANCED
MATERIALS
SALES



**15 R&D
centers**
ACROSS
THE THREE HUBS
IN EUROPE, ASIA
AND NORTH
AMERICA



222
PATENT
APPLICATIONS FILED
> 65%
RELATING
TO SUSTAINABLE
DEVELOPMENT



6 innovation platforms ideally positioned to meet tomorrow's challenges

In today's world of powerful global trends, such as increasing urbanization, resource scarcity, climate change and new technologies, Arkema focuses its research efforts to ensure its solutions adequately address market demand and specific customer expectations worldwide.

Based on this work, which is reviewed regularly, the Group has set up 6 innovation platforms which contribute to 6 United Nations' Sustainable Development Goals.

BIO-BASED PRODUCTS



- Around 9% of total Group sales
- Specialty Rilsan® polyamides 11 and 10 made from castor oil for the automotive, energy, optics and electronics industries

LIGHTWEIGHT MATERIALS AND DESIGN



- Specialty polyamides, Kepstan® PEKK and Elium® recyclable resin, in particular for thermoplastic composites used in the automotive, aerospace and oil and gas sectors
- N3xDimension® UV curable resins, specialty polyamides and Kepstan® PEKK for 3D printing

NEW ENERGIES



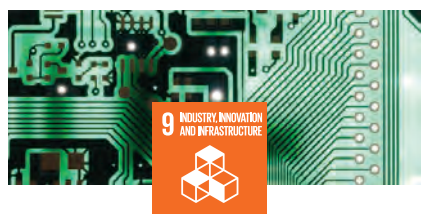
- Kynar® PVDF (separator coatings and binders) and Foranext® electrolytes for batteries
- Kynar® PVDF for photovoltaics
- Elium® recyclable resin for wind power

WATER MANAGEMENT



- Kynar® PVDF for water ultrafiltration
- Albone® hydrogen peroxide to treat drinking water

ELECTRONICS SOLUTIONS



- Kynar® PVDF and specialty polyamides for tablets and smartphones
- Piezotech® piezoelectric polymers for connected objects

HOME EFFICIENCY AND INSULATION



- Adhesives and sealants for windows, doors and insulation panels
- Acrylic emulsions with a low volatile organic compounds content

2019 HIGHLIGHTS

- Opening, with Hexcel, of a joint research and development laboratory in France as part of their strategic alliance to develop thermoplastic composite solutions for the aerospace sector
- In 3D printing
 - Partnership with Carbon®, the world leader in digital manufacturing, to develop next-generation high performance materials made with Sartomer's liquid resins, and Arkema's acquisition of a \$20 million equity interest in Carbon®
 - Inauguration of a new Center of Excellence dedicated to 3D printing with high-performance polymer powders
- Launch of Virtucycle™, a new post-industrial and post-consumer recycling program for high-performance polyamides and PVDF fluoropolymers with partner Agiplast



Numerous Partnerships WITH UNIVERSITIES AND PUBLIC AND PRIVATE RESEARCH LABORATORIES



46% OF SALES ASSESSED SIGNIFICANTLY CONTRIBUTING TO THE SDGs ⁽¹⁾

(1) On the basis of an assessment of 44% of the Group's third-party sales in 2019.

STRATEGY

Second strategic priority: investment in high-growth regions

SECOND STRATEGIC PRIORITY

INVESTMENT IN HIGH-GROWTH REGIONS

ARKEMA HAS AN AMBITIOUS INVESTMENT STRATEGY IN NORTH AMERICA AND HIGH-GROWTH COUNTRIES, PRIMARILY IN ASIA, WHICH COVER KEY GROWTH MARKETS FOR THE GROUP, INCLUDING CONSUMER PRODUCTS (ELECTRONICS, SPORTS AND HYGIENE), NEW ENERGIES AND TRANSPORTATION.

ARKEMA CONTINUES TO REBALANCE ITS GEOGRAPHIC EXPOSURE AND, IN 2019, MADE 32% OF ITS SALES IN ASIA AND THE REST OF THE WORLD, 32% IN NORTH AMERICA AND 36% IN EUROPE.

2020

THIOCHEMICALS



Doubling of production capacity in Kerteh

Markets: animal feed, oil and gas, refining

ADVANCED MATERIALS



25% increase in PA12 global production capacity

Markets: lightweight materials, sports, electronics

ADVANCED MATERIALS



50% increase in PVDF production capacity for batteries

Markets: lithium-ion batteries

ADHESIVES



New world-class adhesives plant in Nara

Markets: non-woven, industrial adhesives



LARGE-SCALE INDUSTRIAL PROJECTS

2022

ADVANCED MATERIALS



**50% increase in PA11
global production capacity**

Markets: lightweight materials, sports,
electronics

An ambitious investment policy

To support its customers' geographic expansion, Arkema aims for recurring capital expenditure to average **5.5% of sales** per year, with 45% dedicated to growth projects and 55% to maintenance, safety and the environment.

In addition to this recurring capital expenditure, the Group will invest around **€500 million⁽¹⁾ in exceptional** capital expenditure in the period 2018-2021 on:

- a doubling in production capacity of the thiochemicals platform in Malaysia; and
- a major investment plan announced in specialty polyamides in Asia, notably with the construction of a new monomer and Rilsan® polyamide 11 production facility in Singapore to support the high customer demand for lightweight bio-based materials in the automotive, 3D printing and consumer products markets.

In 2020, Arkema's recurring and exceptional capital expenditure is expected to amount to around €700 million.

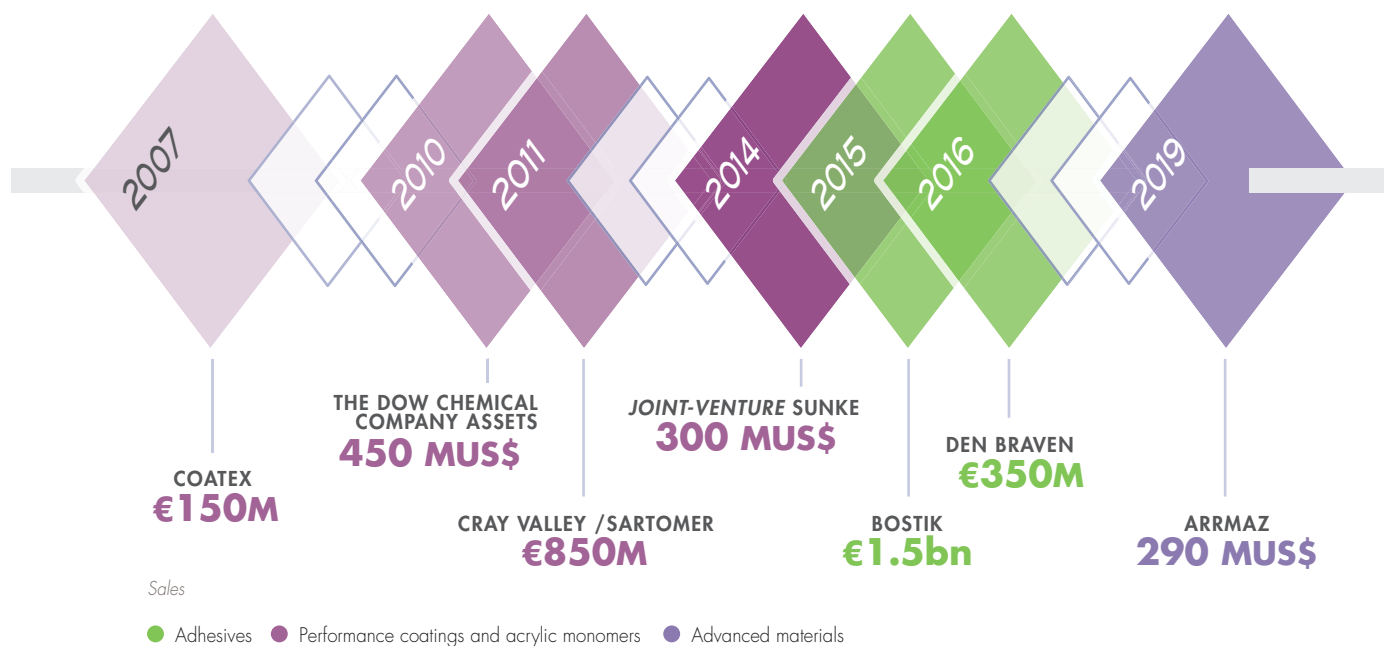
2019 HIGHLIGHTS

- €607 million in recurring and exceptional capital expenditure
- Recurring capital expenditure at 5.8% of Group sales
- Start-up of the Kepstan® PEKK facility in Mobile, United States, for aerospace, oil and gas and 3D printing markets
- Start-up of a 30% capacity extension for photocure advanced liquid resins in Nansha, China, in order to meet strong demand in Asia in the electronics, 3D printing, adhesives and inkjet printing markets
- Start-up of a new production line for ultra-high performance polyamide 12 powders at the Mont plant in France, thus boosting global capacity by over 50% to support the increase in demand in the coatings, personal care, composites and 3D printing markets
- Start-up of a new 90,000-ton per year acrylic acid reactor at our Clear Lake site in Texas, to support the growth of our North American customers in the superabsorbents, paints, adhesives and water treatment markets
- Start-up during the first semester 2020 of the doubling of the methyl mercaptan production capacity at its Kerteh site in Malaysia to support the strong growth of the animal feed market

(1) For the specialty polyamides project, gate 3 estimation with a EUR/USD rate of 1.15.

TRANSFORMATIONAL ACQUISITIONS

Since 2006, thanks to active portfolio management, Arkema has significantly increased its presence in the performance coatings value chain, entered the attractive adhesives market, and strengthened its business portfolio in advanced materials, especially Performance Additives.



A targeted divestment program

Arkema is also continuing its program to divest small non-core businesses representing a total of around €700 million in sales.

In October 2019, Arkema announced the project* of divestment of its Functional Polyolefins business to SK Global Chemical, a major chemicals player in South Korea. Part of the PMMA Business Line, the Functional Polyolefins business represents sales of some €250 million. The offer received is based on an enterprise value of €335 million. The project is expected to be finalized in the second quarter of 2020.

As part of this divestment program, Arkema has finalized the following divestments:

- in late 2016, the activated carbon and filter aid business, which generated around €93 million in sales, for an enterprise value of €145 million;
- in late 2015, Sunclear, a plastic and aluminum sheet distribution business that generated sales of around €180 million, for an enterprise value of €105 million.

* The proposed disposal is subject to the approval of the relevant antitrust authorities.



STRATEGY

First pillar: commercial excellence

FIRST PILLAR

COMMERCIAL EXCELLENCE

CUSTOMERS ARE CENTRAL TO ARKEMA'S STRATEGY AND ITS INNOVATION POLICY. MEETING THEIR NEEDS AS EFFECTIVELY AS POSSIBLE AND PROMOTING THE DIVERSITY OF THE GROUP'S SOLUTIONS ARE THE TWO MAIN OBJECTIVES OF ARKEMA'S COMMERCIAL EXCELLENCE PROGRAM.



A cross-functional approach

Arkema develops a commercial excellence program through targeted initiatives designed to improve customer relationships, which is supported by:

- a collaborative Customer Relationship Management (CRM) tool used to share customer data, manage development opportunities and implement synergies for multi-business customers. This CRM system is being rolled out in 2020 across the entire sales organizational structure;
- implementation of reporting tools that can be used by our sales teams to fine-tune business analysis and management;
- rollout of the Sales Academy, a program of dedicated, ongoing training courses aimed at sales teams, to develop their expertise in sales processes and customer relations;

- a network of key account managers who supervise and consolidate relationships with certain key customers in order to more effectively meet their needs while taking advantage of cross-business synergies that can emerge from the Group's various businesses;
- internal working groups with members from several *Business Lines* that aim to optimize the Group's commercial offering on its major markets;
- targeted sales actions in high-growth regions where Arkema plans to strengthen its positions, such as Southeast Asia, India and the Middle East.

The impact of this program will be assessed in 2020 through a customer satisfaction survey, which we will initially set up and gradually standardize for all Arkema customers. All these initiatives involve an approach of listening and developing a close relationship with the customer.

Recognized solutions

Bostik gained recognition by consumers, who voted Fix & Flash "Product of the Year 2019" in the "repair glue" category. With Fix & Flash, Bostik makes a cutting-edge professional technology available to the general public for the first time. A break with the traditional world of bonding, Fix & Flash uses LED light to ensure fast curing, on any surface and any material.



Expanded services portfolio

To support the sale of its products, Arkema regularly enhances its portfolio of services. The Careflex® technical assistance service, developed in the Thiochemicals business and dedicated to the use of DMDS at refineries and petrochemical plants, is a good example of this. The Group's experts work directly at client sites, worldwide, to advise and train the technicians who use its products, thereby ensuring the highest quality of service.

Strategic partnerships



To strengthen its customer relationships over the long term, Arkema forges strategic partnerships with key customers that are leaders in their markets or areas of expertise. Some relate to industrial developments, such as the partnership with Daikin in refrigerants or with CJ CheilJedang and Novus in Thiochemicals. Others are innovation-oriented, like the partnerships signed in 2018 and 2019 with Hexcel in thermoplastic composites and Carbon® in 3D printing.



In late 2018, Arkema launched "3D Printing Solutions by Arkema", a commercial platform dedicated to its range of materials for 3D printing. The platform will maximize synergies between the various product lines involved and strengthen the Group's expertise and the close ties developed with its customers, partners and equipment manufacturers.

This collaborative development draws on a team of expert engineers and our three centers of excellence, each dedicated to a specific technology: UV-curable additive manufacturing at Exton in the United States, powder bed fusion at the Cerdato Research and Development Center in Serquigny, France, and filament extrusion at King of Prussia in the United States.



SECOND PILLAR

CORPORATE SOCIAL RESPONSIBILITY

IN A WORLD FACED WITH A MULTITUDE OF ECONOMIC, ENVIRONMENTAL AND SOCIAL CHALLENGES, ARKEMA AIMS TO GENERATE SUSTAINABLE AND RESPONSIBLE GROWTH AND CONTRIBUTE TO ADDRESSING THOSE SOCIAL AND ENVIRONMENTAL ISSUES BY PROVIDING ITS CUSTOMERS WITH SUSTAINABLE AND INNOVATIVE SOLUTIONS THAT CONTRIBUTE TO THE SUSTAINABLE DEVELOPMENT GOALS DEFINED BY THE UNITED NATIONS.

THREE KEY OVERARCHING COMMITMENTS



A clear roadmap

To measure long-term progress under its commitment to corporate social responsibility, Arkema has set a number of specific targets:

- **4 environmental targets**, which contribute to reducing the Group’s environmental footprint and cover its greenhouse gas emissions in accordance with the Paris Agreement, its emissions to air, effluent releases and net energy purchases;
- **4 safety targets**, the most important ones being a reduction in the total recordable injury rate and in process safety events; and
- **2 diversity targets**, aimed at raising the percentage of women and of non-French nationals in senior management and executive positions.

Regular interaction with stakeholders

To validate its CSR approach and the relevance of the challenges identified with regard to its various stakeholders (employees, customers, research partners, suppliers, financial community, etc.), Arkema carried out in 2019 a new materiality assessment. This assessment confirmed the aims of its corporate social responsibility policy and pointed to two emerging priorities: workplace quality of life and the circular economy.

A proactive improvement process

Arkema is engaged in a process to improve its CSR performance, with the aim of being included in the *Dow Jones Sustainability Index (DJSI)*.

The Group’s approach and performance in the various areas of CSR are regularly assessed by external stakeholders including customers and SRI rating agencies.



THIRD PILLAR

OPERATIONAL EXCELLENCE

DEVELOPING A CULTURE OF OPERATIONAL EXCELLENCE TO ENSURE THAT THE COMPETITIVENESS AND SUSTAINABILITY OF ITS INDUSTRIAL SITES IS A PRIORITY FOR ARKEMA AND A KEY PILLAR OF ITS STRATEGY.

Our 5 commitments



1. Being a top-quartile performer in the chemical industry in terms of safety and environmental footprint

Arkema continues to improve its safety and environmental performance in line with its 2025 targets for safety and 2030 targets for the climate and the environment.

2. Positioning its main production sites in the top quartile in terms of competitiveness and reliability

Through investments and the rollout of high-performance digital systems, Arkema is constantly improving its industrial facilities and strengthening the competitiveness and reliability of its main production sites.

Thanks to a global goods and services procurement strategy, Arkema also optimizes its operational costs and industrial investments.

To reduce variable costs, Arkema optimizes raw materials consumption and energy efficiency thanks to continuous process improvement developed under its R&D program and targeted investments under its Arkenergy program.

3. Improving the quality of customer service through an optimized supply chain

With its Ambition program whose roll-out was completed in 2017, Arkema reorganized its IT systems to optimize its supply chain and thereby improve its customer service quality. Arkema extended this program in 2018 by setting up a dedicated Supply Chain department, with ambitious targets on improving customer service quality. Reducing working capital is a supply chain target but does not improve customer service quality.

4. Developing the technological innovation policy across different activities

When designing new production units, Arkema implements the latest technological processes it has developed, as well as high-performance digital tools, in order to optimize both the time schedule of its projects as well as their operating costs and capital expenditure.

5. Promote and reinforce employee engagement

In order to sustain its safety and environmental performance, Arkema develops an operational excellence culture amongst employees and promotes their day-to-day actions that contribute to the Company's continuous progress.

The fixed and variable cost savings achieved through its various actions will enable Arkema to offset at least half of annual fixed cost inflation.

Our approach

To implement its operational excellence program, Arkema launched a continuous progress initiative across all Group businesses and subsidiaries. It covers the following points:

- constant assessment of areas of improvement and progress potential in each of the Group's businesses;
- definition of precise targets for each production site on safety, environment, reliability, productivity and raw materials consumption;
- monitoring of key performance indicators at each site;
- identification and sharing of best practices across the Group; and
- involving all employees in the process of improving the performance of production units, with the gradual roll-out of the Smart project.



The Smart project enables all employees at all levels to foster continuous improvement in the workplace by giving them the means to make active contributions, in terms of improving operational performance or solving problems that they encounter. It is being phased in at a pace of 15 to 20 sites per year, with rollout set to be completed across all Group sites by 2025.



FOURTH PILLAR

DIGITAL TRANSFORMATION

New digital technologies are deeply changing customer interactions and the understanding of our markets' evolution, thereby opening up new growth opportunities for the Group. Against this backdrop of increasing digitalization, Arkema created a digital transformation program, which focuses on four key areas: customer experience, new business models, digital plant and employee experience.

Customer experience

By analyzing the large volumes of available data for market and customer experience to gain **a better understanding** of the needs and expectations of customers and end users, and by targeting its portfolio of solutions and adapting its marketing tools and content to the target market, Arkema can respond **more quickly and more efficiently** to the needs of its customers and prospects. Bostik is also stepping up its consumer-oriented digital strategy with the deployment of e-business campaigns, online tutorials and digital collaboration with major retailers.

Digital plant

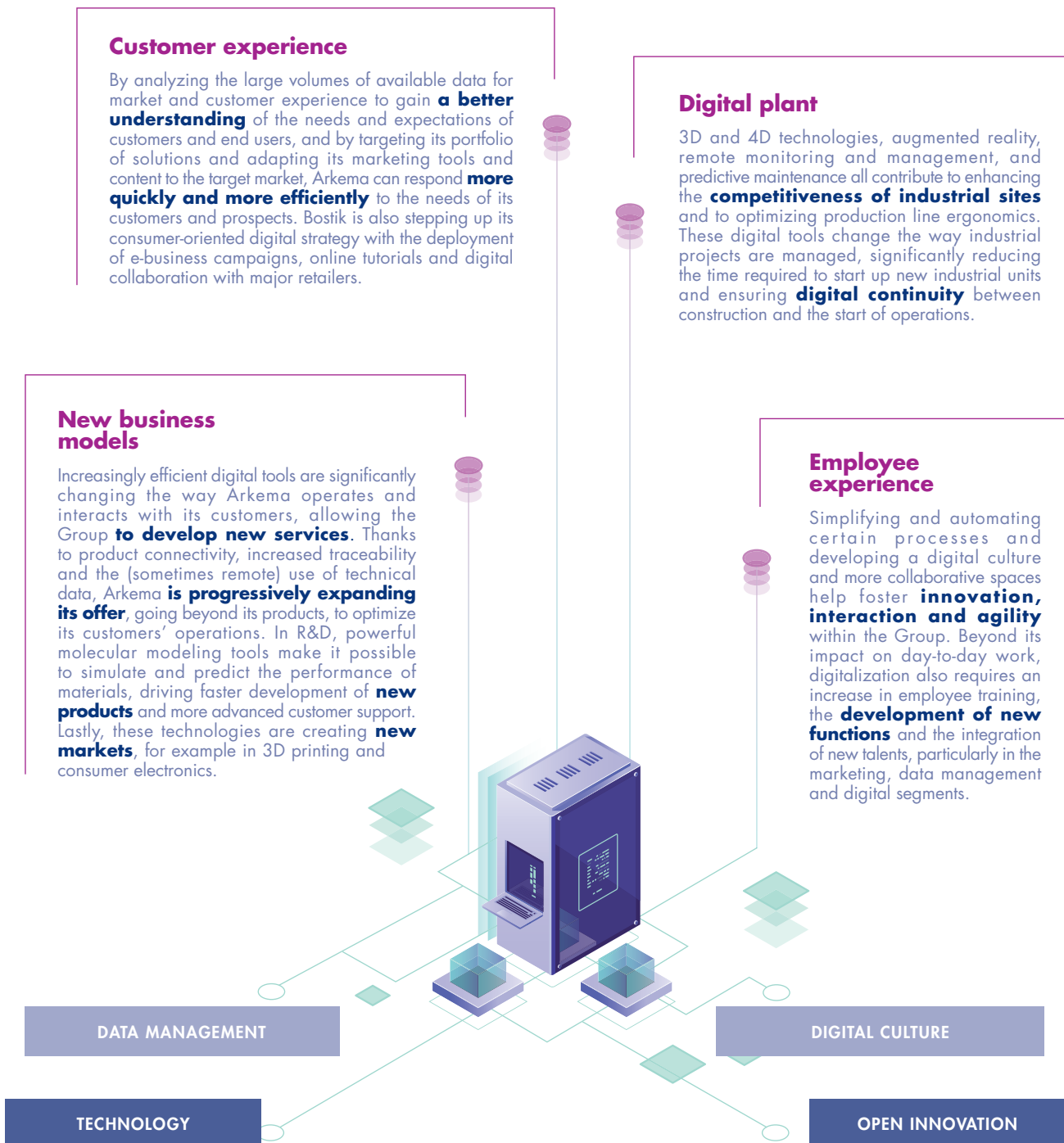
3D and 4D technologies, augmented reality, remote monitoring and management, and predictive maintenance all contribute to enhancing the **competitiveness of industrial sites** and to optimizing production line ergonomics. These digital tools change the way industrial projects are managed, significantly reducing the time required to start up new industrial units and ensuring **digital continuity** between construction and the start of operations.

New business models

Increasingly efficient digital tools are significantly changing the way Arkema operates and interacts with its customers, allowing the Group **to develop new services**. Thanks to product connectivity, increased traceability and the (sometimes remote) use of technical data, Arkema **is progressively expanding its offer**, going beyond its products, to optimize its customers' operations. In R&D, powerful molecular modeling tools make it possible to simulate and predict the performance of materials, driving faster development of **new products** and more advanced customer support. Lastly, these technologies are creating **new markets**, for example in 3D printing and consumer electronics.

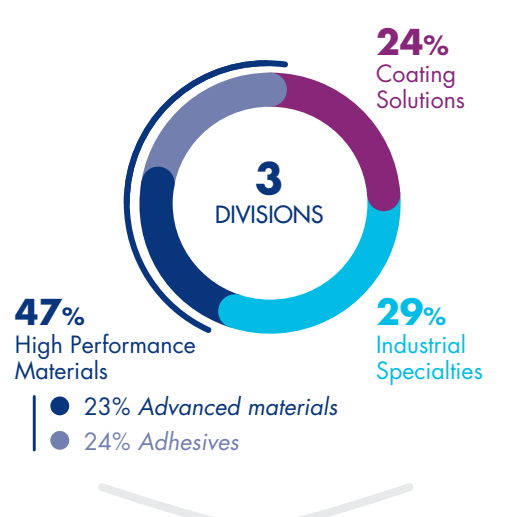
Employee experience

Simplifying and automating certain processes and developing a digital culture and more collaborative spaces help foster **innovation, interaction and agility** within the Group. Beyond its impact on day-to-day work, digitalization also requires an increase in employee training, the **development of new functions** and the integration of new talents, particularly in the marketing, data management and digital segments.



OUR BUSINESS MODEL

Develop, as a responsible industrial company, innovative solutions adapted to our customers' main challenges and support them in their quest for sustainable performance

OUR STRENGTHS ⁽¹⁾	OUR VALUE CREATION MODEL
<p>COMMERCIAL STRENGTHS</p> <ul style="list-style-type: none"> - Top 3 positions in our main product lines - A worldwide presence in 55 countries - A balanced portfolio of businesses - Strong partnerships with leading customers <p>OPERATIONAL STRENGTHS</p> <ul style="list-style-type: none"> - A global footprint with 144 production sites - €6.4 billion in tangible and intangible assets <p>R&D STRENGTHS</p> <ul style="list-style-type: none"> - 6 innovation platforms focused on the megatrends shaping the future - More than 1,600 researchers in 3 regional R&D centers worldwide - A robust intellectual property portfolio with over 10,000 patents <p>HUMAN CAPITAL</p> <ul style="list-style-type: none"> - 20,500 employees embracing the Company's values and engaged in its long-term project <p>FINANCIAL STRENGTHS</p> <ul style="list-style-type: none"> - Limited debt with a net debt of 1.1x EBITDA 	<p>OUR VALUES</p> <ul style="list-style-type: none"> PERFORMANCE ACCOUNTABILITY SOLIDARITY SIMPLICITY <p>OUR ORGANIZATION</p>  <p>47% High Performance Materials</p> <ul style="list-style-type: none"> ● 23% Advanced materials ● 24% Adhesives <p>24% Coating Solutions</p> <p>29% Industrial Specialties</p> <p>3 DIVISIONS</p> <p>Cross-functional initiatives in commercial excellence, CSR, operational excellence and digital transformation</p>

(1) See pages 6 and 7.
 (2) (REBIT - current taxes)/(net debt + shareholders' equity).
 (3) Total recordable injury rate per million hours worked.
 (4) Process safety event rate per million hours worked.
 (5) In intensity compared with 2012 for water, air and energy ; in absolute value compared with 2015 for climate.



OUR AMBITION

OUR PRIORITIES

OFFER

sustainable solutions driven by innovation and product stewardship

- Develop lighter materials
- Increase the use of renewable raw materials
- Facilitate access to safe drinking water
- Contribute to the development of new energies
- Improve the energy performance of buildings
- Contribute to the development of disruptive technologies
- Extend products' lifespan and promote the circular economy

SUPPORT

our customers in their geographic expansion through a policy of targeted investments

ACT

as a responsible manufacturer deeply rooted in host communities

- Ensure personal and equipment safety
- Reduce our environmental footprint
- Contribute to the development of host communities in countries where we operate

Ensure steady growth and high profitability, led by specialty businesses that should account for **more than 80% of sales** in 2023

FINANCIAL TARGETS (2023)

REBIT margin	EBITDA to cash conversion rate
11.5% to 12.5%	35%

Under strict financial discipline

ROCE ⁽²⁾ **at least 10%**

Net debt **< 2x EBITDA**

Solid **investment grade** rating

LONG-TERM EXTRA-FINANCIAL TARGETS

Safety (2025)

- Injury rates: TRIR ⁽³⁾ **< 1.2**
- Process safety event rate: PSE ⁽⁴⁾ **< 3**

Climate and Environment ⁽⁵⁾ (2030)

- Climate (greenhouse gas emissions): **-38%**
- Water (chemical oxygen demand): **-60%**
- Air (volatile organic compound emissions): **-65%**
- Energy (net energy purchases): **-20%**

Employment (2025)

- Percentage of women in senior management and executive positions: **23% to 25%**
- Percentage of non-French nationals in senior management and executive positions: **42% to 45%**

OUR VALUE CREATION

SINCE ITS STOCK MARKET LISTING IN 2006, ARKEMA HAS ENGAGED IN AN IN-DEPTH TRANSFORMATION PROCESS GUIDED BY AN AMBITIOUS PLAN TO CREATE VALUE FOR ITS STAKEHOLDERS.



Deliver innovative, sustainable solutions tailored to customers' specific needs



1 600
SUPPLIERS REGARDING CSR REPRESENTING over **50%** OF THE GROUP'S PURCHASE ⁽¹⁾



222
PATENT APPLICATIONS FILED over **65%** RELATING TO SUSTAINABLE DEVELOPMENT



Numerous Partnerships
ANNOUNCED WITH HEXCEL IN THERMOPLASTIC COMPOSITES AND CARBON® IN 3D PRINTING



46%
OF SALES ASSESSED SIGNIFICANTLY CONTRIBUTING TO THE SDGs ⁽²⁾



Contribute to the social and economic development of the regions where Arkema operates



€607M
IN RECURRING AND EXCEPTIONAL CAPITAL EXPENDITURE



€156M
CURRENT CASH TAX



Numerous Partnerships
IN RESEARCH WITH PUBLIC LABORATORIES AND UNIVERSITIES (ÉCOLE POLYTECHNIQUE IN FRANCE, MONASH UNIVERSITY IN MALAYSIA)



Nearly **1,000**
COMMON GROUND® INITIATIVES TAKEN AT **about 80%** OF THE GROUP'S PRODUCTION SITES



Financing
OF PROJECTS TO SUPPORT EDUCATION, THROUGH A DEDICATED FUND, LED BY 33 NON-PROFITS IN **9 countries**

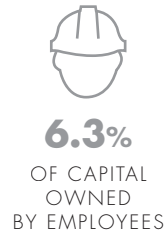
2019 Data

(1) Together for Sustainability.

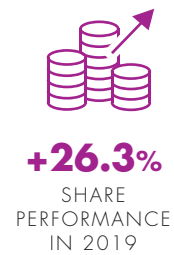
(2) On the basis of an assessment of 44% of the Group's third-party sales in 2019.



Over the next few years, the Group will endeavor to move forward with this plan to continue creating long-term value for all its stakeholders, both internal and external, and especially its employees, customers, shareholders and regions where Arkema operates.



Promote the individual and collective development of all Group employees



Create long-term value with an ambitious transformation plan while gradually increasing dividends



* Dividend proposed at the annual general meeting on 19 May 2020.

GOVERNANCE

Strong and efficient governance

STRONG AND EFFICIENT GOVERNANCE

ARKEMA'S CORPORATE GOVERNANCE COMPRISES A BOARD OF DIRECTORS, WITH A CHAIRMAN AND CHIEF EXECUTIVE OFFICER, A SENIOR INDEPENDENT DIRECTOR, AS WELL AS TWO SPECIALIZED COMMITTEES. THE CHAIRMAN AND CHIEF EXECUTIVE OFFICER IS ALSO SUPPORTED BY AN EXECUTIVE COMMITTEE COMPRISING SEVEN OPERATIONAL AND FUNCTIONAL EXECUTIVE VICE-PRESIDENTS.

COMPOSITION OF THE BOARD OF DIRECTORS

Arkema's Board of Directors comprises

13 directors, including 7 independent directors, 1 director representing employees and 1 director representing shareholder employees.

Independence rate is at 64%⁽¹⁾, in line with the recommendations of the AFEP-MEDEF Code.

Except for the director representing employees, directors are appointed for a four-year term by the ordinary shareholders' meeting.



13
DIRECTORS



45%
WOMEN⁽²⁾



1
SENIOR
INDEPENDENT



95%
ATTENDANCE RATE
IN 2019



64%
INDEPENDENCE
RATE⁽¹⁾

Composition of the Board of Directors at 31 March 2020

		Age	Year of first appointment	Year current term expires	Other directorships in listed companies	Committees	
						Audit and Accounts	Nominating, Compensation and Corporate Governance
Thierry Le Hénaff	Chairman and Chief Executive Officer	56	2006	2020	1		
Yannick Assouad		61	2017	2021	2		
Jean-Marc Bertrand	Director representing shareholder employees	62	2018	2022	None		
Marie-Ange Debon		54	2018	2022	2	Chairman	
Ian Hudson		63	2019	2023	1	•	
Alexandre de Juniac		57	2018	2022	None		•
Victoire de Margerie		56	2012	2023	2		•
Laurent Mignon		56	2006	2023	2		
Hélène Moreau-Leroy	Senior independent director	55	2015	2023	None	•	
Thierry Morin		68	2006	2021	1		Chairman
Nathalie Muracciole	Director representing employees	55	2016	2020	None		
Marc Pandraud		61	2009	2021	None		
Fonds Stratégique de Participations represented by Isabelle Boccon-Gibod	Shareholder with more than 10% of voting rights	52	2014	2022	4		
					3	•	

(1) Excluding directors representing employees and shareholder employees, in line with the AFEP-MEDEF Code.

(2) Excluding directors representing employees, in line with the AFEP-MEDEF Code.



AN EXPERIENCED AND DIVERSE BOARD OF DIRECTORS

In addition to gender balance in its composition, the Board is attentive to maintaining:

- a diversity of experience, in particular as regards international experience;
- skills complementarity, notably with current and former executives with experience in industry (the chemicals industry in particular), finance, acquisitions and their integration, corporate social responsibility and digital; and
- a majority of independent directors.

Director skills matrix

(excluding the Chairman and CEO)



*Independent directors.

GOVERNANCE

Strong and efficient governance

THE BOARD'S WORK

The Board of Directors

decides the Group's overall business strategy and oversees its implementation.

Its approval is required for:

- industrial **investments** in excess of **€80M**
- **acquisitions** or **divestments** with an **enterprise value** in excess of **€130M**
- financial statements, with oversight on the quality of information provided to shareholders and financial markets.

More generally, the Board of Directors promotes long-term value creation by the Group for all of its stakeholders, taking into consideration the social and environmental implications of its businesses.

8 MEETINGS

Including one meeting on Group strategy, with 100% attendance rate

95%
ATTENDANCE RATE

TO ACCOMPLISH ITS MISSIONS, THE BOARD IS SUPPORTED BY

2 specialized committees

Audit and Accounts Committee

The Audit and Accounts Committee oversees matters including the quality of internal control and the reliability of information provided to shareholders and financial markets.

6 MEETINGS

100%
ATTENDANCE RATE

Nominating, Compensation and Corporate Governance Committee

The Nominating, Compensation and Corporate Governance Committee issues recommendations on matters including the composition of the Board, the compensation policy for the Chairman and Chief Executive Officer, and good governance practices.

4 MEETINGS

92%
ATTENDANCE RATE

Annual assessment of the Board of Directors' operating procedures

An assessment of the Board of Directors' operating procedures was carried out by an external consulting firm in cooperation with the Chairman of the Nominating, Compensation and Corporate Governance Committee and the Secretary of the Board of Directors.

More than 75% of directors consider that the operating procedures of Arkema's Board of Directors continued to improve compared with the last external assessment carried out in 2016.

A large majority of directors who also sit on the Boards of comparable companies consider the operating procedures of Arkema's Board of Directors to be the best, thanks to:

- the quality of discussions led by the Chairman and Chief Executive Officer, the ability to speak freely, as well as the active contributions from all directors; and
- the regular review of the strategy through frequent discussions with management and attendance at a strategy seminar.

CORPORATE SOCIAL RESPONSIBILITY

4

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4.1 ARKEMA'S CORPORATE SOCIAL RESPONSIBILITY (CSR) APPROACH

4.1.1 CSR policy

Arkema aims to generate sustainable and responsible growth for its businesses and to meet societal challenges by providing its customers with sustainable and innovative solutions that contribute to the Sustainable Development Goals defined by the United Nations.

The Group's CSR policy is developed in compliance with the main international texts and standards in force and more particularly with the International Bill of Human Rights, the International Labour Organization's (ILO) Declaration on Fundamental Principles and Rights at Work, the OECD Guidelines for Multinational Enterprises, the ten principles of the United Nations Global Compact, to which Arkema committed in 2014, and the Responsible Care® program, of which the Group has been a member since 2006.

To facilitate the understanding of its CSR approach among all stakeholders, Arkema published a Social Commitment Charter in 2018, which was approved by the Executive Committee. It has since been implemented across the organization to ensure support for its sustainable development culture. The charter is based on factors that have long been fundamental to Arkema, including a culture of safety, respect for the environment, innovation, employee issues and a culture of close dialogue. It sets out the three key commitments that structure the Group's CSR policy:

- deliver sustainable solutions driven by innovation;
- manage our activities as a responsible manufacturer; and
- cultivate an open dialogue and close relations with stakeholders.

3 CSR COMMITMENTS

Deliver **sustainable solutions** driven by **innovation**



- **Solutions that address societal challenges**
- **Innovation at the heart of the activities**
- **Product stewardship**

Manage our activity as a **responsible manufacturer**



- **Safety of people and processes**
- **Health**
- **Environmental footprint reduction**

Cultivate an **open dialogue** and **close relations** with our **stakeholders**



- **Ethics**
- **Human Rights**
- **Diversity and employee development**
- **Responsible value chain**
- **Corporate citizenship**

CHARTERS AND POLICIES

The Social Commitment Charter is broken down into different policies that support the Group's three commitments: an Innovation Policy, a Health, Safety, Environment and Quality Policy, an energy policy, a water policy, a Human Rights Policy, a Business Conduct and Ethics Code, a Supplier Code of Conduct, a charter for the promotion and respect of the International Labour Organization's conventions, an Anti-Corruption Policy, a policy on conflict minerals and a policy on the use of Group products for medical devices applications.

These charters and policies are applied across the Group and all of its subsidiaries. Communication and events to support the Social Commitment Charter and its policies were organized at each Group site in 2019, highlighting the management's commitment to these issues and its willingness to involve all employees.

These charters, codes and policies are all available in the CSR section on the Company's website (www.arkema.com).

4.1.2 Description of key impacts, risks, and opportunities

As an economic actor, Arkema interacts with its social environment through its activities. The identification and analysis of the Group's impact on its ecosystem are part of its sustainable development process in order to mitigate the negative impacts and accentuate the positive impacts of the Group's actions, both for Arkema itself and for its stakeholders.

Arkema has therefore been engaged for many years in a continuous process of reducing the main risks associated with its activities, particularly those relating to safety and the environment (described in section 2.1 of this document). At the same time, thanks to its capacity for innovation and its expertise, Arkema develops new products and solutions that provide a wide range of opportunities to contribute to meeting the challenges of sustainable development (for additional detail, see section 1.1.2 of this document).

The Sustainable Development Goals (SDGs) defined by the United Nations set out the economic, social and environmental challenges facing our world today. Arkema's sustainable development initiatives are underpinned by these SDGs. Based on the expectations expressed by stakeholders, the Group's activities and the three commitments structuring its CSR policy, Arkema has assessed its contribution to the SDGs by identifying the extent of its commitments and actions with reference to the targets set for each of them. The aim of these actions is to mitigate social risks and to foster opportunities that contribute to the development of sustainable solutions. Arkema integrates the SDGs in its reporting in line with the practical guide published jointly by the United Nations Global Compact and the Global Reporting Initiative (GRI)⁽¹⁾.

(1) "Integrating the SDGs into Corporate Reporting: A Practical Guide".

TABLE OF THE GROUP'S CONTRIBUTION TO THE UNITED NATIONS SDGS

		Sustainable solutions	Responsible manufacturer	Open dialogue			Sustainable solutions	Responsible manufacturer	Open dialogue
	1 NO POVERTY			1.5		10 REDUCED INEQUALITIES			10.4
	No poverty					Reduced inequalities			
	2 ZERO HUNGER	2.1 2.3 2.4				11 SUSTAINABLE CITIES AND COMMUNITIES	11.1 11.2		
	Zero hunger					Sustainable cities and communities			
	3 GOOD HEALTH AND WELL-BEING	3.8	3.5 3.6 3.9	3.5 3.6 3.9		12 RESPONSIBLE CONSUMPTION AND PRODUCTION	12.2 12.3 12.4 12.5	12.4 12.5	12.6
	Good health and well-being					Responsible consumption and production			
	4 QUALITY EDUCATION		4.3 4.4 4.5	4.3 4.4 4.5 4.7		13 CLIMATE ACTION	13.1	13.1 13.3	
	Quality education					Climate action			
	5 GENDER EQUALITY			5.5		14 LIFE BELOW WATER	14.1	14.1 14.2	
	Gender equality					Life below water			
	6 CLEAN WATER AND SANITATION	6.1 6.2 6.3 6.4	6.3 6.4			15 LIFE ON LAND	15.1 15.5	15.5	
	Clean water and sanitation					Life on land			
	7 AFFORDABLE AND CLEAN ENERGY	7.2 7.3	7.2 7.3			16 PEACE, JUSTICE AND STRONG INSTITUTIONS			16.5
	Affordable and clean energy					Peace, justice and strong institutions			
	8 DECENT WORK AND ECONOMIC GROWTH			8.4 8.5 8.7 8.8		17 PARTNERSHIPS FOR THE GOALS	17.17	17.14	17.14
	Decent work and economic growth					Partnerships for the goals			
	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	9.1 9.4 9.5	9.4						
	Industry, innovation and infrastructure								

■ Strategic contribution (through strategic objectives or programs)
■ Direct contribution (resulting from voluntary initiatives)
■ Indirect contribution (resulting from the Group's activities)

The strategic contribution to the SDGs that relate to Arkema's sustainable solutions commitment is demonstrated by the Group's choice of the six strategic innovation platforms presented in section 1.1.2 of this document. The strategic contributions to the SDGs relating to its responsible manufacturer and open dialogue commitments are illustrated by the long-term targets, which are presented in section 4.1.7 of this chapter.

Consistent with its social commitment, Arkema develops buy-in of the SDGs across all its business and interactively with its value chain. As part of its commitment to responsibly manage its solutions portfolio, the Group began a systematic evaluation in 2018 factoring in contributions to the SDGs, which was stepped up in 2019. This process is described in section 4.2 of this document, which focuses on the Group's sustainable solutions.

4.1.3 Consolidated non-financial information statement

In compliance with article L. 225-102-1 of the French Commercial Code (*Code de commerce*), Arkema takes into account the social and environmental consequences of its activities (those of the Company and of all its subsidiaries included in the consolidation scope), as well as their impact in terms of Human Rights and the fight against corruption and tax evasion.

The Group's business model is described in the 'Profile, ambition and strategy' section of this document.

The identification and review of the main risks associated with its activities are based on a number of sources: the general risks listed in the international reference documents cited in section 4.1.2 of this chapter; the risks targeted by the Responsible Care® program, which are specific to the chemicals industry; feedback from the Group's own experience; incidents that have occurred at companies with similar activities or scope; the material topics expressed by stakeholders during the materiality assessment presented in section 4.1.6 of this chapter; and the Group's duty of care plan. The risk identification and review process is carried out using a collaborative approach involving the Sustainable Development, Human Resources, Health, Safety and Environment, Legal Affairs, Procurement, and Internal Audit and Internal Control departments. The main non-financial risks are included in the risk map presented in chapter 2 of this document and are reviewed by the Risk Review Committee, in line with the risk management procedure described in section 2.2 of this document.

The main non-financial risks identified by the Group in the areas mentioned above are presented in this chapter, along with the due diligence procedures and policies implemented to prevent, identify and mitigate those risks and the outcomes of those policies in the form of performance indicators.

The main risks are:

- the risk of industrial accident liable to have social or environmental consequences;
- the risk of exposure to chemicals, whether involving Group or subcontractor employees, customers, end users or local residents;
- the risk of pollution and the risk of contributing to climate change, whether through Arkema's own activities or those of its upstream value chain or through the use of its products; and
- the risk of losing the skills and expertise necessary to continuously meet business, technological, social and environmental expectations in a proactive manner.

In addition to the risks mentioned above, the Group monitors the following risks, which are also presented in this chapter: ethics and compliance risks, including those relating to the fight against corruption, the risk of human rights violations, and the risk of poor social and environmental performances by suppliers or subcontractors.

The Group's governance of CSR issues is described in section 4.1.5 of this chapter.

The non-financial information statement for the year ended 31 December 2019, which includes all the CSR performance indicators mentioned in this chapter, was reviewed by the independent third-party auditor, as indicated in its limited assurance statement in section 4.5 of this chapter.

In compliance with article R. 225-105-1 III of the French Commercial Code, reported non-financial information is published on the Group's website at the following address:

<https://www.arkema.com/en/social-responsibility>.

CROSS-REFERENCE TABLE FOR THE NON-FINANCIAL INFORMATION STATEMENT

Articles L. 225-102-1 and R. 225-105 of the French Commercial Code (<i>Code de commerce</i>)	Sections in this document
Company business model	Profile, ambition and strategy
Description of the main risks involved in the way the Company takes into account the social and environmental consequences of its activities as regards Human Rights, and avoidance of corruption and tax evasion	2.2 (non-financial risks are tagged "CSR")
Social impact of the Company's activities	4.4.1
Environmental impact of the Company's activities	4.3.3
Impact of the Company's activities on Human Rights	4.1.4 and 4.4.3
Impact of the Company's activities on avoidance of corruption and tax evasion	4.4.2
Impact of the Company's activities and of the use of goods it produces and services it provides on climate change	4.3.3.2

Articles L. 225-102-1 and R. 225-105 of the French Commercial Code (<i>Code de commerce</i>)	Sections in this document
Social commitments to sustainability, allowance made for social and environmental challenges in supplier and subcontractor relations, and measures taken regarding consumer health and safety	4.1, 4.2.4 and 4.4.4
Social commitments to the circular economy	4.3.3.3.4
Social commitments to combat food waste	Non-material risk for the Group
Social commitments to combat food insecurity	Non-material risk for the Group
Social commitments to animal welfare	4.2.4.4
Social commitments to fair, responsible and sustainable food	Non-material risk for the Group
Collective bargaining agreements signed within the Company and their impacts on its economic performance and on employee working conditions	4.4.1.7
Actions to counter discrimination and promote diversity	4.4.1.6
Measures to promote the recruitment of people with disabilities	4.4.1.6

4.1.4 Duty of care plan

Pursuant to the provisions of article L. 225-102-4 of the French Commercial Code, the Group has established and implemented a duty of care plan covering the activities of the Company and all the subsidiaries it controls. More specifically, Arkema has conducted an in-depth review of the consequences of its activities, and of those carried out by its suppliers and subcontractors that relate to their business relationship with Arkema, in order to identify any serious risk of violations of human rights and fundamental freedoms, as well as any serious health, safety and environmental risks, so that, as part of a continuous improvement approach, the Group can introduce or supplement the reasonable care measures necessary to prevent such risks or mitigate their impact.

MANAGEMENT OF THE DUTY OF CARE PLAN

The duty of care plan is reviewed – overall and with respect to its implementation – at least once a year. The review is led by the Sustainable Development department and involves representatives from the Human Resources, Health, Safety and Environment, Legal Affairs, Procurement, and Internal Audit and Internal Control departments. The progress made and proposals for action are presented to the CSR Steering Committee and then to the Risk Review Committee, which validates the duty of care plan before submission to the Executive Committee then to the Board of Directors.

As part of the monitoring of the implementation of the duty of care plan and the assessment of its effectiveness, the internal audit and control system may be modified, if necessary, to take into account any additional items identified. For further details on the risk management and internal control system, see section 2.2.3 of this document.

MAPPING OF SERIOUS RISKS

The identification and review of these risks was carried out using a collaborative approach involving the Sustainable Development, Human Resources, Health, Safety and Environment, Legal Affairs, Procurement, and Internal Audit and Internal Control departments. This process resulted in a risk map that was presented to the Risk Review Committee in line with the risk management procedure described in section 2.2 of this document.

The methods for managing these risks and monitoring the effectiveness of the measures undertaken are different, depending on whether the risks relate to the Group's activities or those of its suppliers and subcontractors.

RISK MANAGEMENT AND EFFECTIVENESS MONITORING FOR RISKS RELATING TO THE GROUP'S ACTIVITIES

The identification and review of these risks are based on deductive analyses, internal feedback, incidents that have occurred at companies with similar activities or scope, and general risks listed in international reference documents. Risk assessments are updated regularly to take into account lessons learned, advances in preventing risks and mitigating their impact, and any emerging risks deemed relevant. Stakeholder expectations, particularly the main issues identified in the 2019 materiality assessment presented in section 4.1.6 of this chapter, are taken into account in the duty of care plan.

Risks are reviewed in light of a combination of factors that includes their impact and likelihood of occurrence and the level of control provided by existing prevention and management measures.

- Human Rights and fundamental freedoms

Respect for Human Rights is of the utmost importance to Arkema. The Group therefore makes every effort to prevent human rights violations against its employees, partners and other stakeholders and to remedy any violations that do occur.

After reviewing internal feedback and the general risks presented in the International Labour Organization's Declaration on Fundamental Principles and Rights at Work and the International Bill of Human Rights, and assessing the impact, likelihood of occurrence and level of control that Arkema has over these issues, no risks of serious violations have been identified in this area.

Given the importance that Arkema places on Human Rights and fundamental freedoms, the Group issued its Human Rights Policy in 2018 in order to make its commitments and management of the risks in this area clearer and more visible for all stakeholders. This policy is available both internally and externally. For further details, see section 4.4.3 of this chapter;

- Health and safety

As a responsible manufacturer, Arkema places personal health and safety among its top priorities. This commitment is clearly expressed in its Health, Safety, Environment and Quality Policy. A harmonized approach, based on risk prevention, an integrated management system and the dissemination of a health and safety culture, has existed within the Group for many years and is managed centrally.

The main risks of serious harm to personal health and safety are:

- the social and environmental consequences arising from industrial accidents or acts of malice. Accident risks are described in section 2.1.1 of this document. The management system for these risks is described in detail in sections 4.3.1 and 4.3.2 of this chapter and includes risk prevention measures, as well as measures for mitigating impacts in the event of an incident or accident.

The effectiveness of the measures undertaken is monitored using numerous indicators, including the total recordable injury rate per million hours worked (TRIR) and the process safety event rate per million hours worked (PSER). In 2019, the TRIR, including accidents involving Group and subcontractor employees, was 1.4, much in line with previous years' figures, which were already indicative of very good performance. The PSER, an indicator introduced in 2018, is improving, with a reading of 3.7. For further details, see section 4.3.2 of this chapter.

- exposure to substances that are toxic or hazardous to human health, whether involving Group or subcontractor employees, customers or people living near Group facilities, as described in section 2.1.1 of this document.

The management system for health and safety risks, which is described in detail in sections 4.3.1 and 4.3.2 of this chapter, includes risk prevention measures, as well as measures for mitigating impacts in the event of an incident or accident. In addition, product stewardship, including the transparency and availability of product information, is presented in sections 4.2.4 and 4.3.2 of this chapter.

The number of occupational illnesses related to exposure to chemicals is one of the indicators for monitoring the effectiveness of prevention measures over the long term. In 2019, 35 cases of occupational illness were reported Group-wide. The frequency rate of 1.0 per million hours worked is an improvement on previous years. Details on occupational illnesses are given in section 4.3.2.2.4 of this chapter.

- Environment

As a responsible manufacturer, Arkema places environmental risk management among its top priorities. This commitment is clearly expressed in its Health, Safety, Environment and Quality Policy.

A harmonized approach, based on the vision set out in this policy, has existed within the Group for many years and is managed centrally.

The main risk of serious damage to the environment is the pollution of air, water and soil, which is described in section 2.1.1 of this document. The management system for environmental risks is described in detail in sections 4.3.1 and 4.3.3 of this chapter and includes risk prevention measures, as well as measures for mitigating impacts in the event of an incident or accident, or in the case of legacy pollution. The effectiveness of the measures undertaken is monitored via numerous indicators, including two strategic, intensive Environmental Footprint Performance Indicators (EFPIs compared with 2012) for which targets have been set for 2030. One relates to the amount of volatile organic compounds (VOCs) released into the air (VOC EFPI). In 2019, the VOC EFPI was 0.60, below the 2018 figure and in line with the 0.35 target set for 2030. The second relates to chemical oxygen demand (COD) in effluent discharges (COD EFPI). In 2019, the COD EFPI was 0.50, well below the 2018 figure and in line with the 0.40 target set for 2030. For further details, see section 4.3.3 of this chapter. The results confirm the validity of the Group's programs and initiatives on reducing pollution risks.

Arkema is also attentive to the issue of climate change, one of the major challenges facing society today. The Group's climate policy and its management are described in section 4.3.3.2 of this chapter and include measures aimed at reducing emissions. In 2019, the Group stepped up its program aimed at combating global warming and set a new objective consistent with the Paris Agreement. The effectiveness of the measures undertaken is monitored via two strategic indicators for which targets have been set for 2030.

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The first relates to greenhouse gas emissions from operations at the Group's industrial sites (GHG indicator). In 2019, absolute GHG emissions compared with 2015 were 0.87, down on the 2018 figure and consistent with the 0.62 target set for 2030. For further details, see section 4.3.3.2.1 of this chapter. The second indicator measures net energy purchases (Energy EFPI compared with 2012), the intensity of which reflects the consumption of energy whose production generates greenhouse gas emissions. In 2019, the Energy EFPI was 0.91, up on the 2018 figure due to unfavorable energy efficiency conditions at certain sites. However, the decline does not call into question the 0.80 target set for 2030. For further details, see section 4.3.3.2.2 of this chapter. The improvement in the GHG indicator in 2019 confirms Arkema's contribution to reducing greenhouse gas emissions.

RISK MANAGEMENT AND EFFECTIVENESS MONITORING FOR RISKS RELATING TO THE ACTIVITIES OF SUPPLIERS AND SUBCONTRACTORS WITH WHICH ARKEMA HAS ESTABLISHED BUSINESS RELATIONSHIPS

Arkema has a number of suppliers involved in various activities relating to the supply of raw materials, energy, goods and services. These activities are liable to entail various kinds of risks. To select suppliers and subcontractors and develop their sense of responsibility with a view to reducing the risk of serious violations of human rights and fundamental freedoms, harm to personal health and safety, and damage to the environment, Arkema takes a harmonized approach, set out in detail in section 4.4.4 of this chapter.

The effectiveness of the measures undertaken is monitored in terms of the number of suppliers assessed and the scores obtained. In 2019, more than 1,600 suppliers were assessed, up from around 1,400 in 2018. The suppliers assessed account for more than 50% of the Group's purchases. In 2019, CSR scores had risen for 57% of suppliers whose assessments had been updated.

Some of the Group's products use raw materials of vegetable origin. Where raw material producers are farmers, the assessment system outlined above is not always applicable. For supplies of castor oil, the main Bio-based raw material used by the Group, an initiative is in progress under the Pragati project, launched in 2016, on environmentally socially responsible sourcing, as described in section 4.4.4.3 of this chapter.

REMEDIATION PROCESS

In the event of a major accident involving health, safety or the environment, a crisis unit is set up in accordance with the Group procedure described in section 4.3.2.3 of this chapter.

For non-accidental incidents liable to affect human rights and fundamental freedoms, human health and safety and the

environment, the remediation process is organized on a case-by-case basis with representatives from the departments involved and a management team adapted to the specific situation. Details on remediation measures regarding biodiversity are given in section 4.3.3.4 of this chapter.

REPORT ON THE IMPLEMENTATION OF THE DUTY OF CARE PLAN

For risks liable to be entailed by the Group's activities, the following conclusions were drawn from the implementation of the duty of care plan:

- significant change is not necessary for the health, safety and environment management system, which is considered to meet duty of care requirements;
- judging from the main indicators, continuous progress initiatives appear to be effective, and should be continued in order to achieve the strategic goals the Group has set:
 - for 2025 in terms of total recordable injury rate (TRIR < 1.2) and process safety event rate (PSER < 3),
 - for 2030 in terms of environmental impact concerning the four strategic indicators: a climate indicator (GHG - 38% in absolute terms compared with 2015) and three intensive emission indicators (VOC EFPI - 65%, COD - 60% and Energy - 20% compared with 2012);
- no risks were identified of serious violations to human rights or fundamental freedoms, or in labor or business relations. Initiatives are nevertheless under way in this area. Information was provided, along with the Social Commitment Charter, and events were organized at each Group site in 2019 to support the Human Rights Policy, highlighting the management's commitment to these issues by encouraging the involvement of all employees.

Concerning risks relating to the activities of suppliers and subcontractors, the programs under way meet duty of care expectations. The following initiatives helped step up these programs in 2019:

- extended reach for the Together for Sustainability program, with special focus on sensitive suppliers and subcontractors;
- decision to continue the Pragati project for responsible castor farming for a further period of three years and to create an independent secretariat to promote good agricultural practices more widely (see details in section 4.4.4.3 of this document).

WHISTLEBLOWING SYSTEM AND REPORTS

The Group has a whistleblowing system that complies with both the requirements of the law on duty of care and the French Sapin II Law. For further details, see section 4.4.2.5 of this chapter.

4.1.5 CSR governance

Arkema's governance of the CSR process is integrated into the Group's corporate governance. Arkema's CSR ambition, the main risks and opportunities, the related potential initiatives and their monitoring, the performance indicators and the sustainable development targets are defined and validated by the Executive Committee and presented once a year to the Board of Directors by the Sustainable Development Vice-President. The scope of the CSR data audit and the findings of the independent third-party auditor responsible for this audit are presented every year to the Audit and Accounts Committee. These findings appear in the auditor's opinion issued to the annual general meeting along with the Board of Directors' report, which also includes a variety of social and environmental information.

To ensure that the social, environmental and business aspects of Arkema's operations are managed consistently and in the interests of all stakeholders, the Group's CSR commitment is led by the Chairman and Chief Executive Officer of the Company and the Group Executive Committee. The Group's commitment to the United Nations Global Compact is renewed each year via its annual Communication on Progress, and in 2019, this commitment reached the GC Advanced level. Internally, environmental, social and ethics policies are validated by the

Executive Committee members, who are responsible for their dissemination and application across the Group. The operational entities are responsible for the effective implementation of these policies.

To fulfill its ambitious CSR approach, the Group has created a Sustainable Development department, comprising the Product Safety and Environment department and the Sustainable Development team. It reports directly to the Industry Executive Vice-President, who is a member of the Executive Committee.

In addition, a CSR Steering Committee guides and supports the Group's progress in the area of CSR. It is chaired by the Industry Executive Vice-President. Its members include the Human Resources and Communication Executive Vice-President and around ten corporate Vice-Presidents, all of whom are actively involved in the CSR process. It meets at least twice a year.

In 2019, a network of CSR correspondents was formalized. It comprises approximately 40 members, including representatives from each Business Line, corporate department and the main countries in which the Group operates. These correspondents work with the Sustainable Development department to implement the CSR policy within their organization.

4.1.6 Stakeholders and materiality assessment

The Group's CSR approach, which includes an open dialogue, aims to establish a responsible and value-creative value chain shared by Arkema and its stakeholders, as presented in the "Profile, ambition and strategy" section.

OPEN DIALOGUE

Consultation and open dialogue with internal and external stakeholders is a prerequisite for understanding their expectations, building relationships based on trust and cooperation, reducing social risks and creating value for all.

The following table summarizes the Group's dialogue with stakeholders in its ecosystem.

Stakeholder	Context and purpose of dialogue	Form of dialogue
Customers	Business relationship and collaboration aimed at meeting the current and future needs of customers and end users	Arkema establishes ongoing dialogue with its customers at various levels of the organization. To increase the value added created, the Group capitalizes in particular on: <ul style="list-style-type: none"> • dedicated management of global key accounts as part of a commercial excellence program; • joint innovation programs with customers, including lifecycle analysis if required; • development of new digital solutions that increase value added for customers and partners. For further details, see the section on Commercial excellence in Profile, ambition and strategy.

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Stakeholder	Context and purpose of dialogue	Form of dialogue
Suppliers	Business relationship and collaboration aimed at meeting the current and future needs of the Group and its customers	Arkema favors suppliers that have a global presence (Europe, Americas and Asia), are competitive and innovative (including in digital technology), and actively deploy a CSR policy. Arkema maintains open dialogue with its suppliers at various levels of the organization so that they support the Group in its developments over the short- and long-term. For further details, see section 4.4.4 of this chapter.
Research partners	Technology partnerships aimed at strengthening the Group's innovation performance by providing access to additional skills and discoveries that can drive breakthrough innovations	Arkema develops a diverse range of partnerships in various forms, including with academic institutions and industrial companies or as part of national or international cooperation efforts. Partnerships such as those involving the Group's innovation platforms contribute to fulfilling the United Nations' Sustainable Development Goals (SDGs). For further details, see sections 1.1.2 and 1.1.5 of the 2019 Universal Registration Document.
Financial community, shareholders and SRI rating agencies	Inform the market of the Group's results and main operations Improve understanding of the Group's activities, strategy and outlook among investors, analysts and individual shareholders through transparent information	<ul style="list-style-type: none"> • Results presentations; • Meetings with institutional investors and analysts; • Discussions with financial rating agencies; • Completing questionnaires and discussions with SRI rating agencies; and • Annual general meeting. For further details, see section 6.4 of this document.
Employees and employee representative bodies	Dialogue with employee representative bodies and direct dialogue with employees	<ul style="list-style-type: none"> • Continuous social dialogue with employee representative bodies that goes beyond legal requirements and provides numerous opportunities for discussion and negotiation with a view to driving social progress; and • Consultation and dialogue with employees notably in the form of internal surveys. For further details, see sections 4.4.1.4 and 4.4.1.7 of this chapter.
Neighboring communities	Neighbors and communities that interact locally with Group sites	The Common Ground® initiative described in section 4.4.6.2 of this chapter promotes local dialogue at each of the Group's sites.
Civil society and NGOs	Proactive and reactive dialogue	<ul style="list-style-type: none"> • Collaboration with NGOs on specific projects; • Discussions in relation to the materiality assessment; • Periodic meetings with the media; and • Responsible and transparent communication in the event of a crisis. For further details, see section 4.4.6 of this chapter.
Public authorities	Regular and occasional contact aimed at ensuring the responsible development of our activities	<ul style="list-style-type: none"> • Responding to periodic surveys; • Participation in various consultation and working groups; and • Occasional contact at various levels (departments and cabinets) on specific topics. For further details, see section 4.4.5 of this chapter.
Professional associations	Continuous contribution to defending the industry's interests vis-à-vis the public authorities and participation in identifying and disseminating best practices across the industry	Arkema participates actively in segment- or topic-specific working groups, commissions and statutory bodies within relevant associations and in the external initiatives carried out by such associations. For further details, see section 4.4.5 of this chapter.

MATERIALITY ASSESSMENT

In the first half of 2019, the Group conducted its second materiality assessment, a formal process of listening and consultation of stakeholders on CSR topics. Three years since the first analysis was conducted, this new exercise in stakeholder engagement has been extended to include the Group's three key regions – the Americas, Asia and Europe – and consultation of a broader range of stakeholders.

This materiality assessment is based on an innovative approach used to clarify and strengthen the Group's CSR policy to cover both historical and rising issues. The methodology has brought genuine added value in confirming the adequacy of CSR initiatives already in place and suggesting pathways for improvement. Given the vast geographic scope covered by the assessment, decisions can be made at the global (corporate) level that can clearly be adapted locally to the seven countries directly involved.

The materiality assessment was carried out with the help of a third-party expert (Des Enjeux et des Hommes and C3 Consensus Europe). It was conducted in two phases, as follows:

- 1. A preparatory phase, during which the Group's stakeholders were mapped and the list of historical or rising CSR issues were identified.

Mapping of the Group's stakeholders in 7 countries

The map covered stakeholders at the corporate level and in seven countries (France, Italy, the United States, Mexico, China, Malaysia and Singapore) located in the three key regions

in which the Group operates. These countries were chosen for their economic importance, domestic demographics and multicultural representation within the Group. Several thousand employees and external stakeholders were identified to take part in interviews, including customers, suppliers, research partners, the financial community, shareholders, non-financial rating agencies, employees and employee representatives, neighboring communities, civil society and NGOs, the media, public authorities, and professional associations.

28 historical and rising CSR issues

The list of 28 CSR issues was prepared based on the points identified in the 2016 materiality assessment, preliminary interviews with key internal stakeholders, recognized international CSR guidelines, a detailed literature review, benchmarking against industry peers and a workshop led by a predictive expert. The issues were divided into two categories:

- 14 "historical" issues of proven importance to the Group. In line with its continuous improvement philosophy, the Group wanted to interview stakeholders to measure its maturity on these key issues,
- 14 "rising" issues. The Group wanted to understand the importance of these issues for stakeholders in order to transpose them into its CSR policy.

Historical issues for estimation of maturity

1	Sustainable solutions driven by innovation
2	Product stewardship
3	Collaborative innovation
4	Prevention and management of industrial risks
5	Occupational health and safety
6	Greenhouse gas emissions reduction and energy management
7	Water and waste management
8	Responsible governance
9	Business ethics
10	Transparency
11	Stakeholder dialogue
12	Labor relations and respect for Human Rights
13	Training and individual development
14	Diversity and equal opportunities

Rising issues for estimation of importance

15	Developing of a CSR culture
16	Responsible procurement and supplier CSR commitment
17	Responsible personal data management
18	Integration of digital technology into the company activities
19	Integration of CSR criteria into the Group's mergers and acquisitions policy
20	Consideration of circular economy challenges
21	Taking into account climate change-related risks for the company
22	Reliable and educational communication on the characteristics and the proper use of products
23	Carbon offsetting and positive contribution to biodiversity
24	Fair remuneration and social protection
25	Well-being at work and work-life balance
26	Promoting the positive impact of products and solutions
27	Taking into account new end-consumer expectations
28	Contribution of the Group to the social and economic dynamics of territories

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2. A consultation phase, led through over 40 in-depth interviews ("qualitative" consultation) with a wide range of stakeholders in the Group's three key regions, and an online survey ("quantitative" consultation) sent to over 6,000 employees and more than 2,400 external stakeholders.

The participation rate in the online survey was 26%, twice as high as the usual rate for this type of survey.

The answers from internal and external stakeholders were compared by analyzing the survey findings and each issue was ranked. The findings are shown in two materiality matrices:

- maturity matrix: the 14 historical issues as perceived to reflect Arkema's maturity,
- importance matrix: the 14 rising issues as perceived to reflect their importance for Arkema.

The detailed matrices are available on the Group's website: <https://www.arkema.com/export/shared/.content/media/downloads/socialresponsibility/arkema-materiality-assessment-2019-en.pdf>

Given the findings of the stakeholder survey, the Group decided to rank the most important historical and rising issues with two levels of priority (priority or important) and two levels of action (continuous, or short- or medium-term change).

Priority issues include points that were identified as priorities in 2016 and the most relevant rising issues. The priority issues that would involve a short-term change to make the Group's activity more sustainable are included under "seize opportunities". The other priority issues are grouped together under "maintain excellence".

The table below presents the priority issues on the two levels of action. The full table is available on the Group's website.

TABLE OF PRIORITY MATTERS

Maintain excellence

- Product stewardship 
- Occupational health and safety 
- Prevention and management of industrial risks 
- Business ethics 
- Diversity and equal opportunities 

Seize opportunities

- Sustainable solutions driven by innovation 
- Collaborative innovation 
- Integration of digital technology into company activities 
- Consideration of circular economy challenges, including water and waste management  
- Greenhouse gas emissions reduction and energy management 
- Training and individual development 
- Well-being at work and work-life balance 

 sustainable solutions;  responsible manufacturer;  open dialogue

The materiality assessment confirmed the adequacy of the Group's CSR policy, which is structured around its three commitments, and enabled it to update its CSR priorities and identify issues that offer strategic opportunities for both the Group and its stakeholders. Consequently, the Executive Committee approved the global initiative of this materiality assessment and selected actions to take, which were published on the Group's website

and intranet in June 2019. More specifically, five priority areas were defined, covering issues identified in this assessment and relating to Arkema's mission laid down in its business model presented in the "Profile, ambition and strategy" section of this document: "Develop, as a responsible industrial company, innovative solutions adapted to our customers' main challenges and support them in their quest for sustainable performance."

The action plans for the five priority areas are outlined in the table below. The indicators and targets referred to are explained in further detail in section 4.1.7 below.

Priority areas	Corresponding priority issues	Objectives and action plans
Sustainable solutions	Sustainable solutions driven by innovation Collaborative innovation Product stewardship	Develop the range of solutions: <ul style="list-style-type: none"> • continue and reinforce collaborative innovation and partnership initiatives in different formats; • implement the sales portfolio assessment program in 2019–2020 in light of sustainability: <ul style="list-style-type: none"> • program deployment in 2019–2020, • new indicator introduced in 2019: Percentage of sales that contribute significantly to Sustainable Development Goals.
Circular economy	Circular economy, including water and waste management Collaborative innovation	Intensify the circular economy approach across the entire value chain: <ul style="list-style-type: none"> • build on existing practices to contribute to resource preservation and environmental footprint reduction; • create a specific global task force: <ul style="list-style-type: none"> • study in progress to choose a strategic indicator. The growing challenge of the circular economy applies to both the Group's solutions and its industrial operations.
Climate	Greenhouse gas emissions reduction and energy management	Develop a climate plan in line with the Paris Agreement: <ul style="list-style-type: none"> • update climate goals to surpass greenhouse gas emission targets achieved and in doing so better meet climate change challenges: <ul style="list-style-type: none"> • new target introduced in 2019: absolute reduction in greenhouse gas emissions based on a scientific approach.
Industrial risks	Prevention and management of industrial risks	Continue the actions taken while still aiming for the same level of excellence in process safety: <ul style="list-style-type: none"> • reduction target for the process safety event rate (PSER).
Well-being and health	Well-being at work and work-life balance Occupational health and safety	Define a Group-wide, in-depth approach to work-life balance: continue the actions taken while still aiming for the same level of excellence in personal safety: <ul style="list-style-type: none"> • reduction target for the total recordable injury rate (TRIR).

In addition to working on these priority areas and maintaining a continuous improvement approach, the Group has decided to:

- reinforce employees' skills in digital technology and corporate social responsibility so as to better integrate these dimensions in all activities; and
- strengthen stakeholder relations locally with the Common Ground® initiative (described in section 4.4.6.2 of this document) and internationally through formal discussions with a panel of stakeholders.

4.1.7 CSR key performance indicators

The following table summarizes Arkema's key CSR performance indicators. Tracking and analyzing these KPIs enables the Group to validate, year after year, the performance of its CSR process and upgrade it as required.

Arkema's long-term objectives, which are set out in the table below, reflect commitments in terms of CSR in line with the Group's ambition, as described in the "Profile, ambition and strategy" section of this document, and the materiality analysis presented above. In 2019, the percentage of sales that contribute significantly to the United Nations' Sustainable Development

Goals was added to the strategic indicators, strengthening the Group's commitment to sustainable solutions.

Environmental targets were also updated to account for the fact that three of them were met in 2018. The GHG emissions target is now expressed in absolute terms, compared with 2015, in line with the expectations of the Paris Agreement. Targets for emissions of volatile organic compounds and chemical oxygen demand, as well as net energy purchases continue to be expressed in intensive value. More ambitious targets have been set for 2030 for all of these environmental indicators.

	Target year	Target	2019	2018	2017
SUSTAINABLE SOLUTIONS					
Percentage of sales that contribute significantly to Sustainable Development Goals ⁽¹⁾			46%	43%	nd
Number of patent applications filed during the year relating to sustainable development			149	154	150
Percentage of sales from products made from renewable raw materials			9%	9%	9%
RESPONSIBLE MANUFACTURER					
Percentage of AIMS audited sites	2025	100%	80%	74%	69%
Safety					
Total recordable injury rate (TRIR) ⁽²⁾	2025	<1.2	1.4	1.3	1.6
Process safety event rate (PSER) ⁽³⁾	2025	<3	3.7	4.4	3.9 ⁽⁴⁾
Percentage of sites having implemented peer observation in the last three years	2025	100%	62%	64%	59%
Environmental footprint					
Greenhouse gas (GHG) emissions ⁽⁵⁾ (in absolute terms compared with 2015)	2030	0.62	0.87	0.90	0.96
Volatile organic compound (VOC) emissions (in EFPI terms compared with 2012)	2030	0.35	0.60	0.62	0.66
Chemical oxygen demand (COD) (in EFPI terms compared with 2012)	2030	0.40	0.50	0.59	0.70
Net energy purchases (in EFPI terms compared with 2012)	2030	0.80	0.91	0.88	0.89
OPEN DIALOGUE					
Employee development and diversity					
Percentage of women in senior management and executive positions	2025	23% to 25%	23%	21%	19%
Percentage of non-French nationals in senior management and executive positions	2025	42% to 45%	40%	39%	37%
Average number of training hours per employee			25	25	25
Corporate citizenship					
Percentage of plants taking part in the Common Ground® program			78%	84%	78%

(1) The percentage of sales contributing significantly to the United Nations SDGs was calculated on the basis of an assessment of 44% of the Group's third-party sales in 2019.

(2) The TRIR includes injuries to both Group and subcontractor employees.

(3) The PSER is calculated in accordance with the criteria set out by the International Council of Chemical Associations (ICCA) and the European Chemical Industry Council (CEFIC).

(4) The method for calculating PSER was reviewed in 2018 (see section 4.3.2.3 of this chapter).

(5) Greenhouse gas emissions cover direct Scope 1 emissions and those of ozone-depleting substances, and indirect Scope 2 emissions.

IMPROVEMENT PROCESS AND RECOGNITION

For several years now, Arkema has been strongly engaged in a process to improve its CSR performance, with the aim of being included in the Dow Jones Sustainability Index (DJSI). The Group's CSR approach is regularly assessed by external stakeholders, particularly extra financial rating agencies and customers. As requested by Group customers, site audits may also be performed by independent auditing firms to supplement this assessment.

Ratings generally improved in 2019, confirming the appropriateness of the CSR approach and providing the Group with areas for improvement that will enable it to rank among the best performing companies in the industry.



Now a Part of **S&P Global**

Participation since 2015, with a significantly improved assessment, in line with the Group's target of joining the DJSI



"A" rating since 2017



In 2019, a "B" rating was obtained for Climate Change and a "B-" rating for Water Security



4th globally in the sector.
Inclusion in the Europe 120 and Eurozone 120 indices since 2015



Gold level obtained since 2015.
Arkema ranks among the top 1% of companies in the sector



Renewed every year since its initial inclusion in 2015

4.2 SUSTAINABLE SOLUTIONS

DEVELOP INNOVATIVE SOLUTIONS ADAPTED TO OUR CUSTOMERS' MAIN CHALLENGES AND SUPPORT THEM IN THEIR QUEST FOR SUSTAINABLE PERFORMANCE

4.2.1 Management of sustainable solutions

In a world faced with a multitude of economic, environmental and social challenges, Arkema aims to provide its customers with sustainable and innovative solutions that contribute to the Sustainable Development Goals (SDGs) defined by the United Nations. As indicated in section 4.1.6 of this chapter, product stewardship and the provision of sustainable and innovative solutions have been clearly confirmed as priorities in the materiality assessment.

Solutions that contribute to sustainable development are therefore central to Arkema's innovation policy and to the development of its product range. This opens up a vast array of opportunities, both for the Group and its partners.

Through its commercial excellence program, Arkema listens to its customers, enhancing its understanding of their needs with a view to developing innovative solutions adapted to their challenges and supporting them in their quest for sustainable performance.

Through its choice of research areas, its continuous development of employees' skills and its innovation structure and processes, Arkema endeavors to develop solutions with its partners that address the societal challenges of today and tomorrow.

Through product stewardship, Arkema also takes care to ensure that its products do not harm people's health or safety or damage the environment. These aspects are taken into account right from the product design stage.

In addition to complying with the regulations, which forms the foundation of its commitment, Arkema implements an approach aimed at continuously improving scientific knowledge so that it can adapt its range of solutions accordingly and provide its customers and end users with the information necessary for the appropriate use of its products.

The importance of sustainable solutions is reflected in the Group’s organization. For example, the Product Safety and Environment team is an integral part of the Sustainable Development department. The Product Stewardship Committee was created in 2019 as an extension of the preexisting REACH Committee, in line with the Group’s social commitment. The new committee comprises four members from the Executive Committee, which

oversees business and industrial operations, and members from the Sustainable Development, Research and Development and Legal Affairs departments. It meets at least twice a year to review progress and decide on priorities and action plans to improve the responsible management of the range of solutions. Every year, the Sustainable Development Vice President presents the Executive Committee with an overview. The overall governance of sustainable development is presented in section 4.1.5 of this chapter.

To supplement its innovation and product stewardship processes, Arkema initiated a program in 2018 to systematically assess its portfolio of solutions in light of sustainability criteria. The program is presented in section 4.2.3 of this chapter.

4.2.2 Innovation

Innovation is a strategic pillar in Arkema’s targeted growth strategy and a key component in its contribution to sustainable development. Innovation in manufacturing technologies, products and applications is a driving force behind the development of sustainable solutions consistent with the Group’s social responsibility commitment.

Arkema’s innovation strategy is outlined in section 1.1 of this document.

The number of sustainability-related patents filed reflects the Group’s dynamic in this field. In 2019, they accounted for 67% of the total number of patents filed.

	2019	2018	2017
Number of patent applications filed during the year relating to sustainable development	149	154	150

4.2.3 Management of the solutions portfolio

ASSESSMENT OF THE SOLUTIONS PORTFOLIO

To shift its product range more assertively toward sustainable solutions, Arkema has initiated a program to systematically assess its portfolio of solutions in light of sustainability criteria.

The methodology selected corresponds to that set out by the World Business Council for Sustainable Development (WBCSD) in its publication entitled “Chemical Industry Methodology for Portfolio Sustainability Assessments (PSA)”. It takes into account all of the social, environmental and economic impacts.

Products are considered in the context of their applications and of the regions in which they are sold.

To the extent permitted by the information available, the assessment takes into account the entire value chain, including

manufacturing processes, from raw materials to the product’s end of life. It is carried out using three sets of criteria:

- basic requirements, which reflect (i) the Group’s commitments relating to product responsibility in the area of health, safety and the environment, (ii) the principles of ethics and respect for human rights, and (iii) profitability factors;
- medium- and long-term trends in the regulatory framework and market expectations in terms of sustainable solutions; and
- contribution to the UN Sustainable Development Goals (SDGs), using the market’s standard solutions as a reference. The ten SDGs most relevant to Group activities were selected.



In this way, solutions are classified into different levels of contribution, making it easier to more effectively target actions that favor a sustainable sales portfolio. Sales making a significant contribution to the SDGs are solutions that, on the basis of a decision tree reflecting the three sets of criteria mentioned above, simultaneously (i) meet the basic requirements, (ii) are aligned with regulatory trends and market expectations, (iii) have a positive impact compared with the market standard on at least one of the SDGs, and (iv) do not generate a significant negative impact on the other SDGs.

Following a pilot phase in 2018 to test the method and its implementation, in early 2019 Arkema initiated the gradual deployment of the program across the product ranges of the various Business Lines. At the end of 2019, three quarters of them had started the assessment. Significant progress was noted, with 44% of sales to the Group's third-party customers assessed. The method is being fine-tuned as it is rolled out. The approach will continue in 2020.

The percentage of sales assessed that contribute significantly to the SDGs was 46% in 2019, compared with 43% in 2018 on the same scope of assessment.

	2019	2018
Percentage of sales that contribute significantly to Sustainable Development Goals ⁽¹⁾	46%	43%

(1) The scope assessed covered 44% of the Group's sales to third parties in 2019.

FOCUS

Oleris® Sebacate plasticizers: 100% bio-sourced for extreme performance

Sebacate plasticizers made from castor oil give polymers flexibility at low temperatures, which broadens their spectrum of technical applications and extends the lifespan of products that contain them. These plasticizers offer an effective alternative to long-chain phthalate plasticizers, which may be subject to regulations.

ECO-DESIGN

Reducing its environmental footprint is one of the Group's key commitments and an area in which stakeholder expectations are high. To meet those expectations, Arkema implements eco-design and circular economy techniques, as described in section 4.3.3.3.4 of this chapter.

In choosing raw materials, the Group favors renewable materials with a low carbon footprint that present the least possible hazard to human health and the environment.

Designing solutions and their implementation by customers and end-users maximizes the levers of circular economy principles. This means a design that provides a function with the least amount of material possible, facilitates reuse and extends product lifespan, while allowing for – depending on the materials used – either biodegradability, or mechanical or chemical recycling.

FOCUS

Thermogrip 43298: the compostable adhesive

Thermogrip 43298 is a compostable hot melt adhesive for paper and fiber board packaging. It is certified by the BPI (Biodegradable Products Institute) for paper coffee cups. The BPI is an American certifier of compostable products and packaging.

	2019	2018	2017
Percentage of sales from products made from renewable raw materials	9%	9%	9%
Percentage of sales volume covered by a full life-cycle assessment	22%	20%	20%

4.2.4 Product stewardship

4.2.4.1 PRODUCT STEWARDSHIP POLICY

Arkema integrates health, safety and environmental protection into every product's design and throughout its life-cycle.

This product stewardship process, which in certain aspects exceeds regulatory requirements, engages stakeholders across the product chain, from raw material suppliers to end-customers.

The Group expresses its commitment to product stewardship in its Social Commitment Charter and its Hygiene, Safety, Environment and Quality Policy and by endorsing the International Council of Chemical Associations' (ICCA) Responsible Care® initiative.

Concrete actions to reflect this commitment include:

- actively contributing to advancing scientific knowledge to better take into account the hazards and risks relating to products and their use;
- aim to reduce health, safety and environmental risks while designing products;
- managing risks in existing products ranges that could lead to substitution, taking into account the entire value chain so that all aspects are considered, from raw materials to the product's end of life, including waste treatment and the circular economy;
- communication and clear information for product users.

Leveraging its organization and the scientific and regulatory expertise acquired over many years, Arkema ensures that product-specific HSE roadmaps are defined by country and are adapted to local conditions, thus helping to drive continuous improvement and deepen its knowledge of each product's features and conditions of use. In addition, the Group uses the Arkema Integrated Management System (AIMS) to manage HSE risks related to product modifications, particularly changes to product composition and manufacturing processes.

A training module on product stewardship has also been introduced internally and added to the training program for Business Line and Logistics teams.

4.2.4.2 REGULATORY PRODUCT MANAGEMENT

Regulatory compliance plays a key role in product safety for customers, the entire value chain and stakeholders.

In recent years, Arkema has notably deployed the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) and implemented the European Union's Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) regulations, which came into effect in 2007 to make the production and use of chemicals safer throughout the European chemicals industry.

Deployment of GHS

GHS is a major United Nations initiative designed to replace the various chemical classification and labeling standards used in different countries with a global system based on consistent criteria. The Group has deployed it in every participating country, in line with its implementation in local legislation.

In Europe, the GHS has been transposed into the Classification, Labeling and Packaging (CLP) regulation governing chemical products and mixtures. Arkema reassessed and classified all the substances contained in its product portfolio within the regulation's deadline and updated the related Safety Data Sheets and labels. The Group tracks the GHS updates published twice a year and aligns its Safety Data Sheets accordingly in the countries and regions that transpose them.

In addition, Arkema has deployed the system in other countries, in particular in the United States, South Korea, China, Malaysia, Australia and Turkey, again within the regulatory timeframe. Roll-out is proceeding apace in the countries that are currently phasing in the GHS, such as Canada and Russia.

REACH implementation in Europe

REACH is a European regulation that aims to make in-depth changes in the way chemical substances are managed by improving the level of knowledge of these substances, analyzing their environmental and health risks and defining measures to manage the risks arising from their use or manufacture.

An advocate of the regulation's objectives since its inception, Arkema mobilized a team of more than 30 experts in toxicology, ecotoxicology and regulatory compliance – working both centrally within the Product Safety and Environment department as well as within the Business Lines and corporate departments – to successfully complete the final phase of registration. In total, the Group registered 425 substances, 40% of which as the lead registrant, at the various stages of registration of the REACH regulation. Compliance with these regulations is expected to represent an overall cost of approximately €65 million over the 2008–2020 period.

When the stages of registration have been completed, research on chemical substances will continue in line with the REACH regulation to further improve knowledge of their properties and applications. The regulation represents a significant source of progress in the areas of risk management and the protection of the health and safety of people and the environment.

The quality of REACH registration dossiers has been of great public interest since the end of the last REACH deadline.

In its 2017 REACH review, the European Commission stated that REACH was fully operational and delivered results on par with

its objectives, that it addressed citizens' concerns about chemical safety, and that it was not recommended to revise it for the time being. The Commission identified four measures to improve the implementation of REACH, including one to improve the quality of registration dossiers.

In June 2019, the European Commission and the European Chemicals Agency, ECHA, issued a joint action plan with a set of measures to address that need for improvement.

In parallel, the European chemical industry, via the European Chemical Industry Council (Cefic), has defined and launched an action plan to review and improve registration dossiers. This multi-annual plan provides REACH registrants with a framework to progressively reassess safety data. In its action plan, Cefic sets the timeline, roles and responsibilities, substance prioritization criteria and critical issues, and explains how progress is to be reported. Cefic has signed a cooperation agreement with ECHA on its implementation.

Arkema joined the more than 150 companies from the chemical industry in signing up to the action plan. It fits perfectly with the Group's product stewardship strategy, which has gone beyond the ECHA's demands by proactively updating its dossiers to take into account new data and changes to ECHA guidelines. These proactive updates accounted for around 40% of the Group's filings maintenance activity in 2019.

Management of REACH-defined substances of very high concern (SVHC)

The European Union introduced its Community Rolling Action Plan (CoRAP) right from the first phase of registration, in order to be able to identify the substances of most concern by 2027. Since 2012, 375 substances have or will be evaluated under the plan. Thirty-one of the Group's substances have been listed in CoRAP and their state of advancement is as follows:

CoRAP	2012–2021	Evaluation completed	Additional information provided, awaiting conclusion	Additional data being constituted	Upcoming evaluation
Number of substances	31	8	6	11	6

Following evaluation, additional information may be requested to determine if the risks are effectively managed. This could eventually lead to proposed pan-European risk management measures, such as restrictions, the identification of substances of very high concern or other initiatives outside the REACH remit.

Arkema has put in place a dedicated process to track the REACH-defined SVHCs that are used in its productions or placed on the market. It was designed in response to the REACH substance authorization process, which has two phases:

- the first consists in identifying substances that could have potential negative impacts on human health or the environment. Once so designated, these "substances of very high concern"

are added to a list of substances that may be subject to prior authorization for their specific use (Annex XIV); and

- the second phase aims to ensure that the risks from the use of these SVHCs are adequately managed and that the substances themselves are being gradually replaced by appropriate alternatives. These substances may not be placed on the market or used after a designated date unless an authorization is granted (or waived) for their specific use.

As soon as the authorities propose that a substance be listed as an SVHC, Arkema responds to the public hearings organized by the ECHA for substances whose use(s) may be subject to authorization.

In cases where these substances finally qualify as SVHCs and are included in the candidate list, a review is conducted to determine the most appropriate response, such as assessing alternative substances for the intended uses, applying for authorization when the substance is listed in Annex XIV, or converting the production unit and phasing out production.

ANALYSIS OF THE GROUP'S SVHCs

Substances of Very High Concern

	SVHCs contained in products placed on the market	Of which SVHCs contained in raw materials
SVHCs subject to REACH authorization	13	12
SVHCs on the REACH candidate list	43	39

In addition to Europe, the table above includes data for Asia and the United States, as well as for Bostik.

In November 2015, Arkema filed an application with the ECHA for the authorization of sodium dichromate, used as a processing aid at the Jarrie plant in France, while waiting for an alternative solution to be found. The request was accepted by the European Commission on 29 January 2018 for a period of 12 years.

At the end of 2019, the industry candidate list contained 201 substances, including (i) hydrazine produced at the plant in Lannemezan, France, (ii) 2-imidazolidinethione (ETU) produced by MLPC, and (iii) nonylphenol ethoxylates (NPE) produced by the surfactants and additives business.

On 13 June 2017, NPE was added to the list of substances that require authorization. In 2018, Arkema decided not to maintain these product lines in the applications subject to authorization.

REACH's third component is the restriction procedure, which is intended to restrict or prohibit a substance's production, marketing or use. The restriction relating to perfluorooctanoic acid (PFOA) derivatives came into effect on 13 June 2017. However, the Group has not been affected by the measure because it voluntarily replaced these substances in its fluoropolymer production process back in January 2016, before the measure came into effect in Europe.

Previously recommended for authorization, cobalt chloride is now recommended for restriction, after an analysis of the most effective risk management option. The proposal prepared by the ECHA was published in October 2018 and entered the phase of analysis by the Committees for Risk Assessment (RAC) and for Socio-Economic Assessment (SEAC). The Group, which uses the substance as a processing aid at the Jarrie plant in France, is analyzing the impact and exploring various solutions, including replacement.

With regard to microplastics, France's law of February 10, 2020 on the fight against waste and promotion of the circular economy introduces restrictions on the use of microplastics intentionally added to products. It will have a limited impact on the Group's activities in 2027 for some of its products used in cosmetics applications.

Compliance with other legislation

Outside Europe, Arkema markets its chemicals in accordance with national and regional regulations, as applicable. Due to its history and global presence, some of these products are already notified in many inventories. Should a need arise for a new product notification, applications can be filed in a timely manner thanks to the extensive database Arkema maintains on the characteristics of its products.

In particular, since 2015, this process has made it possible to respond to the three new REACH-like regulations that have been introduced in South Korea, Taiwan and Turkey. For example, Arkema has completed phase I registration of substances in Taiwan and has been submitting annual reports to the Korean authorities since 2016.

Arkema has also joined consortia formed to jointly register substances brought to market in South Korea, in accordance with article 15 of the Act on the Registration and Evaluation of Chemical Substances (ARECS), and registered nine substances before the first deadline of June 2018. The Group completed the pre-registration of all substances brought to market in South Korea in June 2019, in accordance with the amendment issued in March 2018, and is preparing to register the substances by the set deadline.

The Group is now preparing for upcoming pre-registration/registration deadlines in Turkey. It also prepared for a no-deal exit by the United Kingdom from the European Union, and will start compliance work ahead of the end of the transition period on the basis of the regulatory information available.

Following the publication of rules aimed at reforming the Toxic Substances Control Act (TSCA) Chemical Substance Inventory in the United States, the Group notified the US authorities of active substances in its portfolio in February 2018.

On a more specific note, the Group does not manufacture any persistent organic pollutants (POPs).

The Group complies with regulations on genetically modified organisms (GMOs) in different countries and regions. The great

majority of raw materials of vegetable origin used by Arkema is guaranteed GMO-free, and this can be traced if customers so require.

Lastly, the Group has a policy of restricting the use of its products in medical applications solely to temporary implants (less than 30 days). To assist the Business Lines in their choices, Arkema has set up medical applications assessment committees in order to assess the compliance of the intended products with prevailing laws and regulations.

4.2.4.3 PRODUCT INFORMATION

Arkema relies on an in-house team of expert toxicologists and ecotoxicologists which conducts product hazard studies and works closely with regulatory experts to assess risks in normal conditions of use. The findings are shared across the Group and externally in various forms, such as Safety Data Sheets and labeling.

Safety Data Sheets (SDSs)

In many countries, Arkema describes its product characteristics and conditions of use in Safety Data Sheets (SDSs), which are required to market chemicals classified as hazardous to human health or the environment. They are prepared in some forty languages based on a global database comprising the composition of every product and its toxicological, ecotoxicological and physicochemical data, thereby ensuring consistent information in every market. Arkema issues SDSs in accordance with regulatory requirements and posts them on the Group website or the online QuickFDS platform. As part of the product stewardship process, Arkema exceeds regulatory obligations by issuing SDSs even for products that are not classified as hazardous and by providing users with an emergency hotline available 24/7.

In Europe, the Group's organization and IT infrastructure have made it possible to issue extended "SDSs", the latest REACH compliant format, which improve risk management by including exposure scenarios for each identified use.

Labeling

Arkema has also developed systems to print labels with a consistent classification, regardless of the country in which the product is manufactured or marketed.

In addition, efficient IT systems enable Arkema to prepare compliance documents and align them as needed with the latest formats and data, notably when the GHS standardized classification and labeling system is introduced in a new country.

Poison control centers

The Classification, Labeling and Packaging (CLP) regulation makes alignment with the GHS a legal obligation throughout the European Union. In addition, under the regulation, companies that put hazardous mixtures on the market must provide information about those mixtures to the bodies appointed by their country. The appointed bodies make the information available to poison control centers so that they can provide medical advice rapidly in an emergency situation.

Under the new provisions of the CLP regulation, which came into effect in March 2017, these companies will be required over time to:

- use a harmonized format for the transmission of information via a portal hosted by the European Chemicals Agency (ECHA). This EU-wide format will gradually replace national requirements for the transmission of information; and
- generate a unique formula identifier (UFI) for each formula, which must be included on the product label. This establishes an unambiguous link between the product placed on the market and the information relating to the mixture, enabling accurate and rapid identification of the product's formula. Accurate identification is essential in order to provide the appropriate medical advice in an emergency.

With the help of its teams and its IT infrastructure, the Group has taken the measures necessary to meet the upcoming deadlines, the first of which is 1 January 2021.

4.2.4.4 ANIMAL WELFARE

Given its business portfolio, Arkema neither conducts triage trials on substances derived from its research nor participates in toxicology research projects that could involve the use of laboratory animals.

The Group always conducts in-depth analyses of data in existing literature, thanks to constant tracking of information on Group substances, in order to use all of the available public information.

The Group does not conduct toxicology studies on vertebrate animals other than those required by the authorities and only after an in-depth analysis and application of up-to-date existing public information on the substances in question. The necessary studies are contracted to outside laboratories which are subject to oversight by the relevant ethics committees.

As required by REACH, the Group applies, whenever possible, the rules for waiving standard testing when such tests are not justified (due to the absence of exposure) or when alternative methods can be used.

In addition, Arkema participates in the work of FRANCOIPA, a French platform dedicated to the development, validation and dissemination of alternative animal testing methods, using the 3Rs (reduction, refinement, replacement), to which the Group adheres. It applies the 3R approach in all the studies it conducts.

4.3 RESPONSIBLE MANUFACTURER

As part of its commitment to societal issues described in section 4.1 of this chapter, Arkema operates as a responsible manufacturer and resolutely observes a policy of continuous improvement and

operational excellence. Its goal is to rank among the leading chemical producers in terms of safety performance and to reduce the environmental footprint of its activities.

4.3.1 Health, safety and environmental management

Safety and protecting health and the environment are core priorities in the management of Arkema's business and manufacturing operations, and a major focus of its CSR policy. This focus is shown by the Group's involvement in the Responsible Care® program, a voluntary initiative undertaken by the chemical industry to responsibly manage its operations and products, based on a continuous improvement process.

The Group's health, safety and environment policy is structured around three areas: prevention of risks (related to safety, the environment and pollution), management system, and a culture of safety and the environment. It reflects prevailing legislation and the Group's own requirements formally defined in a Health, Safety, Environment and Quality Policy and in a global standard, the Health, Safety and Environment (HSE) manual. This policy, which confirms the responsible manufacturer commitment expressed in the Group's Social Commitment Charter described in section 4.1.1 of this chapter, and this global standard form the basis of the HSE management systems for all Group entities.

The new materiality assessment performed in 2019 confirmed that occupational health and safety, prevention of industrial risks, consideration of circular economy challenges including water and waste management, and greenhouse gas emissions reduction and energy management were among the Group's priority issues and have been properly integrated as such into its CSR approach.

The management system for this policy is integrated globally by the Group Safety and Environment department (DSEG) and its experts in industrial hygiene, safety and the environment. The department head reports to the Industry Executive Vice-President, who is an Executive Committee member, and makes a monthly presentation to the Executive Committee to keep it informed of the key HSE indicators, progress made in its programs, and any significant events.

Implementation of the Health, Safety, Environment and Quality Policy is handled by the operating teams in each region and Business Line.

HSE assessment of acquisitions

When looking into potential acquisition deals, a team of internal Group experts analyzes the HSE documents and information

provided by the seller based on a list of questions and pre-defined criteria. On-site surveys are also conducted to supplement this analysis.

The Group has set an ambitious target to implement and audit the Arkema Integrated Management System (AIMS) at all its sites, as described in section 4.3.1.2 of this document.

2025 TARGET

Audit 100% of Group sites* in accordance with the Arkema Integrated Management System (AIMS).

* For newly acquired companies' sites, the roll-out of this system takes place over a period of around three years.

4.3.1.1 RISK PREVENTION

Whether in the area of security, health, safety or the environment, risk prevention is everyone's responsibility. Arkema believes that all occupational accidents are preventable and that everyone has their own role and responsibility in ensuring occupational health and safety and protecting the environment and neighborhoods where we operate.

In the area of process safety, Arkema is continuously improving its risk prevention and management practices.

These measures are presented in detail in sections 4.3.2.2 and 4.3.2.3 of this chapter.

4.3.1.2 MANAGEMENT SYSTEM AND AUDITS

The effective implementation of the Group's health, safety and environmental policies is regularly audited, with a focus on measuring progress and harmonizing practices. These audits are an important management practice.

To ensure a highly efficient inspection and control process, all of the Group-led security, safety, environment and quality audits have been consolidated into a single audit, known as the

Arkema Integrated Management System (AIMS). It is based on all of the Group's standards, both proprietary and endorsed, such as ISO 9001, ISO 14001, ISO 45001 (replacing OHSAS 18001) and ISO 50001. This "all-in-one" approach has the dual benefit of being aligned with the Group's corporate culture and ensuring consistency across all its safety, environment, energy and quality management initiatives. For the largest sites (46% of

all Group sites), AIMS audits are conducted every three years by teams comprising Arkema employees and representatives from an independent third-party auditor. Follow-up audits are then performed every year by the independent third-party auditor. For smaller sites, simplified AIMS audits are conducted every three years by Arkema staff.

The 2025 target is for 100% of facilities to have undergone a complete or simplified AIMS audit within the past three years.

	2019	2018	2017
% of facilities AIMS-audited over the past three years	80	74	69

The steady increase in the percentage of AIMS-audited facilities over the last five years illustrates the continued deployment of this program, including at sites coming from acquisitions.

Furthermore, under the AIMS standard, field audits are led by plant employees to assess the safety culture and installation compliance on a continuous, sustainable basis. These assessments include task or process audits, short flash audits, scheduled general inspections and safety tours by management. They concern everyone working on the site, including subcontractor employees, and are performed in every aspect of the site's operations, including production, logistics, maintenance, offices, construction or turnaround sites, and production unit shutdowns.

Facilities are also audited according to a variety of international standards, to earn or renew external certification, depending on their particular situation.

The number of sites certified in this way over the last three years is presented in the following table and attests in 2019, as for previous years, to the Group's ongoing efforts in these areas:

Number of sites certified according to each standard	2019	2018	2017
ISO 45001 or OHSAS 18001 (health and safety)	86	85	74
ISO 14001 (environment)	81	77	70
ISO 50001 (energy)	33	30	29
ISO 9001 (quality)	156	154	150

The migration from OHSAS 18001 to ISO 45001 was initiated in 2018 and will continue until early 2021. 59% of Group facilities have been ISO 45001/OHSAS 18001 certified in Europe, 47% in America and 65% in Asia, representing 47% of Arkema's workforce.

The ISO 14001 certification system requires each production facility 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 an action plan with priority areas for improvement. Periodic environmental assessments enable the facilities to measure progress and determine new improvement targets.

	2019	2018	2017
% of ISO 14001-certified sites	53	48	43

Depending on local conditions, certain facilities have been certified to other standards, such as the Responsible Care® Management System (RCMS) in the United States. RCMS is an integrated safety, health and environmental management system based on the principles of the Responsible Care® program.

Number of sites certified according to the standard	2019	2018	2017
RCMS (United States only: health, safety, environment)	14	12	11

In addition, the Group performs a large number of non-AIMS internal audits every year, including:

- operational safety audits: construction site inspections, pre-start-up reviews, and operational safety audits in areas such as mechanical integrity and explosive atmospheres;
- regulatory hazardous materials transportation audits;
- supplier and logistics audits: transportation companies and warehouses are inspected and assessed. These audits are performed in addition to third-party audits, such as the Safety & Quality Assessment System for overland transportation, the Chemical Distribution Institute for maritime shipping, and the European Barge Inspection Scheme for river shipping. A certain amount of packaging is also inspected;
- security audits; and
- environmental audits in the United States and environmental reporting audits in Europe and Asia.

In addition to audits, teams from the Group Safety and Environment department (DSEG) lead safety support initiatives at facilities whose performance has fallen short of Group standards or which have reported a specific issue. DSEG experts share their findings of the facility's accident record and HSE activities with plant management, then discuss how to prepare, implement and follow up on the remedial action plans. Since 2017, the DSEG has provided specific support to plants during their turnarounds and stepped up its participation in events organized by the Business Lines, plants (annual meetings with partner companies) and corporate departments (maintenance, R&D, etc.).

Another important tool in managing the deployment of the Group's HSE process is feedback on material incidents. It consists in sharing experiences on relevant incidents so that ways can be found to avoid recurrence. Feedback takes place across the global organization through various geographic, professional and technological networks. In the event of a material incident, the network issues an HSE alert that enables other Group facilities that may encounter a similar incident to take corrective measures. The feedback process helps improve the Group's HSE expertise and ensure the effectiveness of the deployed measures.

To harmonize the identification, assessment and analysis of environmental risks, the Group is rolling out a methodology across the world, while the dedicated Starmap IT system was implemented in Europe, the United States and Asia in 2016, as explained in section 4.3.2.2. In 2019, 76% of the Group's industrial sites had installed the system, and around 71% had used it to update their environmental assessment.

4.3.1.3 SAFETY AND ENVIRONMENTAL CULTURE

Instilling a culture of safety through employee training and development of hazard awareness

Behavior plays a critical role in managing and preventing risks. That is why a core aspect of the Group's safety process is the development of a common safety culture that raises everyone's awareness of his or her responsibility and the importance of his or her personal behavior. To develop a shared safety culture across the organization, the Group uses a variety of programs and initiatives, including:

- general training in health, safety and the environment for new hires;
- the "Safety in Action" and "Essentials" programs;
- field initiatives, such as peer observations, flash audits, scheduled general inspections, safety tours and field safety audits;
- dedicated training courses, such as SafeStart®, "Human and Organizational Safety Factors", "Safety Culture and Leadership", "Transporting Hazardous Substances" and "Crisis Management"; and
- the Arkema Safety Academy, which enables every employee to share the Group's safety challenges, policies and tools.

In addition, since 2017, the Group has been progressively integrating the lessons learned from neuroscience to improve accident prevention. These programs and initiatives are detailed in this chapter.

In 2019, safety training (excluding e-learning)⁽¹⁾ totaled 183,545 hours (i.e., 13 hours per year per employee trained), and the number of employees who attended at least one safety training session totaled 14,142 (76% of the Group headcount).

In addition, 6,684 people (36% of the Group headcount) took e-learning courses on safety in 2019⁽¹⁾.

Instilling an environmental culture through employee training and development of hazard awareness

Group employees are trained and made aware of the main characteristics of their plant, the real-world consequences of their actions, the operational management of all types of releases and emissions, the environmental impact of turnaround or start-up operations, and waste sorting.

A dedicated environmental training program is offered at industrial sites after an environmental risk analysis has been performed in each workshop. At an increasing number of facilities, feedback on environmental incidents is being tracked in a common system for reporting incidents and following up corrective actions. The training program is regularly repeated to maintain employee awareness of the importance of critical parameters.

In line with the new long-term environmental objectives that Arkema has set itself, a communication campaign aimed specifically at

(1) In entities at least 50%-owned and employing more than 60 people.

fostering an environmental culture is being prepared with a view to being rolled out throughout the Group.

Details on employee training and the new-hire induction process may be found in section 4.4.1.3.2 of this chapter. Environmental training totaled 10,210 hours in 2019⁽¹⁾, or an average of 2 hours per employee. The number of employees to have attended at least one environmental training course

during the year (excluding e-learning) increased significantly to 4,686, compared with 3,919 in 2018. This means that 25% of the Group's employees⁽¹⁾ attended environment-related training in 2019 (excluding e-learning).

In addition, 4,863 people (26% of the Group headcount) took environment-related e-learning courses in 2019⁽¹⁾.

4.3.2 Health and safety information

BEING A TOP QUARTILE PERFORMER IN SAFETY IN THE CHEMICAL INDUSTRY

4.3.2.1 SAFETY MANAGEMENT

As part of its societal engagement, the Group places the management of personal and environmental risks among its top priorities. Its approach to industrial safety takes into account the potential risks at the Company level but also for the environment and other stakeholders, such as local residents.

The main risks associated with the Group's activities relate to personal safety, exposure to chemicals and process safety. For more information on these risks, see section 2.1 of this document.

The due diligence procedures and policies implemented to prevent, identify and mitigate these risks and the outcomes of such policies in the form of performance indicators are described in detail below.

The Group's commitment to safety has been materialized in three targets for 2025, which reflect the Group's willingness to continuously improve its performance in this area.

2025 TARGETS

Reduce the total recordable injury rate (TRIR) to less than 1.2.

Reduce the process safety event rate (PSER) to less than 3.

Extend the peer observation program to every Group site*.



* For newly acquired companies' sites, the roll-out of this program takes place over a period of around three years.

By setting this strategic TRIR objective for 2025, Arkema is contributing to UN Sustainable Development Goal 3: "Good health and well-being".

4.3.2.2 EMPLOYEE HEALTH AND SAFETY

Arkema considers protecting the health and safety of its own employees and those of its subcontractors as a core value and believes that every occupational accident is preventable.

As part of a prevention and continuous improvement process, the Group is committed to ensuring a good working environment for everyone, in particular by analyzing workstation health and safety risks and studying accident typologies.

Regarding safety, the Group has the same level of expectation for subcontractors working on its industrial sites as for its employees. In particular, all of them systematically take part in awareness initiatives designed to develop a safety culture and in the Group's safety processes and programs. In addition, the injury rates for both employees and subcontractors are tracked as part of the safety performance management system.

Since the analysis of accident data shows the importance of human factors, Arkema has launched a series of programs designed to foster commitment to health and safety among all Group employees and subcontractors working on Group sites.

Another priority concerns the attenuation of arduous working conditions, with the deployment several years ago of a dedicated program comprising workstation ergonomics and other remedial actions. Workplace well-being and the quality of work life are also important factors in protecting employee health (for more details, see section 4.4.1.4 of this chapter).

4.3.2.2.1 Personal safety

The "Safety in Action" and "Essentials" programs

The "Safety in Action" and "Essentials" programs, which concern both Group employees and subcontractors working on Group sites, are deployed worldwide. "Safety in Action" is designed to promote and deepen everyone's safety culture, while the

(1) In entities at least 50%-owned and employing more than 60 people.

“Essentials” program defines a set of rules that must be applied without compromise in every situation.

FOCUS

Time for Safety: a time exclusively dedicated to Safety

To ensure that everyone plays their part in initiatives taken to improve safety, the Group launched the Time for Safety program worldwide. Under this program, each site sets aside a time every week when all employees come together to carry out a safety measure (incident analysis, field audit, safety improvement review, etc.).

Peer observation

Peer observation is aimed at raising risk awareness in ways that help to reduce the number of occupational accidents. It capitalizes on positive experiences and a joint search for solutions to improve practices. Using a structured observation process, each site implements the method taking into account its own specific features (risks, operations). Initially based on observations between employees with similar qualifications, the program has now been extended to allow all employees to observe each other while carrying out their duties.

In 2019, 62% of all Group sites had put in place peer observation practices to improve safety, versus 64% in 2018. The slight decline is attributable to an increase in the number of sites included in the scope. Moreover, practices on the Bostik sites that already have a system are being converged with the Group’s cross-observation approach applied to tasks. The 2025 target is 100% of the Group’s sites.

As an adjunct to cross-observation, Arkema has put in place special programs, such as Smart Zone and SafeStart®:

- **Smart Zone: identifying and rectifying shortfalls**

Bostik has developed a monitoring system to identify in-field non-compliance or shortfalls against best safety practices. Employees detecting such an incident can report it in a Smart Zone table. After immediate corrective action is taken, further measures can be discussed between the employee and the Smart Zone table manager. Implementation of the corrective solution is displayed in the Smart Zone through to completion, for fast, effective incident follow-up.

- **SafeStart® to make safety everyone’s business**

To encourage the shift from a compliance to a commitment-based safety culture, the Group has rolled out the SafeStart® initiative, which is based on observing oneself and other people to identify critical states, such as 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. Techniques to reduce the incidence of critical errors in turn help to drive a continuous improvement in the prevention of accidents. All employees will be trained in the fundamentals of this approach by 2025.

Progressively integrating the lessons learned from neuroscience to improve accident prevention

Since 2017, the Group has initiated a review with a neuroscientist of the mechanisms associated with human error, particularly among experts (which most of the Group’s employees are in their respective roles).

Program rollout has begun, furthering an understanding of behavioral approaches, and facilitating the adoption of safety tools and equipment by highlighting their utility.

Using digital technologies to improve safety

Arkema’s investigation initiated in 2018 into how new technologies can contribute to health, safety and security continued in 2019, in line with its intention to make this pursuit a long-term effort. The investigation involved conducting targeted experiments to test a proof of concept, such as the use of virtual reality and connected tools in France, tablets for safety inspections in the United States, and drones for maintenance inspections in China and France.

Getting stakeholders involved in safety

In France, many sites organize Safety Days once or twice a year with their subcontractors, which are attended by local HSE employees, the Group contract manager and the contractor’s sales manager. During these days, the Group is represented by local executives, business executives and, as applicable, representatives from the Group Procurement and Safety and Environment departments. These events provide an opportunity to share best occupational health and safety practices. Already well established in Europe, this approach is being rolled out across the Group.

In addition, a certain number of initiatives are carried out in order to obtain employee feedback and measure their effective engagement in the area of safety:

- in China, the Employee Engagement Survey, which includes a safety section, is conducted every two years, and the findings are integrated into site improvement plans. In 2019, 93% of respondents said they understood their role and responsibilities in creating a safe work environment;

- in the Americas, the Safety culture & engagement survey conducted in 2019, which also included a safety section, received positive responses in the proportion of 97% to the affirmation “I fully understand the expectations and requirements in terms of safety in my job”;
- in Europe, the latest survey including a safety section was carried out among all employees in 2018: 97% of respondents said that “safety was on their mind”.

For local residents, the Common Ground® initiative allows for open dialogue with local communities, notably addressing industrial risks stemming from the site’s activity. This program is discussed in greater detail in section 4.4.6 “Corporate citizenship and philanthropy” of this chapter.

Injury rates

The Group’s safety performance ranks among the best in the global chemical industry, confirming the clear improvement dynamic underway for several years, driven largely by the deep involvement of every employee.

2025 TARGET

To further improve, the Group has set a target to achieve a total recordable injury rate per million hours worked (TRIR) of less than 1.2 by 2025.

3

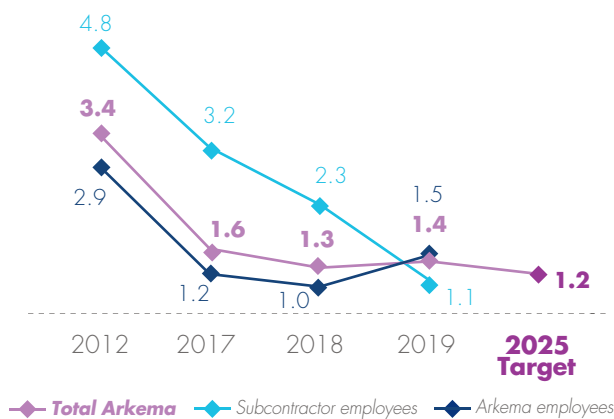
GOOD HEALTH AND WELL-BEING

The Group continued to consolidate its safety performance at a very good level in 2019, with a TRIR of 1.4, virtually unchanged from the very good result achieved in 2018, namely a TRIR of 1.3. This performance stemmed from excellent results for subcontractor employees, with a significant drop in the TRIR to 1.1 in 2019, compared with 2.3 in 2018, offsetting the increase in the TRIR from 1.0 to 1.5 for Group employees. An intensification of targeted actions is planned for this population in 2020 and beyond. The marked improvement in the TRIR for subcontractor employees stems from actions taken to strengthen their integration into the Group’s various safety procedures.

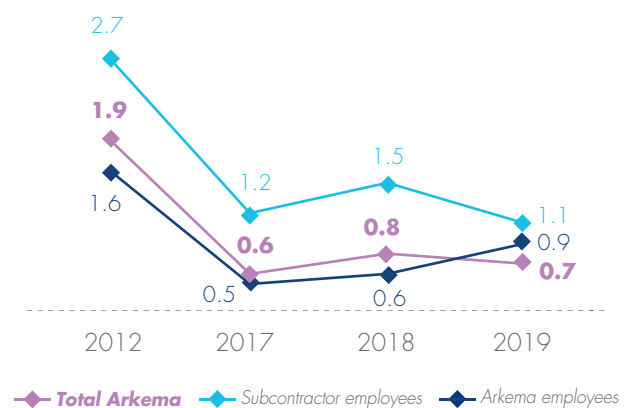
The Group also made progress in its drive to reduce the number of lost-time injuries, thanks to the implementation of prevention initiatives. As a result, the lost-time incident rate (LTIR) declined to 0.7 in 2019 from 0.8 in 2018. An average of 48 days were lost per injury in 2019 across all Group and subcontractor employees, a slight improvement on the 52 days reported in 2018. No fatal accidents have been recorded since 2013.

The following charts show consolidated injury rates for the 2017 to 2019 period, in number of injuries per million hours worked, calculated according to the methodology described in section 4.5.2 of this chapter. They also show data for 2012, the baseline year used to set the strategic safety targets in the Group’s CSR policy.

TOTAL RECORDABLE INJURY RATE (TRIR)⁽¹⁾



LOST-TIME INJURY RATE (LTIR)⁽²⁾



(1) A “total recordable injury” refers to any injury causing bodily harm or psychological trauma to an employee in the course of his or her duties, whether or not it results in a day or longer off work.

(2) A “lost-time injury” refers to any injury causing bodily harm or psychological trauma to an employee in the course of his or her duties and resulting in time off work.

In 2019, a total of 54 Group employees were victims of reported injuries recorded in the TRIR for the year, of which 31 resulted in lost time, out of a total worldwide workforce of 20,507 people. The rate also reflected the 13 incidents involving subcontractor employees reported during the year, of which 5 were lost-time injuries. The rate of potentially serious incidents, which has been running at around 30% in recent years, dropped to 22.4% in 2019, reflecting a significant drop in the potential severity of reported incidents. The Group remains set on further reducing this number in the coming years by means of a program addressing the identification and analysis of potentially serious accidents, allowing it to focus primarily on these types of accidents so as to increase the efficiency of prevention.

4.3.2.2.2 Health at work

Arkema has also undertaken continuous improvement initiatives to prevent health risks and enhance employee wellbeing.

Protecting health at the workplace

To consolidate all of the workplace health and safety initiatives, the Group is developing a workplace risk assessment application, known as STARMAP, to prevent health and safety risks more effectively by capitalizing on globally managed data libraries and best practices. The application is being rolled out worldwide. At 31 December 2019, 41% of the Group's sites worldwide had entered their workplace risk assessment data into the STARMAP tool.

Integrating ergonomics and preventing arduous working conditions

Over the past decade, the Group has undertaken a process to integrate ergonomics and prevent arduous working conditions.

In France, a new agreement on the prevention of arduous working conditions and the integration of ergonomics was signed in 2016 by all of the trade unions, following on from the previous one. In this context, numerous initiatives have contributed to improving working conditions, including the development of internal expertise through the implementation of a network of ergonomics correspondents and the integration of ergonomics into the industrial design of projects.

In the United States, a workstation ergonomics program, based on a set of e-learning modules, has been in place for several years. In addition, several sites have launched a program to improve workstation ergonomics, primarily in packaging operations.

In China, targeted studies are being conducted to improve load handling.

Overall, numerous initiatives have been undertaken to improve ergonomics in various work situations, including load handling, packaging, unloading, equipment control, facility maintenance, and laboratory and office work.

Before implementing improvement initiatives, the Group organizes awareness sessions to improve understanding of ergonomics.

In 2019, the network of ergonomics correspondents continued to grow, particularly within Bostik. As it does every year, the network met to facilitate the exchange of best practices. In addition, medical staff were given the same training in ergonomics as the ergonomics correspondents.

Lastly, HSE project reviews systematically address the integration of ergonomic factors.

Preventing stress and improving quality of work life

Arkema France has been conducting a physician-supported stress prevention program for individual employees for over ten years. Stress levels are determined by taking a standardized stress, anxiety and depression test (OMSAD) during employees' annual check-up with the occupational physician. The Group has also undertaken a company-wide workplace stress prevention initiative to improve any working environment identified as being at risk, based on such proven indicators as an abnormally high percentage of employees diagnosed as being over-stressed.

In 2018, the initiative was strengthened by the signature of a "health and work" agreement covering stress prevention, ergonomics, disability and disconnection. The agreement aims to:

- ensure the relevance of the various measures taken in these areas by strengthening cohesion between the various parties involved and between the working groups set up under existing agreements;
- preserve and enhance the actions undertaken;
- anticipate changes to occupational health issues by gathering and sharing intelligence on these topics;
- strengthen the role of employee representatives by creating a Steering Committee as of 2019; and
- protect health in the workplace.

4.3.2.2.3 Medical care

Regular medical check-ups were available in 94.3% of Group companies in 2019, covering 93.9% of employees.

In France, pursuant to the decree on the modernization of occupational medicine dated 27 December 2016, all employees now have access to individual exposure sheets to facilitate the monitoring of their health.

4.3.2.2.4 Occupational illnesses

Toxic or hazardous substances have been and continue to be used in the manufacture of the Group's products. Despite the safety and monitoring procedures in place Group-wide and in each production facility, employees may have been exposed to such substances and may develop illnesses arising from such exposure.

In this respect, like most manufacturers, the Group has used a variety of asbestos-based insulating or heat-proofing materials at its production facilities in the past. Consequently, certain employees may have been exposed to such materials before they

were gradually removed and replaced. Claims for occupational illnesses related to past asbestos exposure have been filed against the Group, mostly for periods before 1980.

The risk of exposure to chemicals is described in section 2.1.1 of this document.

With respect to industrial hygiene, beyond the use of:

- enclosed industrial processes limiting emissions as much as possible;
- protective systems such as source capture of residual emissions, general improvement works designed to minimize exposure; and
- the use of appropriate personal protective equipment at each workstation;

Occupational illness frequency rate (OIFR)

	2019	2018	2017
Number of occupational illnesses reported per million hours worked	1.0	1.9	1.6

In France, the Group also deploys traceability programs to track potential exposure to arduous working conditions in its facilities (including chemicals exposure), as part of its global risk assessment report. Globally, the Group is working on digitizing its risk assessment data using the dedicated STARMAP tool (described in section 4.3.2.2.2 of this chapter), which guarantees internal traceability.

Agreements on early retirement for employees in asbestos-contaminated facilities

In France, four Group sites have been included by ministerial decree on a list of sites whose current employees would be entitled to the early retirement provisions for asbestos workers. The Group cannot exclude that other Group sites may be added to the list in the future.

In this context, on 30 June 2003, Arkema France signed an agreement with all of the representative trade unions that improved the terms of retirement for employees qualifying for this provision, and adjusted their retirement dates to facilitate the transfer of their skills and knowledge within the organization. These measures were extended to all Group companies in France by an agreement signed on 1 September 2007 with all of the unions. For more information, please refer to note 20 to the 2019 consolidated financial statements in section 5.3.3 of the 2019 Universal Registration Document.

4.3.2.3 PROCESS SAFETY

The Group carefully analyzes the industrial risks associated with all of its production, transportation, loading/offloading and storage processes and pays particular attention to both internal and external feedback concerning incidents, accidents and best industrial risk management practices.

the Group requires risk exposure to be assessed at each workstation and that employees' residual exposure to hazardous chemicals be regularly measured in order to prevent the risk of occupational illness in the future. Measurement data are stored in conditions that guarantee their long-term integrity.

In 2019, 35 occupational illnesses were reported Group-wide, of which 15 were related to exposure to asbestos and 11 to exposure to chemicals. These figures, which include diseases not listed to date in the tables of occupational illnesses, are down compared with 2018, implying a decline in the occupational illness frequency rate (OIFR) below.

The OIFR refers to the number of occupational illnesses reported per million hours worked.

The aim of the risk analysis is to identify and manage potential risks that may cause harm to people, goods or the environment. This enables the Group to seek out processes that are inherently safer and to implement risk management measures that focus on prevention.

The analysis is carried out in compliance with applicable legislation, using systematic studies based on recognized methods, which are chosen in accordance with the type of process involved, the complexity of the operations and the size of the facility. The aspects taken into account include (i) the risks associated with the properties of the chemical products used, (ii) the risks associated with operating conditions, equipment characteristics and potential technical and human errors, (iii) the risks associated with the location of units on a site and their potential interaction and (iv) natural risks.

The risks identified in this way are prioritized using a semi-quantitative process developed and led by a network of experts in Europe, the United States and Asia. The experts are also responsible for preparing the directives, procedures and guidelines required for effective risk management.

The risk analysis process and the corresponding measures are carried out prior to the implementation of new processes, of new facilities, of operations that require the use of new chemical products, and of extensions or modifications to existing facilities. The resulting risk analyses are updated periodically.

As a result, the Group regularly makes improvements to its existing production units. In 2019, Group capital expenditure allocated to safety, the environment and maintaining the production facilities to standard amounted to €279 million, versus €270 million in 2018.

At the same time, the Group is investing heavily to reinforce a culture of process safety among its employees. This involves not only technical training in process safety systems and methods, but also seminars in the United States, Europe and Asia for plant employees and managers, conducted by experts from the Center for Chemical Process Safety of the American Institute of Chemical Engineers, companies specializing in process safety, or the Group. In 2018, the DSEG published a booklet entitled "Process safety fundamentals" for plant employees and managers to inform, train and share information with them on process safety values.

In France, Technological Risk Prevention Plans (*plans de prévention des risques technologiques – PPRT*) put in place in accordance with environmental legislation help manage urban development around the Group's upper-tier Seveso facilities. As of year-end 2019, 16 facilities operated by the Group in France are subject to a PPRT, for which the Group is required to part-finance related measures. Furthermore, the French ministerial decree of 29 September 2005, requiring that the probability of occurrence, kinetics, impact intensity and severity of potential accidents be assessed and addressed in the hazardous impact studies performed for classified installations subject to authorization, also entails the introduction of risk management measures at all of the sites classified as such.

In Europe, at the date of this document, 35 of the Group's production facilities are subject to reinforced monitoring in accordance with the provisions of the Seveso III directive (directive 2012/18/EU of 4 July 2012) concerning major accidents involving hazardous substances. This directive requires, in particular, the deployment of safety management systems and the regular updating of hazard studies.

In the United States, the management of industrial safety risks is primarily regulated by the Occupational Safety and Health Administration (OSHA) and its Process Safety Management of Highly Hazardous Chemicals standard and by the Environmental Protection Agency (EPA) and its Risk Management Plan (RMP) Rule, implementing section 112(r) of the Clean Air Act. In particular, these texts require companies to inform authorities if they use or store a quantity of a hazardous substance above a defined threshold and, if such a substance is stored, to implement specific risk management programs that include a heightened equipment inspection process, operator training and emergency plans. Other regulations at the federal, state or local level are applicable to the storage of chemicals, the safety of operators when handling stored products and the storage of highly hazardous substances.

For sites exposed to natural risks such as extreme weather events or earthquakes, risk scenarios are defined and regularly updated, together with the measures designed to mitigate their impact. For further details, see the risk of accidents at sites in section 2.1.1 of this document.

Crisis management

The in-plant crisis management procedures 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 on Group sites and during transportation. Crisis situations may be caused by internal or external events, including natural occurrences such as flooding.

A year-round on-call system enables the Group to manage crises by setting up a dedicated crisis management team. The Group regularly offers courses in "Crisis management and communication" and "Media training", and conducts simulations of crises and set-up of crisis management teams, especially at the highest risk Seveso sites in Europe. Some of these exercises may involve Group staff, as well as external stakeholders such as government employees, elected officials, the fire department or local residents.

The crisis management process also applies to events caused by Group products located at customer sites. An emergency number is indicated on shipping documents and Safety Data Sheets for Arkema. It is available *via* the country subsidiary for Bostik. Within this product line, a product recall exercise is organized every year for the "food contact" segment with products designed for the general public.

Process safety events (PSEs)

The Group is intent on minimizing the number of process safety events. In 2017, Arkema adopted the new process safety event criteria published by the International Council of Chemical Associations (ICCA) and introduced a new process safety indicator, the PSER (number of process safety events per million hours worked) based on ICCA and CEFIC criteria.

2025 TARGET

Driving further efforts on reducing industrial accident risks, the Group has set the strategic target of a PSER under 3 by 2025.



In 2019, the PSER was 3.7, compared to 4.4 in 2018. This increase is the result of targeted actions carried out by the sites following analysis of incidents by type. The Group is contributing to industry-wide efforts on reporting reliability and harmonization for this enduringly complex indicator.

Major PSEs are reported as soon as possible to Executive Committee members and to the neighboring community in the event of nuisances, applying the procedures specified for managing such events.

The number of PSEs is reviewed monthly by the Executive Committee.

Transportation-related events

Transportation-related events are events that occur during the transportation or handling of hazardous and nonhazardous goods at loading/offloading areas and on Group and customer sites. The Group uses six criteria to distinguish between major and minor events, primarily based on the regulations in effect for the transportation of hazardous goods.

Major events are communicated to the Executive Committee on a quarterly basis.

4.3.2.4 SECURITY

In the area of security, Arkema provides training and makes every effort to use the best technologies available in order to protect people and the facilities. The Group's action plans are notably based on recommendations by public authorities and on targeted audits.

To prevent and reduce the impact of possible malicious acts, Arkema has decided to strengthen its security policy in several key areas:

- **cyber security:** heightened protection of the Group's corporate and industrial IT networks worldwide;
- **physical security:** guidelines defining the level of protection to be implemented in the event of an intrusion, depending on the site's criticality and the prevailing social conditions (particularly crime levels);
- **transportation:** additional measures to enhance transportation security;

- **intellectual property:** heightened security measures at research centers; and
- **travel:** increased employee protection during business travel.

To roll out this safety policy to all employees, the Group-wide "i-Safe" awareness program, launched in 2018, is based on best cybersecurity practices. Ten of these, known as "the Golden rules", are deployed gradually via team meetings that extend to all employees. The first topics covered in these meetings were prudent use of USB flash drives and email, data protection, vigilance in the face of potential attacks, safe business travel, and vigilance on social media.

FOCUS

Crisis management in cybersecurity

Cybersecurity was integrated into the crisis management process with the implementation of a cyber crisis alert and management plan, supported by an expert response team available 24 hours a day, 7 days a week.

4.3.3 Environmental information

REDUCING THE ENVIRONMENTAL FOOTPRINT OF THE GROUP'S OPERATIONS

4.3.3.1 ENVIRONMENTAL MANAGEMENT

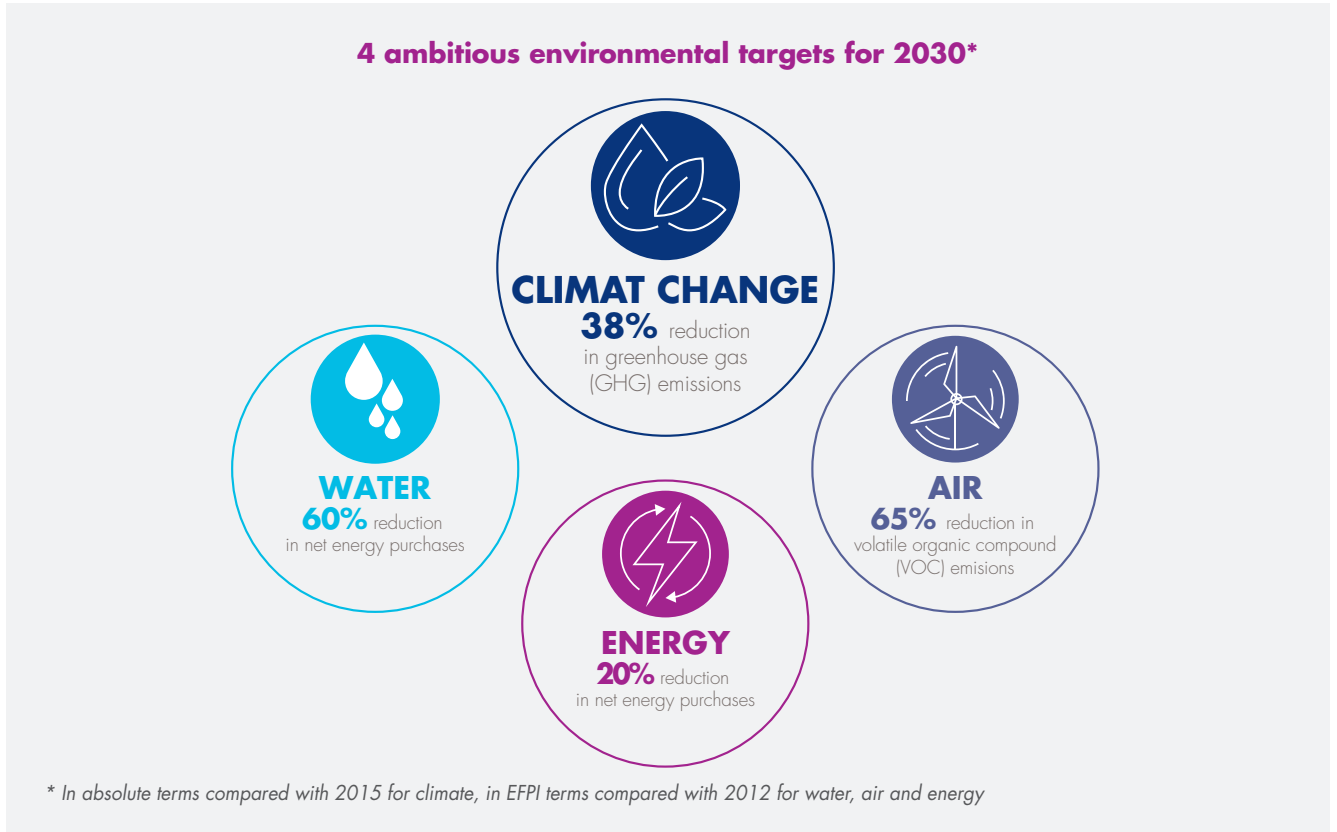
Reducing its environmental footprint and combating climate change are part of Arkema's commitment to being a responsible manufacturer. To achieve these objectives, the Group continues to upgrade its manufacturing practices to reduce emissions, optimize its use of energy, water and non-renewable raw materials, and support the circular economy. The Group's plants stringently track their effluent releases, air emissions and waste production and implement appropriate measures to manage the risks associated with the environment and climate change, taking into account their potential impact not only for Arkema but also for the environment and other stakeholders.

The main risks associated with the Group's activities relate to air, water and soil pollution, climate change and the use of resources. The due diligence procedures and policies implemented to prevent, identify and mitigate these risks and the outcomes of such policies in the form of performance indicators are presented in detail below and organized around the topics of climate change, resource management and impact on biodiversity.

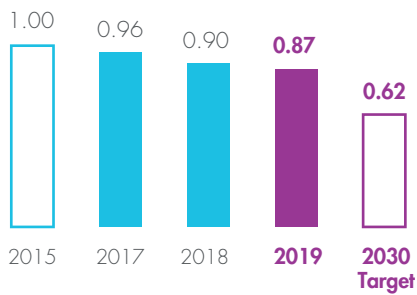
In addition to these initiatives carried out at its industrial sites, Arkema also leverages its sustainable development-oriented innovation process to develop solutions for its customers that contribute to combating climate change, facilitate the management of water resources, support new energies and enhance energy efficiency, thereby providing new opportunities for growth. For further details, see section 1.1 of this document.

The new materiality assessment conducted in 2019 and set out in section 4.1.6 of this chapter confirms the importance that stakeholders attribute to environmental topics. Several years ago, the Group defined four objectives for 2025 that aim to reduce energy consumption and emissions into air (greenhouse gases and volatile organic compounds) and to water (chemical oxygen demand). With a baseline year of 2012, these objectives apply to intensive indicators, known as Environmental Footprint Performance Indicators (EFPIs), which are not impacted by changes in the scope of reporting, making them more effective in tracking the Group's industrial performance. Through the efforts undertaken, three of these targets were reached ahead of time in 2018.

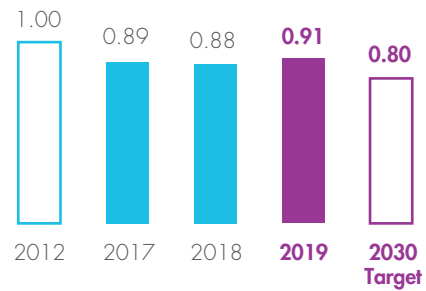
Through its commitment to reduce its environmental footprint and take into consideration climate change factors, the Group has decided to review these objectives with a new long-term target:



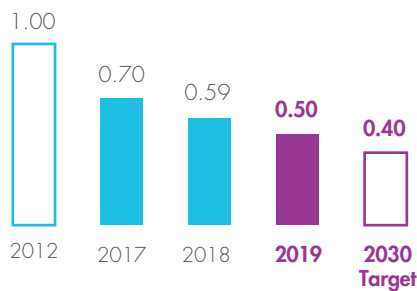
CLIMATE (GREENHOUSE GAS EMISSIONS*)



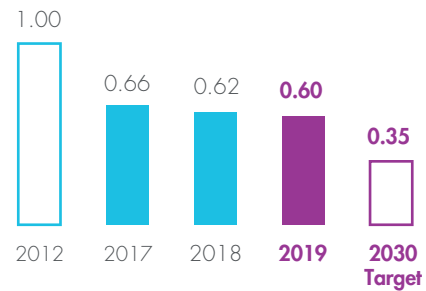
ENERGY (NET ENERGY PURCHASES EFPI)



WATER (CHEMICAL OXYGEN DEMAND EFPI)



AIR (VOLATILE ORGANIC COMPOUNDS EFPI)



NB: the change in the EFPIs is expressed in relation to an index base of 1 in 2012.

* Scope 1 and Scope 2 emissions as defined in the Kyoto Protocol + ODS listed in the Montreal Protocol.

These four strategic indicators and their trends are covered in more detail below.

Beyond the evolution of these four strategic indicators, the Group reports absolute figures for every parameter used to track the Group's environmental footprint.

To meet its targets, the Group has undertaken initiatives at two levels:

- continuous improvement programs, based on employee training and an action plan deployed in every unit; and
- a certification process, completed by internal audits, to assess the performance of each plant's environmental management system.

Regulatory and compliance monitoring

The Group ensures that its HSE network properly understands the applicable EU regulations, such as Phase III of the European Union Emissions Trading Scheme (EU ETS), the Industrial Emissions Directive (IED), the reviewed Best Available Techniques Reference (BREF) documents, as well as the latest environmental data reporting rules which concern it, thanks to the organization of awareness-building sessions and dedicated network meetings. In 2019, Arkema started preparing for the EU-ETS phase IV study (European Union greenhouse gas emission allowance trading scheme), which will be implemented over the 2021–2030 period. The Group also performs regulatory compliance audits every three years at the US facilities. For China, a regulatory monitoring process has been set up with a specialized firm. European facilities can monitor their compliance with applicable regulations using specific IT applications dedicated to each country's legislation.

Management engagement

Initiatives underway to reduce the environmental footprint are extensively reviewed and discussed within the Group:

- each business's entire environmental footprint, including its energy footprint, is reviewed annually in individual meetings with the business's Managing Director and industrial Vice-President(s) and the Group Safety and Environment and Sustainable Development Vice-Presidents. During this process, the managers concerned are assigned an environmental target for the following year. This target is a criterion for their annual performance review and compensation;
- the Group's annual environmental and energy reports presenting results for the reporting and prior years, along with historical environmental footprint data (excluding energy) for the trailing six years, are issued to all the departments concerned. These reports track the initiatives that helped to improve the Group's environmental performance. A total of 188 initiatives were undertaken in 2019. They covered the full range of environmental related topics, including water

withdrawals, the reduction in water effluent releases, GHG and COV emissions, soil contamination and waste production; and

- each year, the Group Safety and Environment Vice-President and the Sustainable Development Vice-President provide the Executive Committee with overviews of, respectively, the Group's environmental performance and the progress made in the key indicators towards the long-term targets. In 2019 the targets were redefined for the period until 2030.

In addition to internally tracking the improvement plans deployed in each entity, the Group ensures alignment among the environmental management systems through an external certification process.

Environmental statement

The Group's statement concerning its environmental indicators is based on the principles of relevance, representativeness and consistency. The methodology applied is described in section 4.5 of this chapter.

4.3.3.2 CLIMATE CHANGE

A firm supporter of the fight against climate change, Arkema is committed to reducing its energy use and the greenhouse gas emissions (GHG) associated with its activities, mainly through its Arkenergy program.

At the *Rencontre des Entrepreneurs de France* (LaREF) meeting for French entrepreneurs held in August 2019, Arkema reaffirmed its 2015 and 2017 commitments to a low-carbon industry and economy by signing the French Business Climate Pledge 2019.

The Group is also determined to enhance its product range, notably by developing solutions that help reduce greenhouse gas emissions. This is illustrated by changes to its fluorogases offering and by the development of the four innovation platforms described in section 1.1.2 of this document: "Lightweight materials and design", "New energies", "Home efficiency and insulation" and "Bio-based products".

Arkema's climate policy and its management of climate-related issues are included in the Group's environmental policy, which is described in section 4.3.1 of this chapter, as part of its commitment to being a responsible manufacturer.

The Group publishes its greenhouse gas emissions in accordance with the GHG Protocol, which is based on the Kyoto Protocol:

- Scope 1 emissions are direct emissions;
- Scope 2 emissions are indirect emissions relating to energy purchases; and
- Scope 3 emissions are indirect emissions relating to the value chain, both upstream and downstream of the Group's activities.

In addition to complying with the GHG Protocol, the Group also reports its direct greenhouse gas emissions from ozone depleting substances in line with the Montreal Protocol.

As it has met its GHG reduction target ahead of time and aims to bolster its contribution to climate issues, the Group has decided to set a new GHG emissions reduction target based on scientific knowledge. This new long-term Science-Based Target (SBT), is deemed consistent with the goal of keeping the rise in global temperatures to well below 2 °C above pre-industrial levels by the end of the century, in accordance with the Paris Agreement and recent reports from the Intergovernmental Panel on Climate Change (IPCC).

2030 TARGET

The Group's target is to reduce greenhouse gas emissions by 38%* compared with 2015.



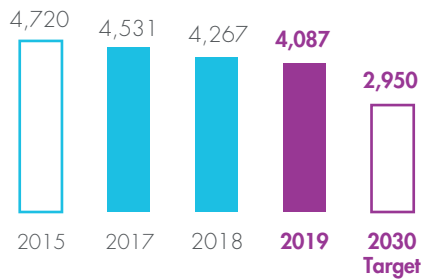
* Absolute target for Scope 1 and Scope 2 emissions as defined in the Kyoto Protocol + substances listed in the Montreal Protocol.

The methodology used to define this SBT is described in section 4.5 of this chapter. It covers Scope 1 and Scope 2 GHG emissions as defined in the Kyoto Protocol. As a responsible manufacturer, Arkema also includes GHG emissions of substances targeted by the Montreal Protocol to fully contribute to the climate change challenge.

Absolute indicator for greenhouse gas emissions SBT

The chart below details greenhouse gas emissions⁽¹⁾ (in kt CO₂ eq.) from the Group's operations in 2019, 2018 and 2017, calculated according to the methodology described in section 4.5 of this chapter.

GHG EMISSIONS⁽²⁾ (in kt CO₂ eq. per year)



In 2019, the Group's GHG emissions were down more than 4% compared with 2018. For each scope, they are set out below.

4.3.3.2.1 Scope 1 and 2 greenhouse gas emissions

Scope 1 direct emissions

The Group's direct greenhouse gas emissions (Scope 1) arise from:

- hydrofluorocarbon (HFC) emissions from its fluorogas production units;

(1) Scope 1 and Scope 2 emissions as defined in the Kyoto Protocol + substances listed in the Montreal Protocol.

(2) In 2019, GHG emissions include those of American Acryl's Bayport facility. Emissions from previous years have been recalculated to take account of this consolidation (see section 4.5.2.1 of this chapter).

- fugitive emissions from cooling circuits using GHGs;
- burning of fuel oil and gas in production operations; and
- processes that generate carbon dioxide (CO₂), nitrous oxide (N₂O) or methane (CH₄) as a product, by-product, coproduct or waste, and gas discharges from processes such as thermal oxidation, which converts VOCs into CO₂.

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

- installing emissions scrubbers, notably at the plants in Calvert City (United States), Pierre-Bénite (France) and Changshu (China);
- introducing systematic leak detection programs at the fluorogas production facilities, so as to minimize fugitive emissions; and
- replacing boilers with more efficient installations as part of the Arkenergy program (see section 4.3.3.2.2 on energy below).

Absolute indicator for direct greenhouse gas emissions

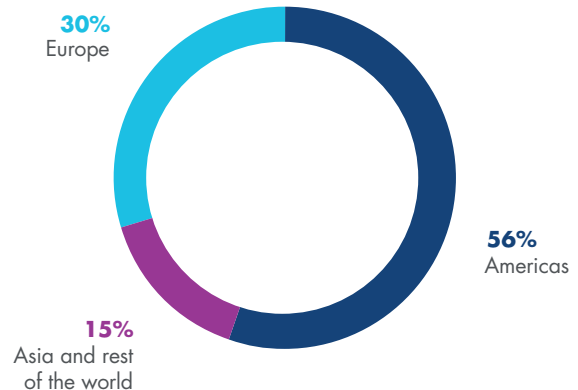
The chart below details direct greenhouse gas emissions (in kt CO₂ eq.) from the Group's operations in 2019, 2018 and 2017, calculated according to the methodology described in section 4.5 of this chapter.

DIRECT GHG EMISSIONS (in kt CO₂ eq. per year)

Scope 1 GHG emissions (kt CO ₂ eq.)	2019	2018 ⁽²⁾	2017 ⁽²⁾
Total	2,698	2,807	3,085
Of which CO ₂	1,490	1,567	1,515
Of which HFC	1,174	1,210	1,530
Others	34	30	40

In 2019, the slight decrease in emissions is attributable chiefly to the continued improvement of the treatment of vents on the Calvert City site (United States).

DIRECT GHG EMISSIONS BY REGION (in kt CO₂ eq. per year)



The geographical breakdown of emissions was stable compared with 2018.

Other direct emissions

The Group emits GHGs involved in producing HCFCs, substances that deplete the ozone layer (Montreal Protocol).

Montreal Protocol	2019	2018	2017
Greenhouse gas emissions (kt eq.CO ₂)	247	277	340

The main factor in the decline in emissions is a reduction in production volumes at the Pierre-Bénite site (France).

Scope 2 indirect emissions

The Group analyzes the following indirect GHG emissions:

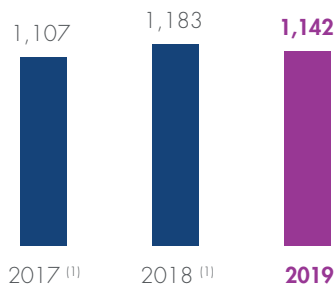
- Scope 2 CO₂ emissions from the suppliers of the electricity and steam purchased by the Group; and
- Scope 3 CO₂ emissions, categories 1, 2, 3, 4, 5, 6, 7, 8, 9, 12 and 15. See section 4.3.3.2.3 below.

To reduce its indirect Scope 2 emissions, the Group takes steps to scale back its energy consumption and source low-carbon or renewable electricity, as described in section 4.3.3.2.2 on energy.

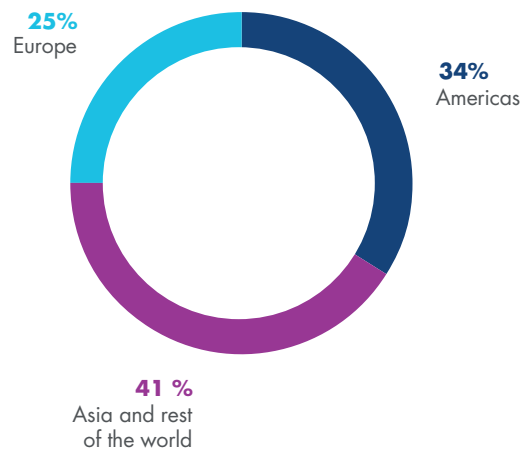
The chart below presents the Scope 2 emissions from the Group’s operations in 2019, 2018 and 2017, as defined above and calculated according to the methodology described in section 4.5 of this chapter.

Scope 2 CO₂ emissions break down as follows

INDIRECT GHG EMISSIONS (SCOPE 2) (in kt CO₂ eq.)



INDIRECT GHG EMISSIONS BY REGION (in kt CO₂ eq. per year)



Scope 2 CO₂ emissions were down 3.5% in 2019 compared with 2018, under the combined impact of the Arkenergy improvement plan and lower production volumes.

Internal carbon price

In 2016, to enhance its long-term approach, the Group set an internal price for Scope 1 and Scope 2 GHG emissions, expressed in terms of CO₂ equivalent, known as “internal carbon price”. It is used to analyze strategic industrial investments and to steer investment decisions under the operational excellence program towards the lowest carbon solutions. The internal carbon price is applied to compare scenarios using different processes to determine their impact on product cost.

The Executive Committee reviews the use of the internal carbon price, checks its relevance and, if necessary, adjusts the value. In 2019, it was raised to €50 per tonne of CO₂.

4.3.3.2.2 Energy

The Group deploys a wide range of actions to reduce Scope 1 and 2 CO₂ emissions as part of both the Arkenergy program and its operational excellence strategy (for further details, see the “Profile, ambition and strategy” section in this document).

Energy consumption

The Group uses a variety of energy sources, primarily in its industrial operations. To optimize energy consumption, the Group set the following target:

2030 TARGET

Reduce net energy purchases by 20% in EFPI terms compared with 2012.



To this end, the Group is rolling out the Arkenergy program in every subsidiary through a global network of Energy Leaders in the Business Lines, factories and relevant Procurement and Technical departments. It focuses on optimizing the energies used in the Group’s production facilities and processes. Moreover, Arkenergy is structured to meet the following priorities:

- continuously optimize energy use and cost, from equipment design and procurement to day-to-day on-site operations;
- deploy an energy management system to systematically integrate best operational practices, define site-specific targets and periodically review them; and
- ensure compliance with energy efficiency legislation, regulations and other applicable standards.

As well as improving energy efficiency, the program is also contributing to reinforcing the production plants’ competitiveness.

Based on energy efficiency audits worldwide, focusing on the plants that account for more than 85% of the Group’s energy consumption, the Arkenergy approach covers the following main points:

- implementing the ISO 50001 energy management system in Europe and Asia. To date, a total of 33 sites are ISO 50001-certified, which corresponds to 60% of Arkema’s total energy use;
- allocating a dedicated capital expenditure budget specifically for Arkenergy initiatives. In 2019, 51 capital projects were funded out of the budget, including 28 in Europe, 12 in the Americas and 11 in Asia; and

- since 2018, automating processes in order to continuously optimize the use of energy and raw materials.

The Group’s deployment of digital technologies helps to optimize energy consumption through the introduction of data collection and analysis systems. For example, advanced control systems involve installing “controllers” or IT systems that enable comprehensive and coherent management of the units’ various operating parameters. The resulting optimization has brought a reduction in the energy (steam) used, while maintaining product quality and operating stability. Three new sites joined this program in 2019: Houston (USA), Changshu (China) and Jarrie (France).

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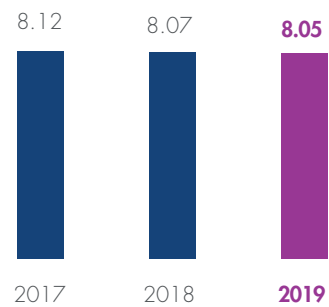
Optimized steam trap management

In 2019, Arkema signed an agreement with Armstrong covering the European scope to optimize its steam systems. Steam traps can cause significant energy losses if the trap system fails, especially if the plant must be shut down entirely to replace them. Arkema wanted to cut this failure rate by 75% over three years by changing the installation position and inspecting the traps regularly. A digital solution was selected to enable qualified experts to monitor steam trap systems and consolidate results at Group level.

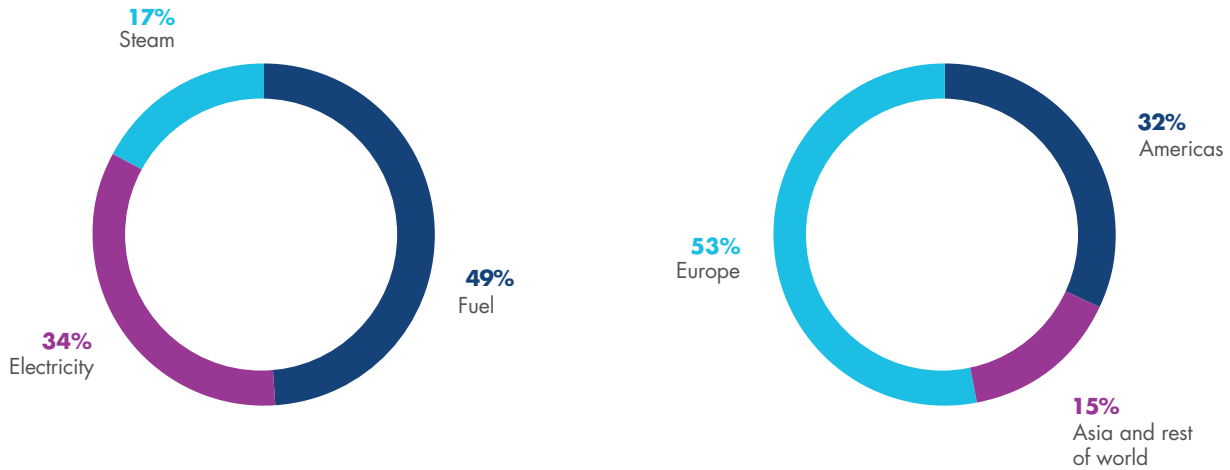
Absolute indicator for energy purchases

The chart hereafter presents consolidated net energy purchases in 2019, 2018 and 2017, calculated in terawatt-hours according to the methodology described in section 4.5 of this document.

NET ENERGY PURCHASES (in TWh)



The net energy purchases by type of energy and geographical region break down as follow:



In 2019:

- 98% of the TWh generated by fuel were natural gas-fired, up from 97% in 2018;
- 22% of the net TWh purchased by the Group, regardless of source, were from low-carbon electricity, as was the case in 2018;

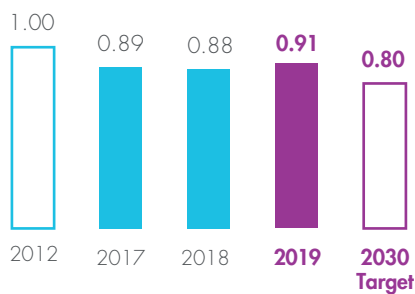
As part of its mobilization in favor of the climate and its strategic objective of reducing GHGs, Arkema is working to shift its energy mix in favor of low-carbon energy sources.

Intensive indicator for energy purchases

The chart below presents the net energy purchases EFPI for the Group's operations in 2019, 2018 and 2017, calculated according to the methodology described in section 4.5 of this chapter. Net energy purchases are calculated using the Group's biggest net energy purchasing entities, which account for more than 80% of the consolidated total.

In 2019, there was a significant increase in this indicator owing to the drop in production volumes in certain plants, social unrest threatening the stability of activity in France and the installation of thermal oxidizers to reduce VOC emissions.

NET ENERGY PURCHASES EFPI



4.3.3.2.3 Scope 3 emissions inventory

Following an initial inventory of its indirect Scope 3 emissions in 2016, the Group calculates the Scope 3 emissions arising from its upstream and downstream value chain each year, in accordance with the GHG Protocol calculation guidance issued by the World Business Council for Sustainable Development (WBCSD). The guidance also supports compliance with French legislation and standards, including the provisions of French Law no. 2015-992 of 17 August 2015 concerning the energy transition to drive green growth.

According to the WBCSD, drawing on the GHG Protocol, Scope 3 emissions arise from 15 categories of activities across the corporate value chain. Arkema has identified ten significant categories, three non-significant categories and two non-relevant categories. The emissions calculated for the Group in 2019 are presented by category in the table below. The calculation methods are described in the methodology presented in section 4.5.2.4 of this chapter.

Category number	Category name	Emissions (kt eq. CO ₂)	Comments
1	Purchased goods and services	6,749	Very significant. As is often the case in the chemicals industry, this category is material for Arkema. The increase reflects more precise accounting for this category, including industrial gases.
2	Capital goods	365	Significant. The marked decline in this category results from a methodological change providing for greater precision, as described in the methodological note in 4.5.2.4.
3	Fuel- and energy-related activities not included in Scope 1 or 2	682	Significant
4	Upstream transportation and distribution	314	Significant
5	Waste generated	436	Significant
6	Business travel	26	Non-significant
7	Employee commuting	33	Non-significant
8	Upstream leased assets	9	Non-significant. The marked decline in this category results from a methodological change providing for greater precision, as described in the methodological note in 4.5.2.4.
9	Downstream transportation and distribution	370	Significant. The increase of 74 kt eq. CO ₂ between 2018 and 2019 results from more precise methodology and better reporting by the subsidiaries, as described in the methodological note in 4.5.2.4.
10	Processing of sold products	Data not available	Significant. Given the diversity of applications for the products sold by the Group, the indirect emissions relating to the processing of said products cannot be assessed reliably.
11	Use of sold products	Data not available	Very significant. As is often the case in the chemicals industry, this category is the most material for Arkema. Current knowledge of product use data makes it impossible to estimate this category reliably. However, the Group has identified fluorogases as the most emission-intensive products. Arkema is developing new blends and products to enable the transition from the old generation of products (HCFCs) to current (HFCs) and new generations (HFOs).
12	End-of-life treatment of products sold	2,473	Very significant. The estimate for this category has increased following the extension of the scope, and does not take into account the Fluorogases Business Line.
13	Downstream leased assets	-	Not relevant. The Group does not lease any assets downstream of its value chain.
14	Franchises	-	Not relevant. The Group does not have any franchises.
15	Investments	1,104	Significant. This category corresponds to acquisitions made in 2019.
TOTAL		12,561	

In 2019, indirect Scope 3 GHG emissions, which were estimated for 11 categories, represented 12,561 kt eq.CO₂. and were higher than Scope 1 and 2 emissions combined.

In 2019, the Group continued the data collection process, particularly for categories identified as significant for which the data are incomplete or unavailable. The process gave rise to estimates for two new categories and made the estimate for two other categories more reliable. The goal is to be able to prepare effective action plans to reduce the Group's material Scope 3 emissions.

4.3.3.3 RESOURCE MANAGEMENT AND THE CIRCULAR ECONOMY

To respond to the scarcity of natural resources and the increasing environmental impact of human activities, Arkema develops the circular economy by conserving resources and reducing the environmental impact of activities throughout the life cycle. The Group has made this issue a priority area based on its materiality assessment conducted in 2019, which is described in section 4.1.6 of this document. This growing challenge of the circular economy applies to both the Group's solutions and its industrial operations.

The Group's initiatives to reduce the environmental impact of its industrial sites are underpinned by its resource management policy and notably consist in optimizing their use of raw materials, energy and natural resources like water. New manufacturing units are designed to incorporate environmental footprint considerations into the choice of processes and equipment. Special attention is also paid to operating conditions, and maintenance and development investments are regularly undertaken to optimize the use of water, energy and raw materials at Group plants.

Arkema also supports integrating circular economy practices across the value chain by developing a recycling policy in both its upstream and downstream operations, using raw materials from renewable sources and limiting waste.

4.3.3.3.1 Energy use

Arkema has developed a climate policy, which is presented in section 4.3.3.2 of this chapter. Energy use has an impact on both resources and greenhouse gas emissions. Energy-related data are therefore presented under the heading "Energy", in section 4.3.3.2 of this chapter.

4.3.3.3.2 Water use

Water is used in the Group's industrial operations to:

- provide a reaction medium for certain production processes, cool production installations and clean products and equipment;
- generate steam; and
- operate hydraulic barriers to treat groundwater contaminated by legacy pollution on historical sites.

To contribute to optimizing the use of fresh water, whether withdrawn from the surface or the water table, the Group is upgrading production practices by installing water-saving systems and closed loops. These initiatives can cover a wide range of solutions, such as tracking usage more effectively, installing flow meters, deploying leak detection programs, changing technologies, upgrading fire-fighting systems, recovering rainwater and recycling water from scrubbing or boiler condensates.

In 2016, as part of the operational excellence program, the Group launched the "Optim'O" project to optimize its production units' water management. The analyses carried out as part of this project found that:

- 80% of water withdrawn from the natural environment is returned as surface water;
- 90% of consolidated water use is attributable to less than 17 plants, none of which are located in a water-stressed region; and
- facilities located in water-stressed regions represent less than 2% of the Group's consolidated water use.

Drawing on these observations, the Optim'O project gives rise to numerous initiatives, particularly at the 35 sites that account for most of the Group's water use and/or generate the most wastewater. The work carried out on the water network at the Feuchy site (France), for example, has reduced the use of drinking water by 10%.

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Mapping water use

In 2019, the Saint-Auban site (France) reduced its groundwater withdrawals by approximately 20% thanks to better pumping regulation and adaptation to the site's water needs.

The table below presents consolidated water withdrawals in 2019, 2018 and 2017, calculated according to the methodology described in section 4.5 of this chapter.

Water use	2019	2018	2017
Total water withdrawn (in millions of cu.m)	113	119	118

In 2019, water withdrawals were down significantly compared with 2018 thanks to various improvement measures, such as better regulation of groundwater withdrawal at the Saint-Auban site (France), water recycling operations at the Casda site (China) and optimization of water use on cooling cycles at the Serquigny site (France).

4.3.3.3 Raw materials use

Arkema wants to contribute to optimizing the consumption of non-renewable raw materials used in its manufacturing process with the primary goal of reducing their use by deploying process control initiatives and developing best operating practices. These initiatives are described in more detail in the "Profile, ambition and strategy" section of this document.

In addition, to optimize its own and its customers' raw materials use, the Group undertakes, independently or in partnership with suppliers, such programs as recycling the reaction solvents used in its production processes. It promotes the purchase of recycled packaging and encourages its suppliers to develop this practice. It also offers customers other recycling solutions and deploys the circular economy initiatives described below.

Lastly, the Group uses renewable and especially Bio-based raw materials in its products. The Group products in question are presented in section 1.1.2 of this document. This ongoing commitment was demonstrated in 2019 by the fact that products at least 20% made from renewable raw materials accounted for around 9% of Group sales.

4.3.3.4 Circular economy

The Group strives to limit waste and recovers by-products generated by its industrial processes. Thanks to eco-design, it extends the lifespan of customer products and facilitates recycling. It develops the use of recycled packaging and helps its customers assess the environmental performance of their products.

Life-cycle assessments

To assess the environmental performance of certain products and in response to customer requests, life-cycle assessments (LCAs) are used to convert the entire inventory of a product's process material and energy inputs and environmental emissions into environmental impacts. The Group has developed dedicated LCA expertise at its Rhône-Alpes research center in France. It has also set up the global Arkema LCA Network, which is instilling this LCA culture across the organization, in particular through periodic

employee training courses, and durably embedding it into the Group's CSR process.

The Group supplies LCA data at the request of customers to enable them to assess the environmental footprint of a given product all along its value chain. This particularly concerns the Rilsan®, Rilsamid®, Pebax®, Kynar® and Forane® ranges, as well as Bostik adhesives and synthetic intermediates. Assessments are also performed, through trade associations, for acrylic monomers, PMMA and resin dispersions for coating applications. A full life-cycle assessment was carried out on 22% of the sales generated in 2019.

Depending on the type of product, internal experts assess the impacts in such areas as climate (greenhouse gas emissions), ozone depletion potential, contribution to acidification, and energy, water and land use. Their scope is generally limited to a cradle-to-gate analysis, i.e., to production operations and upstream factors. In certain cases, this expertise may be shared with customers to help them implement their own eco-design process, by providing them with the impact data and discussing the most relevant indicators and the best practices associated with their assessment.

LCAs are performed in accordance with the recommendations of the International Reference Life Cycle Data System (ILCD) Handbook and the international ISO 14040 and ISO 14044 standards describing the principles and framework for LCAs.

Extending the lifespan of customer products

Arkema aims to constantly improve the lifespan of both its own and its customers' products.

For example, Kynar® PVDF offers a coating with a particularly long lifespan. In the Kynar Aquatec® range, used for reflective roofs that reduce buildings' energy consumption, it preserves the white finish for an especially long time without maintenance.

Arkema has also developed a line of organic peroxides for crosslinking rubber, which is then used to manufacture automotive and other parts that last longer than their conventional counterparts.

Recycling customer products

Arkema is developing a number of solutions that are making it easier for customers to recycle their products.

For example, Elium® liquid thermoplastic resins are produced using the same equipment and processes as thermoset composites.

Their properties make them easy to recycle, unlike parts made from thermoset resins such as epoxy.

The Group has also developed technologies to protect glass bottles (Kercoat®) and hide scuffs (Opticoat®), which significantly improve the appearance and useful lives of bottles by tripling the number of times returnable beer and other bottles can be reused.

The adsorption business has developed a solution that increases the recycling rate of roadwork scrap. Using Cecabase RT® additives in the 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.

In Europe, the European MMAtwo project was launched in 2018 to develop a chemical recycling process for PMMA that is to be validated on an industrial scale within three years. This initiative brings together 13 partners, including four French businesses representing all stages in the value chain. The European Union is providing €6.6 million of the project's funding, as part of its Horizon 2020 program.

In 2019, Arkema introduced its new Virtucycle™ recycling program for high performance polymers in partnership with Agiplast, which is specialized in the manufacturing and regeneration of engineering plastic compounds. The program enables customers to partner with Arkema in post-industrial and post-consumer recycling projects for its specialty polymers. In implementing this program, the Group encourages its customers to get involved in recycling its end-of-life products or providing sourcing opportunities for recycled raw materials.

Recycling packaging materials

For many years, the Group has been using recycling and recovery channels provided by packaging suppliers and encourages its customers to also use these systems.

Recycled packaging is used whenever possible, depending on the compatibility between containers and contents. Out of their total packaging consumption, some industrial sites use up to 70% recycled packaging.

The Group also stresses the use of new packaging designed with an optimized percentage of recycled materials, as cardboard and plastic container recycling operators now offer a wide selection.

The marketing teams from the various Business Lines work to integrate into their product lines packaging made from Post Consumer Recycled, or PCR, content, as the offering of these materials continues to grow. The Group's technical approach to packaging places priority on single-material packaging and high recyclability options. For example, the small bags used for Bostik's tile adhesives and mortars have always been made out of kraft paper, a material with a recycling rate of 80% to 85%.

A firm advocate of using recycled packaging, Arkema urges its suppliers to design and develop standards that will contribute to rapidly expanding recycled packaging solutions throughout the chemical industry.

Reusing by-products

Arkema markets by-products from the production of its leading products by finding suitable commercial applications linked to their inherent properties.

By-products from the conversion of castor oil into undecanoic amino acid at the Marseille (France) plant are examples of re-use through the OLERIS® range, whose bio-based origin is in increasing demand in recycling channels.

Waste

RECYCLING

In addition, Arkema is seeking solutions to transform certain types of industrial waste, which otherwise would be discarded, into products that can be used in other industries. The Group formed a transdisciplinary working group – representing Business Lines, procurement, processes, HSE, R&D, sustainable development – to step up these efforts and increase coordination with partners.

In 2019, 14% of hazardous waste produced worldwide was recycled on- or off-site to recover useful materials.

For example, the Mont facility in France has long marketed the sodium-water produced as part of a monomer purification process to the paper industry for use in the kraft paper and cardboard production process. The basic, organic material-rich water helps to minimize sulfur loss in the process regeneration loops.

At the Hengshui site in China, 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 discharging the residual acid as waste, the plant is now able to sell 50,000 tonnes a year of solid sodium sulfate.

On the Lacq site (France), desulfogypsum from the sulfur residue treatment facility is a non-hazardous waste that is re-used as a material for the manufacture of plasterboard in cement works. In 2019, 13,500 metric tons of desulfogypsum were recycled in this way, thereby avoiding their being sent to landfill.

EMISSIONS

While inherent to its industrial operations, the Group ensures that its waste production is managed at every stage of its business activity and that resource recovery and/or recycling solutions are found whenever possible.

This commitment is reflected in a number of areas:

- reducing waste at source, by designing products and processes that generate as little waste as possible;

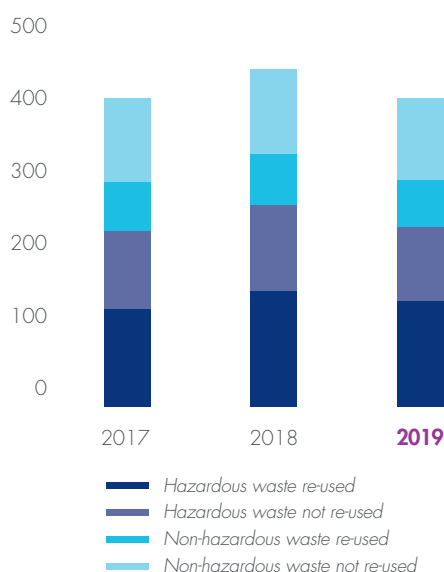
- recycling waste in the product value chain, in compliance with the REACH regulation; and
- recovering the energy potential of by-products and waste, wherever possible, by burning them as fuel.

In recent years, the Group has in particular:

- explored new ways to recover and reuse certain types of by-products, for example, to replace conventional fuels in boilers, notably at the La Chambre, Carling and Marseille sites in France;
- recycled cleaning solvents and optimized cleaning cycles; and
- installed filters to reduce sludge volumes.

The following chart shows the amounts of hazardous and non-hazardous waste generated by the Group's operations in 2019, 2018 and 2017, calculated according to the methodology described in section 4.5 of this chapter.

HAZARDOUS AND NON-HAZARDOUS WASTE (in kt per year)



In 2019, tonnages of non-hazardous waste fell back to their 2017 level owing to a lesser number of exceptional operations than in 2018 and reduced production.

The Group's objective is not only to reduce overall waste production, but also to recycle waste or recover its energy potential by burning it as fuel.

The following table shows the amounts of hazardous waste that were either recycled or burned as fuel in 2019, 2018 and 2017, calculated according to the methodology described in section 4.5 of this chapter.

Hazardous waste (in kt per year)	2019	2018	2017
Waste recycled into materials	25	28	27
Waste burned as fuel	88	90	90
Non-recycled hazardous waste	65	69	67
• Of which landfilled	3.8	4.0	3.4
TOTAL HAZARDOUS WASTE	178	187	184

Waste recovery for reuse as fuel continues across the Group. In 2019, 14% of hazardous waste produced by the Group worldwide was recycled at the production site or off-site to recover useful materials and 49% was burned as fuel.

The Group treated non-hazardous waste, also recovered, in a similar fashion. In 2019, 8,000 metric tons of sludge from a wastewater treatment plant was re-used in cement plants by industrial sites in France.

Non-hazardous waste (in kt per year)	2019	2018	2017
Recycled non-hazardous waste	101	119	107
Non-recycled non-hazardous waste	146	159	135
• Of which landfilled	26	37	27
TOTAL NON-HAZARDOUS WASTE	247	278	242

4.3.3.4 PROTECTING BIODIVERSITY

Arkema cares about preserving biodiversity and contributes to protecting the world's fauna and flora by reducing each site's emissions into air, water and soil.

The following paragraphs describe the Group's commitments in this area, its prevention and mitigation programs and the indicators for measuring their effectiveness, particularly in terms of the volatile organic compounds (VOCs) released into the air and the chemical oxygen demand (COD) of water discharges.

4.3.3.4.1 Measures to protect flora, fauna and biodiversity in general

Preserving biodiversity primarily means protecting all of the flora and fauna species liable to be impacted by emissions from the Group's operations.

The initiatives carried out are therefore designed to reduce releases into air and water and their impact on the surrounding soil and sub-soil.

Periodic environmental assessments enable the facilities to identify their environmental impact and the species liable to be affected, define priority objectives for their environmental protection action plans, and measure the improvements. Additionally, new manufacturing units are designed to incorporate environmental footprint considerations into the choice of processes and equipment.

In this way, the compliance and other initiatives being led by the Group have enabled:

- a reduction in chemical oxygen demand (COD) in the effluent discharged into rivers, thereby preserving the dissolved oxygen that is essential to all aquatic life, as described below;
- a reduction in the amount of volatile organic compounds (VOCs) released into the air, thereby limiting the formation of ground-level ozone, a super-oxidant harmful to flora and fauna, as described below;
- a reduction in greenhouse gas (GHG) emissions, thereby contributing to the fight against global warming, as described below;
- a reduction in SO₂ emissions, thereby helping to prevent the formation of acid rain which, in addition to its direct impact on plant life, can also alter soil and surface water characteristics;
- a reduction in NO_x emissions; and
- Arkema to continue soil remediation projects at sites with long-standing industrial operations, as described in section 4.3.3.4.3 of this chapter, in order to protect the species that depend on the land, preserve the quality of local groundwater and control the impact of legacy pollution.

4.3.3.4.2 Emissions into air, water and soil

The Group pursues an active policy of managing and reducing the impact of its operations on emissions into air, water and soil.

As part of this process, emitted substances are identified and their amounts calculated by category, so that appropriate measures can be taken to manage each one, in compliance with applicable host country legislation.

In this way, the manufacturing plants are reducing their emissions by optimizing their use of raw materials, energy or natural resources, so that they result in fewer emissions and less waste. In line with the Group's strategic environmental objectives, as tracked by the EFPIs, production units are also being constantly improved with process upgrades and the installation of effluent treatment facilities.

Air emissions

The Group's objective is to minimize its emissions of the most harmful compounds, particularly greenhouse gases (GHG), as described above, volatile organic compounds (VOCs), acidifying substances (nitrogen oxides and sulfur dioxide) and dust.

VOLATILE ORGANIC COMPOUND (VOC) EMISSIONS

Group production facilities are reducing their VOC emissions in several ways, including:

- collecting and treating effluents containing VOCs, particularly with thermal oxidizers or vent scrubbing; and
- carrying out regular campaigns to detect and eliminate VOC leaks.

The Group is also reducing its emissions of acidifying substances by:

- fueling boilers with low or ultra-low sulfur fuels, or replacing fuel oil with natural gas; and
- installing new low-NO_x burner technologies.

In 2019, major work to update the solvent management plan for the Genay site (France) resulted in a better assessment of VOC emissions, explaining the near 50% drop in its emissions.

ABSOLUTE INDICATORS FOR AIR EMISSIONS

The indicators in the table below present air emissions from the Group's operations in 2019, 2018 and 2017, calculated according to the methodology described in section 4.5 of this chapter.

Air emissions	2019	2018	2017
Acidifying substances (t SO ₂ eq.)	2,620	3,040	3,380
• SO _x (t)	1,590	1,960	2,254
• NO _x (t)	1,200	1,230	1,350
Carbon monoxide (CO) (t)	950	940	860
Volatile organic compounds (VOCs) (t)	3,810	4,150	4,280
Dust (t)	203	235	230

The steady decline in acidifying substances since 2016 attests to the success of the initiatives undertaken by several production plants to significantly reduce their emissions. Several investments were made to upgrade the boilers, either to run on natural gas instead of fuel oil or to equip them with vented emission treatment systems, so that these emissions were significantly reduced. In 2019, the drop in SO₂ emissions resulted from an improvement in the operation of the Lacq treatment unit (France), the reduction in the use of flares at the Beaumont and Houston sites (United States) and improved reporting on the Marseille site (France).

For volatile organic compounds, the decline resulted from an improvement in the treatment of vents on the Mont and Marseille sites (France) and an update of the solvent management plan for Genay (France). The drop was observed despite the reassessment of emissions from certain vents at the Hengshui-Casda site (China).

Carbon monoxide emissions were virtually stable in 2019.

For dust, the decline resulted mainly from improved reporting and lower production volumes at certain sites. Specific work was carried out at the Honfleur site (France), where the filtration treatment system was replaced and improved.

FOCUS

VOC reduction at the Mont site (France)

In 2019, a VOC working group improved the reliability of the treatment of vents and allowed new outlets to be connected. These actions resulted in a 10% reduction in the site's VOC emissions.

INTENSIVE INDICATOR FOR AIR EMISSIONS

The chart below presents the volatile organic compound emissions EFPI from the Group's operations in 2019, 2018 and 2017, calculated according to the methodology described in section 4.5 of this chapter. Emissions are calculated using the Group's biggest VOC emitters, which account for more than 80% of the consolidated total.

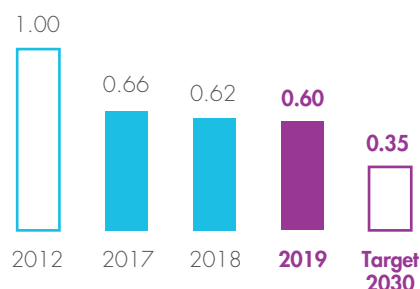
As the VOC target for 2025 was reached early in 2018, the Group has set a new goal for 2030, now the target year for the four strategic environmental indicators.

2030 TARGET

Reduce VOC emissions, expressed in EFPI terms, 65% compared with 2012.



VOLATILE ORGANIC COMPOUND (VOC) EFPI



As with emissions in absolute terms, the improvement in this indicator reflects progress in treatments on certain sites, in particular in France. New action plans will be rolled out to achieve this ambitious new goal.

Effluent releases

Reducing effluent and other water discharge is one of the Group's main environmental objectives, with particular attention paid to effluents with high chemical oxygen demand (COD) and/or suspended solids.

The Optim'O project, presented above in relation to its water consumption aspects, also aims to reduce the amount of effluent discharged by the Group. It is contributing to:

- continuously optimize water use and the efficiency of the water treatment process, from the initial design of the installations to their daily operation, through the use of advanced

technologies and the development of innovative solutions, thanks in particular to the “Water management” innovation platform;

- ensure compliance with applicable legislation and regulatory developments, such as the European Union’s Best Available Techniques reference document (BREF) for Common Waste Water (CWW), which sets out the best available techniques for wastewater treatment and the associated threshold emission levels; and

- implement the pretreatment of process effluent, where relevant, to reduce the COD content of effluent sent to wastewater treatment facilities.

Through detailed mapping of effluent treatment conditions at the Group’s industrial sites carried out in 2017 under the Optim’O project, 39 priority sites were identified as having the greatest impact on the Group’s COD EFPI. An action plan was deployed in 2018 and monitored under a dedicated audit program. Thirteen sites were audited in 2019, and the program will be continued at a further 18 sites in 2020.

ABSOLUTE INDICATORS FOR EFFLUENT RELEASES

The environmental indicators in the table below present effluent released from the Group’s operations in 2019, 2018 and 2017, calculated according to the methodology described in section 4.5 of this chapter.

Effluent releases	2019	2018	2017
Chemical oxygen demand (COD) (t O ₂)	1,950	2,170	2,440
Suspended solids (t)	571	535	920

In recent years, several initiatives have helped to reduce COD emissions from certain plants. Since 2016, the Optim’O project has helped to strengthen this process through better reporting, targeted investments and better facilities management.

FOCUS

Improved operational control and technical improvements to the water treatment plant brought a 40% reduction in COD discharge at the Spinetta Marengo site (Italy).

In addition, weather events at the Calvert City site (United States) triggered a slight increase in suspended solid releases in 2019.

INTENSIVE INDICATOR FOR EFFLUENT RELEASES

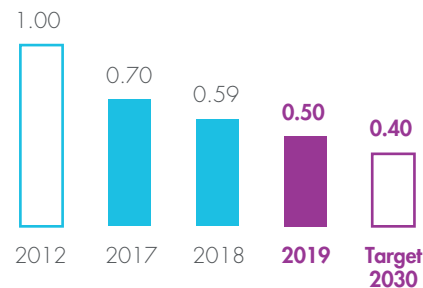
The chart below presents the COD effluent EFPI from the Group’s operations in 2019, 2018 and 2017, calculated according to the methodology described in section 4.5 of this chapter. Emissions are calculated using the Group’s biggest COD effluent emitters, which account for more than 80% of the consolidated total.

2030 TARGET

Reduce COD emissions, expressed in EFPI terms, by 60% compared with 2012.



CHEMICAL OXYGEN DEMAND (COD) EFPI



The significant improvement stems from the various advances in wastewater treatment plants, in particular at the Spinetta Marengo site (Italy).

Other emissions

Another major focus of the Group’s environmental policies is to ease the impact of nuisances from its operations on people living in nearby communities. Every year, projects are undertaken to attenuate such other nuisances as:

- odors, by upgrading treatment installations to cut SO₂ facilities;
- noise, by improving air compressor soundproofing; and
- visual pollution (smoke), by firing boilers with natural gas rather than fuel oil.

The Group has put in place communication systems to alert stakeholders in real-time about any event likely to result in noise, odors, or visual pollution in and around a production site. In addition, most facilities now have a system for receiving and responding to complaints from local residents so that they can address the issues and minimize the nuisances to the extent possible. Complaints are investigated and action plans defined accordingly in liaison with local authorities.

Other measures to develop biodiversity

Despite occupying only a limited amount of land, the Group is leading a number of initiatives to help enhance biodiversity on sites where part of the land is not allocated to industrial operations. One of the purposes is to encourage revegetation and the development of local species on and around the sites.

The Group promotes certain initiatives to improve biodiversity around production units. In Italy, for example, some 150 olive trees are being tended on the grounds of the Gissi facility, helping to safeguard the surrounding plant and animal ecosystem.

4.3.3.4.3 Managing legacy pollution and protecting the soil

Arkema responsibly manages soil and groundwater contamination caused by legacy pollution, including the storage of waste from operating facilities that have been operated, sold or acquired. The Group manages its environmental responsibility in such a way as to ensure that the health impacts and risks of its operations are managed in compliance with the applicable regulations, and that the environment is protected over the long term, with an appropriate allocation of funds.

In addition, Arkema implements prevention policies at all of the operating facilities, with mechanical integrity programs, dedicated incident reporting systems and experience sharing. When soil or groundwater contamination is suspected at a facility, an inquiry is conducted to determine the extent of the area concerned and ascertain the impact. The Group cooperates with the authorities to define the appropriate response, in line with applicable legislation.

The Group also implements a wide range of remediation initiatives using new techniques and looks for ways to reuse redundant industrial sites.

Site pollution risks are described in section 2.1.1 of this document.

Brownfield redevelopment

To redevelop certain vacant brownfield sites, the Group is partnering with local players, academics and specialized companies. For example, in 2019 Corsica Sole installed solar panels to repurpose parcels of land at Arkema's Saint-Auban (France) site. Covering 10 hectares, or 20% of the plant's surface area, the solar power facility plans for annual output of 19 GWh. The energy produced goes towards self-consumption to power the plant's operations.

Provisions for the management of legacy pollution

The amount of provisions for environmental risk at 31 December 2019 may be found in note 21.3 to the consolidated financial statements, in section 5.3.3 of the 2019 Universal Registration Document.

4.4 OPEN DIALOGUE AND CLOSE RELATIONS WITH STAKEHOLDERS

FOSTER INTERACTION AND VALUE CREATION WITH STAKEHOLDERS THANKS TO OPEN AND CLOSE DIALOGUE

The Group’s activities are part of a value chain and an ecosystem comprising numerous partners and stakeholders, as described in section 4.1.6 of this chapter. Open dialogue with its internal and external stakeholders is a cornerstone of Arkema’s corporate social policy and a prerequisite for understanding their expectations, building relationships based on trust and cooperation, and ultimately minimizing social risks and creating value for all.

All of the international standards and principles that the Group upholds, and their transposition into Arkema’s corporate reference documents, are presented in section 4.1 of this chapter.

In its dialogue with stakeholders, Arkema:

- respects human rights and fundamental freedoms and makes them central to its activities;
- places great importance on conducting its business in line with the principles and rules on ethics, integrity and compliance.

Arkema therefore complies with prevailing laws and regulations and best business practices;

- fosters the individual and collective development of all its employees; Arkema’s global human resources policy places a key focus on the development of skills, the promotion of diversity, and employee engagement and well-being;
- establishes open dialogue with its customers, suppliers and partners with a view to building a responsible value chain that creates shared value. In its choice of industrial and business partners, Arkema favors those that respect its social commitments; and
- helps develop lasting relationships based on trust and openness through its Common Ground® initiative, which is aimed at its neighbors and local host communities.

4.4.1 Employee information

PROMOTE THE INDIVIDUAL DEVELOPMENT AND COLLECTIVE COMMITMENT OF ALL THE COMPANY’S MEN AND WOMEN

4.4.1.1 TALENT MANAGEMENT

Arkema considers each of its 20,507 employees as talents. Given the highly technical nature of its businesses, developing expertise and maintaining a high level of engagement among its employees are key objectives for Arkema, which must continuously evolve in order to meet business, technological, social and environmental expectations in a proactive manner.

The objectives of its talent management policy are to support the Group’s growth in a multicultural environment, make sure it has the expertise it will need in the medium to long term, meet employees’ goals in training and individual development, and enhance employee well-being at work. The actions taken to achieve these objectives are described below.

Two quantitative indicators with set target values have been defined to measure progress towards these objectives between now and 2025:

2025 TARGETS

Percentage of women in senior management and executive positions: 23% to 25%.

Percentage of non-French nationals in senior management and executive positions: 42% to 45%



Talent management is based on the principles of workplace equality and non-discrimination. It is exercised in keeping with the Group’s core values of simplicity, solidarity, performance

4 CORPORATE SOCIAL RESPONSIBILITY

Open dialogue and close relations with stakeholders

and accountability, while moving towards the UN’s Sustainable Development Goals, as indicated in section 4.1.2 of this chapter.

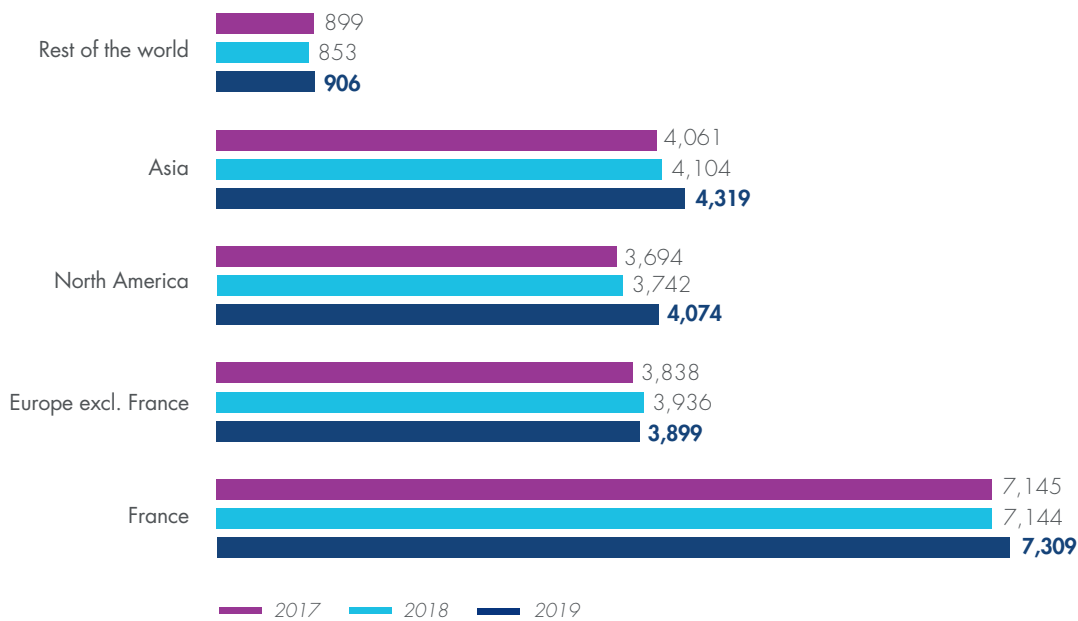
This policy is supported on a global level by the Human Resources Development, Internal Communication, Labor Relations and Remuneration Systems departments, as well as by the subsidiary management teams in different countries. All these department heads and management teams report to the Human Resources and Communication Executive Vice-President, who is a member of Arkema’s Executive Committee. Highlights and project

advancement are communicated to the Group’s Executive Committee on a monthly basis.

Human resources issues and challenges are presented to the Board of Directors once a year.

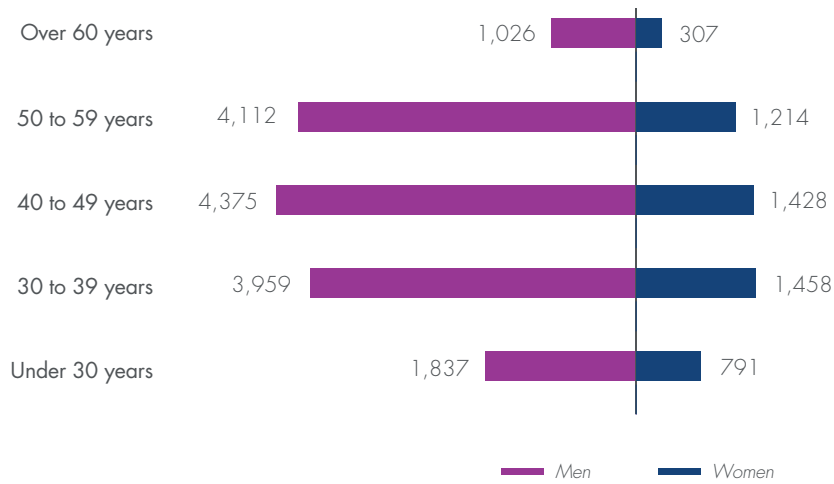
The Group clearly states that it consistently complies with the constitutional texts, treaties, conventions, laws and regulations in force in the countries and regions in which it operates, as detailed in section 4.4.2 of this chapter.

TOTAL HEADCOUNT BY REGION OVER THE PAST 3 YEARS



Total headcount stood at 20,507 at 31 December 2019, compared with 20,010 at 31 December 2018 and 19,779 at 31 December 2017. The change is attributable primarily to the acquisitions of ArrMaz, Lambson and Prochimir, which represent an increase of 504 employees in the workforce, in the second half of 2019.

GROUP EMPLOYEE AGE PYRAMID



The age pyramid shows a balanced distribution in the various deciles between the ages of 30 and 60, reflecting the loyalty of employees. The Group has an internal talent pool sufficient to cover part of the replacement of employees expected to retire over the coming ten years. The training and individual development programs implemented and described in section 4.4.1.3 of this chapter will allow for the necessary transfer of skills.

The low proportion of employees under 30 is explained by the high level of qualification required by the Group’s businesses.

4.4.1.2 AN AGILE AND COLLABORATIVE ORGANIZATION

Work organization

In every country where Arkema operates, it organizes employee work time to enhance engagement and performance, with the approval of employee representatives and in accordance with local regulations.

Given the specific features of its industrial operations, some employee categories may work on regular continuous or on-call shifts. These requirements are taken into account in a special remuneration scheme and adapted work schedule. For employees on shift rotations, the number of employees assigned to a given position and daily shift planning are determined in such a way as to safeguard employees’ quality of life.

Work is organized within the Group so as to provide for full-time positions. Part-time employees accounted for 3.7% of the total workforce at 31 December 2019. In the majority of cases, these employees have chosen to work part time.

In response to a sudden demand increase or unusual difficulties, the Group may make use of fixed-term employment contracts, overtime, subcontractors or temporary employment agencies, in compliance with local legislation and depending on the local labor market.

Any overtime worked results in compensatory time off and/or pay, in compliance with the regulations applicable in each country.

Initially implemented at the Group’s head offices in the United States and France, teleworking was extended to all French sites in 2019, for certain positions. As a result, the percentage of employees who could benefit from teleworking almost doubled in one year, now at nearly 6% of the total headcount in France. This is a high proportion given Arkema’s business.

In all, nearly 14% of employees telework, either regularly or occasionally.

Employee engagement

The Smart project is part of the Group’s Operational Excellence program. This project aims to bring all employees together under a shared vision, by eliciting their ideas for improvement and helping make active contributions towards progress.

Problem-solving and joint decision-making are two essential focuses of the program.

Smart offers work methods and a collaborative environment to foster and apply ideas and contributions from field staff to benefit from their extensive skills and experience.

This is not a one-off project but a new approach designed to transform the organization and change its culture. The Smart initiative was launched in 2017 and was rolled out further in 2018 and 2019. Approximately 40 sites on three continents have joined the movement in different areas (maintenance, production, supply chain, laboratory, human resources).

Digital transformation

New digital technology is completely transforming the work environment. To keep up with these changes, Arkema supports its employees to help them adapt to this transformation, which can create new performance drivers such as collaborative work within an international organization. The digital transformation is mainly understood in light of two aspects: employee experience and collaborative methods.

Employee experience

Employee experience covers all measures taken to help employees in their everyday tasks and optimize their use of tools.

A Human Resources Information System (HRIS) was implemented worldwide in 13 countries in 2019 to standardize and share processes and data. This system facilitates access to organizational data or monitoring of personal information in cases of internal mobility.

Arkema News, the Group's intranet translated into 8 languages, has for many years informed employees whatever their location, of Group news in real time. An additional version is also in place in the main countries where Arkema operates to provide more specific information on the local environment.

In 2019, the IT Systems department (I-Team) launched campaigns at all Group entities, which were taken up by regional organizations to teach employees about data protection and introduce them to digital technology.

GLOBAL OUTCOMES OF THE 2019 I-TEAM CAMPAIGNS

Number of participants	Number of sessions	Number of countries	Number of sites	Satisfaction score
5,500	500	25	120	4.5 out of 5

In Europe, this vast set of campaigns was transposed as the Work smart program, consisting of short in-house training sessions in various formats to concretely address employee needs.

The enterprise social networking tool Yammer is widely used within the Group to further contribute to creating an agile, spontaneous work environment. The service is used by members of a group to discuss various topics and share experience. In 2019, more than 370 groups bringing together more than 7,000 employees met to discuss such cross-cutting questions as safety, mutual aid on new digital tools, communication on major projects and even sport.

FOCUS

GoTo Webinar

The Group's results are presented every quarter by Executive Committee members on the day they are released *via* a webinar. Employees from any location have direct access to the information and can ask questions in real time.

Collaborative work methods

Digital technology offers opportunities to improve the performance of industrial sites by boosting the added value of human capital, as people play a fundamental role in the value chain of the production process.

Digital project managers take initiatives to bring these opportunities to the next level. They are supported by a network of about 30 "digital champions" at the various Business Lines or corporate departments. Their primary role is to identify areas where the use of digital technology makes the most sense based on practical experience culled from the field.

They then conduct a Proof Of Concept (POC), a short-term feasibility exercise, to test the value of an idea rapidly before approving a prototype and, where applicable, moving on to industrial scale production. Dozens of POCs have been launched, in operations, maintenance and engineering.

This agile method also relies on the involvement of operational staff to approve the relevance of ideas, therefore identifying promising projects more quickly. Operational staff contribute to each step in the POC, from testing to industrial production.

These various examples illustrate the measures Arkema has taken to enhance collaborative work methods and encourage its teams to embrace digital technology.

FOCUS

Optimizing production processes and improving product quality at Bostik's Roosendaal site

The decision to industrialize the use of handheld barcode scanners to check raw materials used in the composition of glues produced in Roosendaal (Netherlands) was made based on a POC. Employees were very much involved in the project, testing the scanner at different stages in the design phase. Additionally, this digital tool reduces the arduousness of work and lets employees focus on more value-added tasks.

The scanners will be introduced at other Group sites with support from Roosendaal teams.

4.4.1.3 PERSONAL DEVELOPMENT AND TRAINING

Arkema emphasizes the three fundamental areas of recruitment, training and career management to ensure employee development and the Group's sustainable growth.

4.4.1.3.1 Recruitment/Employer brand

The Group's recruitment policies are designed to attract talented, highly skilled individuals to support its growth and workforce renewal. In keeping with core values of simplicity, solidarity, performance and accountability, Arkema attaches a great deal of importance to finding applicants with cultural awareness, teamwork skills, a solutions-driven approach and an entrepreneurial spirit.

BREAKDOWN AND CHANGE IN THE NUMBER OF RECRUITMENTS BY REGION

	2019	2019	2018	2017
France	23%	366	393	364
Europe (excluding France)	16%	260	252	254
North America	27%	437	528	463
Asia	25%	403	533	438
Rest of the world	8%	127	127	97
GROUP TOTAL	100%	1,593	1,833	1,616

In 2019, Arkema hired 1,593 people under permanent contracts, compared with 1,833 in 2018 and 1,616 in 2017.

The geographic distribution of recruitments shows that Asia and North America remain the most active regions, in line with the Group's expansion in Asia and the higher employee turnover in both regions.

To achieve its goals and enhance its reputation while enlarging its international perspective, Arkema designed a global employer brand that is heightened through local actions. The slogan "Go Beyond Your Discoveries" establishes the Company's talent acquisition strategy on three main pillars.

1) Gain recognition from young talent as a responsible, preferred employer

In order to strengthen its reputation worldwide and continuously replenish its pool of potential job candidates, the Group nurtures special relationships with the best educational and training institutions for all its professions. In 2019, Arkema led a vast campaign to build

relations with schools in France and Asia, particularly in China. In France, China and the United States, Arkema's teams participated in 81 forums, organized 166 visits to industrial sites, research and development centers or showrooms, and maintained partnerships with 33 schools or universities. The purpose of special events such as these is to forge close ties between Group employees and students. In 2019, some 500 apprenticeship participants or interns and 18 IVB participants joined the Group. They also provide the opportunity for Arkema to present its products to students and young graduates, regardless of their area of expertise or background, to attract and retain them for the long term.

In 2019, Arkema, in its capacity as sponsor of the FIFA Women's World Cup in France, gave students from partner schools the opportunity to attend matches. About 100 students, mostly women, benefited from the initiative. This offered Arkema a way to develop its reputation, resulting in an increase in its visibility in the media. The FIFA Women's World Cup was also an opportunity to raise the company's profile among young people and to show

the importance attached to the development of women in both sport and industry.

In 2019, Universum, an employer branding leader, published its survey of engineering students in France, who ranked Arkema an “attractive employer”, where they would love to work.

2) Attracting the best talent through employer branding

To support its growth, Arkema takes a proactive approach, in line with its diversity policy, to attract talent from a variety of backgrounds, and promote gender diversity. The Group uses various channels, including social media, to communicate externally about the Group, its products and its wide range of jobs.

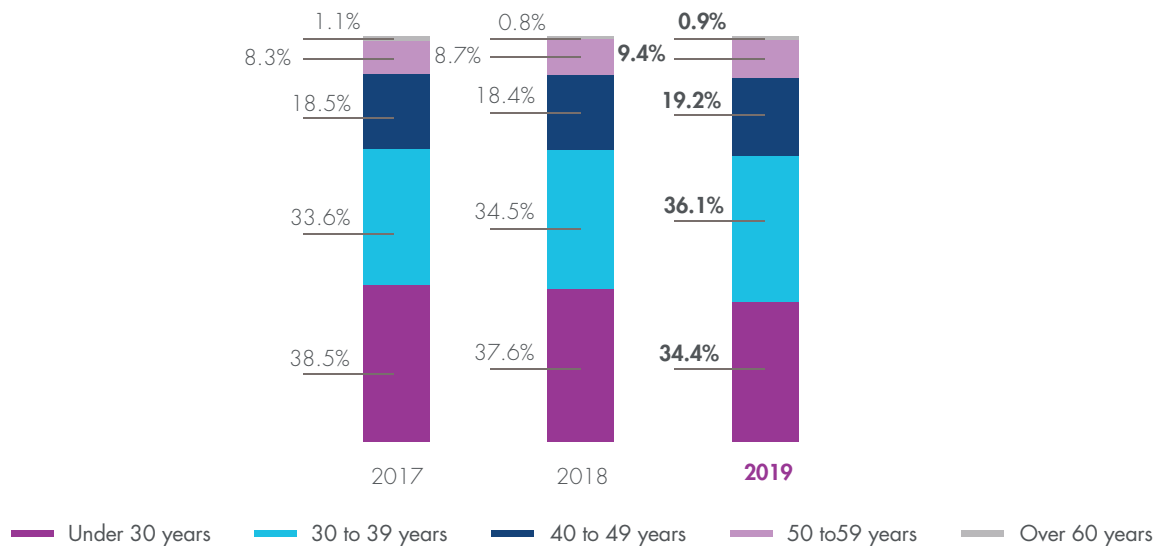
In 2019, Arkema developed new visuals to support its employer branding campaign at global level. The visuals highlight the value of Arkema employees at every level in the organization, to

provide an accurate picture of their job and encourage different types of candidates to apply. These images are also a way to combat stereotypes and convince potential applicants from diverse backgrounds that they could enjoy a rewarding career at the Group.

These actions are carried out on social media such as LinkedIn, Facebook and Twitter, giving the internal network of ambassadors the opportunity to interact directly with applicants. On Glassdoor, the Group boasted an attractive international rating of 3.7 out of 5 at the end of 2019.

Arkema takes steps to ensure the global coordination and centralized management of job applications. By implementing its new HRIS (Human Resources Information System) worldwide, recruiters can coordinate their actions to bring the Group top skills and diverse profiles that can support Arkema in its long-term development.

RECRUITMENTS UNDER PERMANENT CONTRACTS BY AGE GROUP



Recruitment practices within the Group are designed to provide the skills and expertise that the technical, sales and administrative professions need. People under 40 have accounted for an average of more than 70% of total recruitments over the last three years. This illustrates the initiatives that have been in place for several years to proactively respond to the wave of retirements projected over the next ten years.

RECRUITMENTS UNDER PERMANENT CONTRACTS BY AGE GROUP AND GENDER IN 2019

	Male	Female
Under 30	392	156
30 to 39 years	419	156
40 to 49 years	209	97
50 to 59 years	111	39
Over 60 years	12	2
GROUP TOTAL	1,143	450

The high proportion of women under 30 out of the 450 women hired at the Group reflects its employer branding policy to promote awareness and appeal among young female graduates.

3) Welcoming and integrating new employees

Arkema guides its new employees, which account for nearly 10% of the Group's headcount, through the integration process so that they can rapidly become operational.

In 2019, onboarding procedures, including the orientation process adapted to each type of position, was reviewed based on best practices and will be rolled out at Group level in 2020.

Managers are highly involved in integrating new members of their team. They work with the employee's direct manager upstream to make sure the new hire is given time to gain an understanding of the Company and the local site.

The integration toolkit contains a welcome pack and valuable information about the global integration process and timeline.

The entire program is outlined and set out in the Integration Passport, which is then given to the new hire.

Managing departures

The actions described above have been implemented to hire new employees and help make up for departures. The action plans outlined in sections 4.4.1.3.2 and 4.4.1.3.3 of this chapter in the areas of training and career management round out the recruitment policy.

The breakdown of Group employees by age group in section 4.4.1.1 of this chapter shows that a significant number of Arkema employees will retire over the next few years.

CHANGE IN THE NUMBER OF RECRUITMENTS BY REASON

	2019	2018	2017
Resignations	945	1,004	862
Retirement	285	330	321
Dismissals	342	322	332
Other reasons	169	196	190

In the event of a reorganization or restructuring that leads to the closure of workshops or sites, Arkema endeavors to offer the staff members concerned adapted solutions, such as internal or external redeployment and retraining.

A third of dismissals in 2019 were on economic grounds. They were the result of workshop reorganizations, which

mainly affected the Bostik activity (United States, China, United Kingdom and Turkey). The employees concerned received support measures.

Dismissals for personal reasons represented 1% of the total workforce.

CHANGE IN EMPLOYEE TURNOVER

(as a %)	2019	2018	2017
Turnover	4.8%	5.2%	4.6%

Employee turnover, defined as resignations as a percentage of employees under permanent contracts, stood at 4.8% in 2019, close to the 2017 level and down slightly compared with 2018. The decline is attributable to a drop in the number of resignations. This trend is especially positive insofar as the Group is currently broadening its footprint in geographies (Asia and the United States) and specialty business sectors where turnover is generally higher. These figures fall within the industry average.

Note that resignations concern the managerial and non-managerial categories in proportions close to their respective weighting in the workforce as a whole.

4.4.1.3.2 Training policy

Arkema seeks to offer training that meets the needs of the Company and its employees. It also strives to ensure the relevance and effectiveness of the resources provided, in order to optimize the time and money invested. In 2019, safety, health, environment and quality (SHEQ) training and business training accounted for 42% and 44% of the training hours provided in the Group, respectively. Management-related training allowing employees to progress to managerial responsibilities represents nearly 10% of the total.

CHANGE IN TRAINING HOURS (EXCLUDING E-LEARNING)

	2019	2018	2017
Percentage of employees having attended at least one training course during the year	86.1%	92.7%	85.0%
Average number of training hours per employee per year	25	25	25
Average number of training hours per manager	24	nd	nd
Average number of training hours per non-manager	25	nd	nd

The Group's total number of training hours was 462,769, a slight increase compared with 2018 (+1.3%). 86% of the workforce attended at least one training course. The decline compared with 2018 can be ascribed to the establishment of institutes (Business institute and Management institute) with more specialized educational content intended for specific target populations.

Professional training concerns all employees regardless of their job, level of responsibility or age. This is why the Group has reaffirmed its desire to provide every employee with access to lifelong learning in the course of their career at Arkema, as shown by the number of training hours in each job category.

In France, the quality of training modules is assessed via questionnaires that are completed by participants at the end of each session, which are then used to generate feedback reports.

In addition to these quality assessments, certain training modules include checks to ensure that participants are able to put their new skills into practice on their own. For example, production line operator training is carried out in stages under a formal process that covers both the program content and subsequent validation of results. This ensures a real ramp-up of skills and performance, allowing employees to access promotions and internal mobility opportunities, and enabling the Group to develop employee loyalty and heighten performance. This approach also meets the standards required by the Arkema management system.

Training programs can culminate in job progression or rises in grade or coefficient that are conducive to career advancement.

Global Group-wide programs are delivered through two training institutes. In addition to these courses, each entity defines its own training programs based on local needs.

Business institute

These business "academies" are development programs focused on meeting strategic business objectives. Training sessions are led by internal and external instructors to share experience and best practices, standardize processes, enhance professionalization and build skills. The academies already deployed include:

- the Sales Academy, which was set up in early 2018 to support sales teams worldwide. It supports the development of the Group's sales strategy, as well as the implementation of a CRM (Customer Relationship Management) application. In 2019, 26 sessions held on three continents resulted in nearly 80% of the target workforce being trained;
- the Supply Chain Academy, created in 2018, held its first sessions for managers in Europe and Asia. In 2019, three sessions resulted in nearly 40% of the managers concerned being trained;
- the Safety Academy created nearly 10 years ago to educate all employees about the importance of occupational safety.

A Procurement Academy was set up in 2019 and prepared for rollout in 2020.

An IT Academy is currently being developed to help professionals from this technical field keep up with the technological and digital transformation.

Management institute

The Group has established three management programs:

- the Arkema Leadership Academy is designed for middle managers with high development potential. Training focuses on leadership, allowing managers to analyze their profile individually and take an active role in their professional development. The program is led by HEC in Europe and Asia, and by Cornell university in the United States;
- the Arkema Executive Academy is aimed at experienced managers capable of taking on positions of responsibility within the Group. In a single session bringing together employees from around the world, the aim is to provide participants with the resources necessary to develop their skills as future leaders;

- the Top Executive Academy was created for around 100 executives and is based on internal and external master classes on negotiation, internal control, international business, career management, innovation, legal affairs, digital technologies, CSR, leadership, and finance. At the end of 2019, all managers had begun this training course.

FOCUS

Management training to drive internal promotions

These programs have provided Company managers with the skills they need to take positions of responsibility, thereby promoting their development. In 2019, 75% of vacancies for senior management positions were filled internally.

Internally developed training programs

The Group encourages employees who are experts in their field to become an in-house authority and instructor. Subsidiaries in the United States and China have implemented about 15 training modules in diverse areas that are perfectly adapted to employees' needs. These initiatives promote the transfer of skills and highlight the value of instructors' expertise. In this area, nearly 300 training sessions were conducted internally, attracting some 3,500 trainees.

This type of training provides a way for the Group to offset the risk of losing skills due to the high number of retirements expected in coming years.

E-learning is used to provide employees with a basic set of behaviors and practices to adopt worldwide in fundamental areas such as business conduct and safety. Three modules were added in 2019 on facility maintenance.

	2019	2018	2017
Number of employees having taken an e-learning course	9,517	9,403 ⁽¹⁾	10,496
Percentage of employees having taken at least one elearning course during the year	51%	51%	55%

Numbers in safety-related e-learning courses have edged down in favor of courses related to the environment.

4.4.1.3.3 Career management

Career management, a cornerstone of the Group's human resources development policy, aims to diversify the experience that employees acquire along their career paths and thereby cultivate new skills, this being an essential factor in the Group's development.

This process therefore focuses on both:

- ensuring that the Group has the expertise it needs to secure its successful development, today and over the medium term; and
- helping employees build their careers thereby enabling them to increase their skills and realize their career goals based on the potential and opportunities available within the Group.

FOCUS

Community for Marketing Excellence

The Community for Marketing Excellence was created by Arkema's US teams to enhance the knowledge and develop the skills of the Group's marketing employees. The modules were designed and led in-house. About 15 modules are currently available and focus on a range of areas. New modules were added in 2019 to cover digital technology applications in marketing. The entire program can be accessed via the HRIS tool. Each marketing employee is recommended to take at least three sessions a year.

Number of employees who took an e-learning course

Arkema's development of digital tools for use by employees resulted, very early on, in the expansion of its training offer to include easy-to-use e-learning modules, particularly for courses on safety and corporate subjects. The expanding curriculum currently consists of around 20 modules in French and English and sometimes in Chinese, German or Italian, depending on the course. These training courses are easily accessible to nearly all employees, most of whom now have a log-in and access to a computer, which makes for ease of enrollment.

(1) This amount corrects the figure indicated in the 2018 reference document following the detection of double counting of participants in certain e-learning modules.

The employee career management process is handled:

- at the Group level for managers in France and grade 15 jobs and higher internationally; and
- by the career managers network in each country or facility for operational, administrative, technical and supervisory employees.

The career management policy is based on the same principles regardless of employee category, country, age or gender, as follows:

- providing each employee with the resources and support he or she needs to manage every phase in his or her career;
- leading a proactive promotion-from-within policy;
- identifying and developing high-potential individuals to encourage them to take on greater responsibilities and support career development;
- encouraging mobility between subsidiaries and geographical areas; and
- enabling every employee to move up in the organization and enrich his or her experience and skills, while ensuring organizational flexibility.

Career management tools

To conduct its business activities with the expected level of performance and prepare for the future while helping its employees meet their goals, Arkema uses a range of career management tools and processes.

ANNUAL PERFORMANCE REVIEWS

All of the Group's employees have the opportunity to discuss their situation with their direct manager in an annual performance review.

The Human Resources Information System (HRIS) tool implemented worldwide at Arkema in 2019 is used to perform these reviews using an electronic format, meaning that information can more easily be shared within human resources and internal mobility can be monitored.

The tool is based on the feedback given to participants after their self-assessment has been compared with those of their manager and their manager's manager. This system provides input for preparing personalized action and improvement plans involving specific guidance or training.

In addition, 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 professions. In France, several assessment points mark out the course of an employee's career. For example, the Carrefour 35 meeting is organized mainly for employees around the age of 35 to encourage them to consider where they would like their career path to lead them, particularly within the Group. The individual experience assessment addresses employees around the ages of 50 to 55, to help them enhance their skills while actively passing on their knowledge to others.

Employees working in matrix organizations receive a review from both their direct and their cross-cutting supervisors. The HRIS application is used to structure this practice.

JOB EVALUATION

Arkema has been using the Hay job evaluation method and applies uniform criteria to measure job demands and assess challenges. This system is used by organizations to classify and rank positions within its structure using a common language across different countries. By applying uniform criteria, the Hay method promotes equal opportunity in an objective manner.

In addition to being used as an instrument for horizontal and vertical career development within the Group, these evaluations enable comparisons with other organizations in the industry.

Together with the Hay method, the Matrix assessment is used by career managers to measure expertise (skills, reach, innovation capability).

CAREER COMMITTEES

Various people within the organization are involved in employee performance appraisals to ensure the collective efficiency of teams and a clear, objective and fair basis for internal promotion.

Each site sets up its own career committee, which brings together management committee members, career managers and the human resources manager every two months to cover all employees regardless of job category.

Career committees are also organized by type of job to plan intersite mobility and assess Company requirements, then map out career paths and renew the talent pool accordingly in order to meet those needs.

PEOPLE REVIEWS

As the Company and its businesses continuously evolve, the organization must identify the right talent and support them. Career managers and operational managers conduct people reviews to boost employee development and loyalty in such a way that also works towards meeting the Group's future needs.

These annual collaborative reviews are used to examine career path scenarios for employees likely to move on to positions of responsibility and/or develop professionally.

Every year, key people within each level in the Group's organizational hierarchy draw up a list of high-potential employees within their teams. Based on an in-depth assessment and overview, heads of corporate departments and Business Lines, career managers and operational managers work together to select a pool of high-potential talent.

Following the people reviews, career managers set forth an individual career development plan, which is rigorously monitored and adjusted if and when necessary.

On a global scale, operational managers and career managers regularly review geographic mobility options for employees looking for this type of opportunity.

SUCCESSION PLANNING

Given Arkema’s industry and the technical nature of its businesses, succession planning covers all levels and professions within the organization to ensure that key roles can be filled while maintaining the same level of expertise. The list of different positions in the Group is matched with a selection of potential candidates, who engage in a career development plan supported by various internal processes.

International experience

Arkema, which mainly operates in Europe, North America and Asia, is actively pursuing an international job mobility policy designed to ensure that it has the skills and capabilities it needs at all its sites, and to broaden employee skills by offering them opportunities to work in different environments.

The number of Group employees working as expatriates, for an average of three years each, is around 100, reflecting the Group’s priority focus on promoting or hiring locally whenever possible, including for executive or high responsibility positions.

Four programs aligned with the different international mobility objectives are available:

EXPERTISE

This program enables employees who are contributing to implementing strategic Group projects in a country where the requisite skills are not yet available to gradually transfer those capabilities to local employees.

DEVELOPMENT

This program concerns employees who are going to take up a position in their area of expertise for a set period (on average three years) in a country where similar capabilities exist locally, with the goal of broadening their skills and returning home with their newly acquired experience.

INTERNATIONAL

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

TALENT PROGRAM

Introduced in 2016, this program offers an international experience to talented junior employees identified after being hired for an initial position or completing an IVB contract with the Group.

4.4.1.4 EMPLOYEE ENGAGEMENT AND WELL-BEING

We believe that employee engagement and well-being at work are key factors to ensure the Group’s long-term efficiency. The materiality assessment conducted in 2019 and described in section 4.1.6 of this chapter confirms the importance that both internal and external stakeholders attribute to this area. The Group firmly believes in developing open dialogue with

employees to continuously improve the quality and safety of the work environment, and the relationship employees have with their job, along with work atmosphere and organization.

Employee engagement and satisfaction

Europe

Arkema periodically carries out internal surveys in particular to assess employee satisfaction and engagement and to identify appropriate action plans.

In 2018, Arkema conducted an employee opinion survey among its teams in the main European countries, excluding Bostik. Covering 70% of the Group’s workforce in Europe and 38% of all Group employees, the survey focused on three main themes: daily work life, support from Arkema, and relations between Arkema and the employee. The response rate was 60%, representing a very satisfactory level of coverage.

The results were very positive, as demonstrated by the Net Promoter Score (NPS). The most commonly used indicator in this area, the NPS measures on a scale of 1 to 10 how likely employees are to recommend their company to others. The very high score achieved by Arkema (20) reflects employees’ attachment to the Company.

The findings were analyzed in detail for each entity and shared with employees. In 2019, they were used to prepare action plans on internal communication about professional opportunities within the Group.

In China

In 2019, a similar survey was conducted in China, which represents 14% of the Group’s workforce. This survey covered broad themes, and employees responded expressing a high engagement rate and strong sense of pride and belonging. All Chinese subsidiaries participated in the exercise, involving 2,900 employees, of which 27% women. Management supported and promoted the survey to encourage employee involvement, resulting in a high response rate of 93%.

United States

In 2019, the Group conducted a survey of some 4,000 employees based in North America and Brazil. It focused on 15 different themes, with an emphasis on safety, corporate culture and employee engagement. The response rate was 86%.

In the past three years, no fewer than 71% of Group employees have been able to express their opinion and 80% of them are actively engaged.

Work/life balance

Arkema intends to remain a great place to work. This is essential to employee well-being and performance, but also in retaining

talent and increasing the Group's attractiveness for candidates, which all contribute to Group performance.

The main ways in which the Group helps employees achieve better work/life balance are flexible work arrangements, support for working parents, and improvement of the work environment.

Arkema uses collaborative working methods, thus encouraging teleworking to provide employees with greater flexibility in their work/life balance. As stated in section 4.4.1.2 of this chapter, almost 14% of the Group's employees telework, which is a high proportion in view of its industrial activity.

Another advantage offered to young parents to safeguard their work/life balance is paternity leave granted with the birth or arrival of a child. Arkema confirms the importance it gives to parenting by maintaining the employee's full pay during the leave period. This measure applies to many employees across Europe.

Mobile technology has significantly changed the Group's work methods and practices. Keenly aware of the importance of using these devices responsibly to promote the well-being of people within the organization, Arkema has taken measures in France to raise employee awareness about how to use and behave with mobile technology:

- information brochure on the use of portable devices and email management;
- awareness weeks organized for all employees: self-assessment questionnaires on practices, expert insight and practical tips; and
- awareness training for managers.

Pleasant and friendly workspaces significantly contribute to employee well-being.

Following the redesign of the work environment at the head office of Arkema China Investment in Shanghai, the initiative was applied to the Bostik head office in Colombes, near Paris. The project not only consisted in designing an open space office for all employees, but also integrated new collaboration and work methods, such as a zero paper policy.

The initiative was led in cooperation with employees to garner their support for the project. Other actions were taken (workshops, group discussions, tours) under the Smart Move program to guide employees through this change.

Many factors were taken into account to enhance employee comfort: a selection of sound-absorbing flooring and ergonomic equipment for a pleasant and luminous workspace design.

A quiet room was set up on every floor. This room is to be used by employees who temporarily need a break from the open space area.

A few weeks after settling into the new offices, Bostik organized workshops where employees could express their opinion about the setup. Among the takeaways from these discussions, teams

now feel closer to each other and have fast access to important information.

Actions taken to prevent psychosocial risks and to improve working conditions

Actions have been taken in stress prevention since 2010. Stress is measured on an individual basis, as part of the regular occupational medical checkups, and once a year statistically to support sectors with high levels of stress.

An ergonomics program was initiated in 2015 to improve different aspects of working conditions in both manufacturing and services. The program has been deployed in France and will be extended to other countries where the Group operates.

Arkema also actively raises employee awareness about excessive digital use. Its current campaign on hyperconnectivity is mainly being led in France, with a "digital etiquette week".

FOCUS

Campus

In 2019, a well-being space was created at the head office in Colombes. The Campus is an original hub for employees designed to facilitate collaboration between teams and stimulate creativity and innovation. The space includes both informal workspaces and areas for relaxation, providing employees with a pleasant environment that enhances their quality of work life.

The Social Club initiated in China is another example of initiatives taken to improve well-being in the workplace. A wide range of sports and leisure activities is available for employees. This contributes to their fulfillment and well-being, while encouraging them to talk to each other as equals, without regard for their position in the hierarchy. These actions reinforce employees' feeling of belonging and make a positive contribution to the subsidiary's social life.

This set of initiatives is a factor in the decline in turnover seen in 2019 (see details in section 4.4.1.3.1 of this chapter).

Absenteeism

Absenteeism, which includes sickness, accident and maternity leave, as well as strikes and unpaid leave, stood at 4.2% for 2019, up compared with 2018 (3.9%). This trend has various origins depending on the geographies where the Group operates. For instance, the number of hours of absence for maternity leave has increased in China (where 75% of female employees are under 40); in Germany, the counting of certain hours of absence authorized by the chemical collective agreement has been

modified for certain establishments. The rate of absenteeism for medical reasons is stable at 2.8%.

For further details, see section 4.5.4 of this chapter.

Benefit schemes

In most countries in which the Group operates, employees are covered by mandatory public schemes addressing risks related to death, disability, work incapacity, pensions and healthcare costs.

In addition to this statutory coverage, Group entities in France and abroad are responsible for implementing and updating health, welfare and employee benefit schemes, with a preference for defined contribution plans in line with local requirements and practices. 95% of Group employees accordingly receive supplementary life cover, 90% supplementary disability cover, and 80% health insurance cover.

4.4.1.5 A MOTIVATING AND COMPETITIVE COMPENSATION SYSTEM

A key component of the Group's human resources policies, total compensation is designed to recognize and equitably reward each employee's contribution to Arkema's success.

The compensation structure comprises a fixed base salary, an individual bonus and a collective bonus, which are applied differently depending on the position and the country. This structure fulfills a number of objectives:

- compensate individual and collective performance;
- enhance each employee's awareness of his or her responsibilities and involve everyone in meeting objectives;
- offer fair compensation consistently across the organization; and
- manage costs.

36% of employees receive some form of individual bonus, the amount of which depends on their fulfillment of personal objectives and their contribution to the collective performance of a business, a country organization or the Group. A significant portion of their bonus depends on safety or other CSR objectives.

73% of employees are eligible for some form of collective bonus, which gives them a stake in the Group's expansion and financial performance. This is the case for the incentive and profit-sharing schemes in effect in France.

Group companies regularly participate in compensation surveys organized by specialized structures. They have access to benchmarks used to position them on their geographic market, as against other industrial groups or within the chemical industry, and measure compensation attractiveness.

All employees benefit from minimum compensation guarantees, and are paid on time, in full and without any deductions.

Total payroll costs for 2019 and previous years are presented in note 27 to the consolidated financial statements, in section 5.3.3 of the 2019 Universal Registration Document.

Equal pay between men and women

With an average proportion of women on its payroll of 25.3%, which is steadily increasing, the Group did not wait for mandatory regulations to make equal pay a key factor in annual salary and career reviews at all Group companies.

In France, Arkema France and Bostik publish their gender equality scores, as required by law. For 2019, the figures are respectively 88 and 83.

In addition to equal pay, Arkema has for many years ensured that women enjoy the same career development opportunities as their male counterparts.

Its policy aims to meet the following four objectives:

- strengthening the principle of non-discrimination in the hiring process;
- ensuring equal pay for equal work;
- encouraging and facilitating career development; and
- taking parenthood into account in the career management process.

Employee share ownership

Since its creation, Arkema has encouraged employee share ownership, with plans offered every two years in the Group's main host countries to enable employees to purchase Company shares on preferential terms.

The participation rate has increased over time, with the most recent offering in 2018, to an average of 41% (close to 70% in France and 25% in other countries), and the average amount invested by employees reached €6,950 in 2018.

The sums invested are frozen for five years, in return for a 20% discount on the subscription price in relation to the reference price. At 31 December 2019, almost 40% of employees shares were available.

These figures reflect the employees' engagement and their confidence in the Group's development. At 31 December 2019, 6.3% of outstanding shares were owned by employees, collectively making them one of the Company's leading shareholders.

For further details, see section 6.2.7 of the 2019 Universal Registration Document.

Performance shares

Performance shares are granted, as decided each year by the Board of Directors, to executives and employees who have demonstrated remarkable performance or whom the Group wishes to incentivize and involve more closely in its long-term development. In 2019, performance shares were granted to some 1,500 beneficiaries, representing 7.4% of the total headcount.

For more information, please refer to section 3.5, section 6.2.6 and note 29 to the consolidated financial statements at 31 December 2019 in section 5.3.3 of the 2019 Universal Registration Document.

4.4.1.6 DIVERSITY, EQUAL OPPORTUNITY AND EQUAL TREATMENT

Diversity and equal treatment policy

As part of its policy of non-discrimination, workplace equality and diversity, the Group commits to promoting the elimination of all forms of discrimination in its operations, and to hiring people solely on the basis of its needs and each applicant's personal qualities, as defined in its Business Conduct and Ethics Code and its human resources policy memo. These principles feature in the Group's recruitment charter.

Workplace equality is one of the major priorities of the Group's human resources policy, along with the prevention of discrimination in general. Special attention is given to ensure gender equality in the workplace, facilitate the integration of employees with a disability and prevent discrimination on the basis of age, nationality or mandate as employee representative. Measures put in place to ensure equal opportunity and obtain quantifiable results include:

- a program that periodically revises job descriptions to ensure that they are non-discriminatory and consistent across each profession, with a particular focus on accurately describing the related tasks and responsibilities. In addition, the positions, job titles and requisite profiles are reviewed once a year, department by department;
- recruitment policies based on the sole criterion of suitability for the job. In the United States, for example, Arkema Inc. gives training to people involved in the recruitment and hiring process, provides them with job descriptions and applicant profiles, and remedies any situation where there is a significant underrepresentation of minorities or women in the workforce. In France, human resources managers receive training on the prevention of discrimination during the recruitment process;
- certification training courses: certain training modules include checks to ensure that participants are able to put their new skills into practice on their own. For example, production line operator training is carried out in stages under a formal process that covers both the program content and subsequent validation of results. This ensures a real ramp-up of skills and performance, allowing employees to access promotions and mobility; and
- an annual review of compensation to ensure equal pay.

The strategic objectives set by the Group for 2025, to increase the percentage of women and of non-French nationals in senior management and executive positions, reflect its efforts to support diversity in carrying out its business activities.

A Diversity Steering Committee made up of heads of Business Lines and corporate Vice-Presidents works to promote and

implement initiatives that support diversity. Building on existing actions, a "Managing in diversity" training module was created in 2019 and will be rolled out further in 2020.

Measures to promote female employees' access to positions of responsibility

Although historically not many women have worked in the industry, the proportion of women in the Group's total headcount has steadily increased to 25.3% at 31 December 2019. Women accounted for 28.2% of new hires across all levels in the organization, but they remain under-represented in senior management.

2025 TARGET

23% to 25% of senior management and executive positions to be held by women.



In 2019, women accounted for 23% of all senior managers and executives across the Group, compared with 21% in 2018. The change is primarily the result of the support program introduced in 2016 to promote equal opportunity and gender diversity.

Senior managers and executives are considered as high responsibility positions. They account for about 10% of Group managerial employees and 23% of them are women.

During the annual review of human resources issues carried out by the Board of Directors, the number of women on the governing bodies is always examined very closely. The goal of increasing the proportion of women in senior management and among managers by 2025, defined as a priority in 2015, is the response given to this challenge. Within senior management and among managers, which constitute a pool for governing body members, support for women's careers is regularly examined by *ad hoc* committees.

Women hold 34% of lower management positions and about 30% of middle management positions. The action plan to reach the 2025 target involves:

- a mentoring program run by senior executives to help women move into positions of responsibility. This program has benefited around 50 women in France over nearly three years, and is now being expanded internationally. 90% of them have enjoyed career development since their mentoring, for the most part a promotion to a position with greater responsibility;
- introducing career workshops designed in particular to encourage women to maintain their career goals. The workshops were introduced in 2018 and provide a forum for managers seeking to reflect on their career paths;
- identifying women in key positions in other businesses or organizations to create a pool of female talent for future recruitment needs; and
- carrying out communication and awareness campaigns within the Group.

Measures to foster international diversity

Developing the percentage of non-French nationals in management positions is a key component of the Group's geographic growth strategy. The Group has therefore set the following target for 2025:

2025 TARGET

42% to 45% of senior management and executive positions to be held by non-French nationals.

In 2019, 40% of senior managers were non-French nationals, compared to 39% in 2018.

In every country where Arkema operates, local skills and capabilities are developed in every aspect of the business, including top management.

The action plan involves:

- expatriation programs (for further details, see section 4.4.1.3.3 of this chapter) and more specifically the "Talent Program" for the most junior employees;
- training for managers on "working in an intercultural environment";
- manage diversity; more than 200 employees were trained in France in 2019, and the program is to be rolled out in Europe in 2020.

Measures to promote the recruitment of people with disabilities

One of the flagship commitments of the Group's disability policy is to hire and maintain the employability of people with disabilities, through dedicated training programs and workstation modifications. In addition, the Group's recruitment procedures make it possible to offer disabled talents various job opportunities.

The measures taken in France illustrate the approach implemented by the Group. For the other regions, similar measures have been implemented taking into account local conditions and legislation.

At the end of 2019, disabled employees accounted for 4.3% of the Group's workforce in France.

A new, four-year agreement was signed by Arkema France in 2017 reaffirming the Group's commitment to hiring, integrating, training and retaining disabled employees, raising awareness of the issue and increasing the use of social enterprises and work centers.

In the United States, to encourage diversity in hiring, Arkema Inc. vacancies for outside applicants are posted on job search sites designed for people with a disability and emailed to local community organizations that help people with a disability find employment.

Measures to hire and retain seniors

In France, the issue of recruiting and retaining seniors is included in the strategic workforce planning (SWP) agreement. "Seniors" are defined as people over 50 years old. The Group pledged to undertake initiatives in the following areas:

- recruitment: 10% of permanent contracts for people aged 50 and over;
- retaining senior employees;
- supporting career-endings;
- transitioning to retirement; and
- knowledge transfer.

In 2019, 31 of the 366 people hired under permanent contracts in France were over 50 years old, representing 8.5% of the total.

4.4.1.7 ACTIVE SOCIAL DIALOGUE WITH EMPLOYEE REPRESENTATIVES

The Group respects the fundamental freedoms of its employees, such as the freedom of association and expression, protects their personal data and respects their privacy, as defined in its Business Conduct and Ethics Code.

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, in addition to complying with host country legislation, the Group facilitates employee representation in order to support suitable collective bargaining processes. 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.

Arkema pledges to enforce a non-discrimination policy with regard to employee representatives, and to respect and protect their rights.

The social dialogue organization

As part of its employee relations policy, the Group fosters ongoing dialogue with employee representatives in every entity, in accordance with local cultural norms and legislation.

At the European level

The social dialogue body is the 24-member European Works Council, which holds a one-day plenary meeting every six months to discuss issues within its remit, including:

- business issues: market trends, commercial situation, activity level, main strategic priorities, growth outlook and objectives;

4 CORPORATE SOCIAL RESPONSIBILITY

Open dialogue and close relations with stakeholders

- financial issues: review of the consolidated financial statements, annual report and investments;
- labor issues: human resources policy and the employment situation and outlook;
- environmental issues: Group policy and emerging European regulations; and
- organizational issues: significant changes in the Group's organization, developments in the businesses and the creation or termination of operations affecting at least two European Union countries.

In 2019, three plenary sessions were held at Arkema's head office.

In the United States

Employees at unionized facilities are covered by collective bargaining agreements negotiated with local and national trade

unions for an average period of three years. They deal with such issues as compensation, the safety of people and processes, and quality of work life.

In China

An Employee Representatives Congress of Arkema China Investment Co. Ltd, the Group's main local subsidiary, is in place. It currently has 34 members. The ERC has a broad remit, ranging from pay negotiations to safety and training. It complements the labor unions already in place at the Group's local production plants.

Around the world, a high percentage of employees were represented by elected bodies or unions in 2019, as shown in the following table.

PERCENTAGE OF EMPLOYEES REPRESENTED BY ELECTED BODIES AND/OR UNIONS, BY REGION

	2019*
GROUP TOTAL	91%
France	100%
Europe (excluding France)	93%
North America	78%
Asia	84%
Rest of the world	100%

* Data corresponding to sites employing more than 60 people, which accounts for 90.6% of the Group's total workforce.

Employee relations with regard to the Group's development

When a reorganization project is approved and implemented, in-depth discussions are held with the representatives as part of information and consultation procedures, both at corporate level and locally. Similarly, much attention is paid to responding responsibly to the social impact of these changes.

Collective agreements

Since the Group was founded, its collective bargaining policy has led to the signing of a wide range of agreements in each facility or company.

In France, some agreements are Group-wide and therefore applicable to every Group company in the country, while others have been negotiated only for a given company or facility.

The implementation of social and economic committees in France was completed in 2019.

In other countries, collective bargaining procedures are aligned with national employee representation practices and legislation.

Negotiations are designed to raise the social status of employees in correlation with the Group's development and with the macroeconomic and legal environment.

In recent years, health and well-being in the workplace have been extensively discussed with labor representatives. For example, teleworking was extended to industrial sites, for certain positions, in 2019. An occupational health framework agreement was signed at Arkema France to continue to improve employee health and implement a coordinated policy covering commitments made during negotiations. Shared indicators are monitored at the Company and entity level by multidisciplinary committees.

In 2019, 83 agreements were signed worldwide, including 24 in France.

4.4.2 Compliance and ethics

The Group places great importance on conducting its business in line with the principles and rules on compliance and ethics. As such, Arkema complies with prevailing laws, regulations and best business practices. Failure to respect these policies would expose the Group to legal or reputational risks.

In addition to complying with international conventions and host country legislation, Arkema is committed to complying with competition rules and to rejecting all forms of corruption and fraud. It also condemns and works to prevent fraud and corruption in business transactions with its partners.

4.4.2.1 THE CODE OF CONDUCT AND ANTI-CORRUPTION POLICY

The Group's Business Conduct and Ethics Code (also known simply as the "Code of Conduct"), which includes the Anti-Corruption Policy, sets out Arkema's best business practices expected of all employees at all times.

It may be downloaded from the corporate website and covers the following main points:

- employees must not offer, provide or accept, directly or indirectly, any undue advantage, be it pecuniary or otherwise, in order to secure business relations or any other business advantage. The counterparties who may be concerned include people in positions of public authority, business intermediaries, client employees and political parties;
- employees must scrupulously comply with all applicable laws relating to antitrust legislation in every country in which the Group operates; and
- employees must comply with import and export regulations.

Laying down the Group's directives on influence peddling and corruption, the Anti-Corruption Policy:

- defines corruption and influence peddling;
- provides concrete examples of behaviors to avoid that could be construed as acts of corruption or influence peddling; and
- outlines the basic set of rules relating to gifts and hospitality offered to employees.

The Code of Conduct and Policy were translated into the 12 languages of the main countries in which the Group operates and sent to all Group employees by the Chairman and Chief Executive Officer in October 2018.

4.4.2.2 MEASURES FOR REDUCING THE RISKS OF ANTI-COMPETITIVE PRACTICES, CORRUPTION AND FRAUD

Arkema has put in place a business compliance and ethics program, which primarily covers antitrust, export control and anti-corruption laws. It defines and describes guidelines, procedures and risk management processes applicable throughout the Group.

To ensure that the program runs efficiently, the following resources have been implemented:

- classroom training to build employee awareness of the need to comply with competition, export control and anti-corruption rules;
- a practical guide to competition covering rules and recommended behaviors issued to employees;
- the verification of business intermediaries prior to appointment, according to the business intermediary procedure, to minimize the risks of corruption-prone situations arising;
- systematic prior approval required for any export to countries subject to commercial or financial restrictions, according to the export control procedure;
- e-learning modules on antitrust legislation and anti-corruption, which primarily address employees most exposed to these risks. As of December 31, 2019, 6,390 employees had completed the e-learning course on corruption; and
- a compliance statement signed by all employees potentially exposed to these risks, attesting that they will abide by the Code of Conduct and comply with the procedures associated with it.

4.4.2.3 CONTROL PROCEDURES AND DISCIPLINARY ACTION

Application of the compliance program is overseen by the Compliance Committee. This committee, whose members are appointed by the Chairman and Chief Executive Officer and which reports to the Executive Committee, is made up of representatives from the following departments: Internal Audit and Internal Control, Human Resources, Sustainable Development, Industry Environmental Safety, Legal Affairs, Finance & Treasury, Taxation. It also includes a member of the Executive Committee.

It is responsible for monitoring compliance Group-wide in the following areas: antitrust laws, business intermediaries, fraud, business practices and integrity, work environment integrity and environmental stewardship. The Compliance Committee met four times in 2019.

For all practical questions regarding an ethical issue in general, and any problem in applying the Code of Conduct in particular, the Compliance Committee can be consulted either by executive management or by an employee.

In the various regions where the Group operates, the regional Vice-Presidents are appointed as correspondents to the Compliance Committee.

As part of the global risk management process, the Internal Audit and Internal Control department regularly performs audits in the subsidiaries. These include an analysis of the management processes to help detect possible risks of fraud and to define, where appropriate, the necessary corrective measures. For more information on the global risk management process, see section 2.2 of this document.

The corruption risk map, as indicated in section 2.1.2 of this document, is updated regularly so that the third-party verification process can be adapted if necessary.

Disciplinary sanctions are provided for in the Code of Conduct and the Anti-Corruption Policy in the event of a breach of either document. The details are described in the Internal rules of each entity. In 2019, one incident resulted in disciplinary action against an employee.

4.4.2.4 PERSONAL DATA PROTECTION

Arkema takes steps to comply with personal data regulations in all the countries in which the Group operates. A network of local representatives, supervised by the Data Protection Referent, is being formed to enable consistent, global management of personal data protection within the Group.

The Data Protection Referent works closely with cybersecurity teams to implement IT security measures in line with the General Data Protection Regulation (GDPR) that will protect data handled by the Group.

Since the personal data protection email address was registered, five requests have been submitted to exercise access rights, all of which have been processed.

4.4.2.5 WHISTLEBLOWING SYSTEM

The Group's whistleblowing procedures have been translated into 12 languages. Extensive communication has been deployed (email addressed to subsidiaries, signage at sites and subsidiaries, intranet posts) to strengthen the awareness of employees at all levels of the organization to these issues. The whistleblowing system enables any Group employee (or equivalent) or anyone working with the Group on an external or occasional basis (subcontractor, intermediary, supplier, customer) to report any suspected wrongdoing that might involve Arkema. It can be used to report any issues relating to the Business Conduct and Ethics Code, in particular social impacts, including health,

safety and human rights violations, environmental impacts and corruption.

The reports are handled by the Whistleblower Committee, which acts in the strictest confidentiality. The Whistleblower Committee, whose members are appointed by the Chairman and Chief Executive Officer, comprises representatives from the following departments: Internal Audit and Internal Control, Sustainable Development, Legal Affairs and Institutional Affairs.

The whistleblowing system supplements the disclosure mechanisms already available at certain subsidiaries.

Two reports were received in 2019. The first involved a human resources issue, more specifically relating to an employment contract. The second dealt with a business issue. Both reports were processed, but neither claim was substantiated. As a result, no disciplinary action was taken.

4.4.2.6 TAX POLICY

Arkema conducts industrial, commercial and service operations in many countries and communities around the world. The Group aims to contribute to the development of these communities through the payment of a tax related to the activities and functions it performs within them.

Arkema complies with the tax laws and regulations of the countries in which it operates, as well as international tax standards, in particular those developed by the OECD. To do so, Arkema relies on a tax department that has tax professionals in the countries where its challenges are greatest. In other countries, the Group's tax department calls on recognized external consultants whenever necessary to validate its practices.

The main objective of tax policy is to provide the Group with long-term legal certainty. Arkema condemns and seeks to prevent all forms of tax evasion. As such, it does not implement aggressive tax planning geared towards transferring tax bases without justification to countries with low tax rates. Neither does it create legal structures devoid of substance for fiscal reasons in such countries. None of the Group's subsidiaries is located in tax havens included on the European Union "black list" dated 7 November 2019.

Arkema applies transfer pricing policies endorsed by the OECD to its inter-company flows, and believes its policies to be reasonable in view of the risks and functions of the entities making up the Group. These policies and the corresponding practices are applied within the Group by the tax department, first, via training for the employees responsible for applying them, and second, by making documentation available to tax administrations in a timely manner, either spontaneously or on request, depending on the regulations of the country in question.

Arkema cooperates with tax administrations with integrity and transparency when being audited, and ensures the implementation of any corrective measures when the audits are completed. This approach to dialogue with tax administrations was materialized

in France by Arkema's membership of the "tax partnership" in March 2019, allowing it to have real-time exchanges on identified topics with the French tax administration so as to secure its positions.

Tax risk reporting is integrated into the risk management process and is presented annually to the Group Audit Committee.

4.4.3 Human Rights

Arkema respects human rights and fundamental freedoms, as defined in the Universal Declaration of Human Rights, and makes them central to its activities. The Group therefore makes every effort to prevent human rights violations against its employees, partners and other stakeholders and to remedy any violations that do occur.

A Human Rights Policy setting out the Group's commitment in this area was published in 2018 and deployed by all entities.

Arkema's commitment is reflected in its compliance with international standards and the applicable laws in the countries in which the Group operates, regular assessment of the risks that may be generated by the Group's activities, access to a whistleblowing system for both internal and external stakeholders, the implementation of corrective action when necessary, a policy of continuous improvement of the Company's practices through on-going process improvements and training initiatives, an assessment and dialogue program with suppliers and subcontractors, aimed at promoting respect for human rights, and transparent communication on the Group's efforts in this area.

The Group opposes all forms of forced labor, child labor, discrimination and harassment and upholds the fundamental rights of a decent minimum wage, health and safety, equal opportunities, respect for private life, freedom of association, the right to strike and the right to collective bargaining.

As a result, when preparing its duty of care plan in compliance with article L. 225-102-4 of the French Commercial Code, Arkema did not identify any serious risks of human rights violations.

The Group's vigilance in the area of human rights also applies across its value chain and more particularly to its suppliers and subcontractors. Human rights compliance is an integral part of the commitments expected of the Group's partners, expressed through their adherence to the Supplier Code of Conduct, as well as one of the criteria for assessing and managing suppliers. For further details, see section 4.4.4 of this chapter.

Awareness-raising initiatives are undertaken to enable employees, and particularly those in management positions, to respect and protect human rights in the performance of their duties. These awareness-raising initiatives are designed to give all employees a better understanding of the concept of human rights and enable them to apply the associated principles both internally and in their relations with third parties.

To meet stakeholder expectations, keep risk analyses up-to-date and remedy any violations, the Group leverages a number of resources:

- the integration of human rights issues into internal control checklists and internal audit assignments;
- an annual inventory of risks carried out across the Group's main entities by the Internal Audit and Internal Control department;
- continuous dialogue with local communities via the Common Ground® initiative; and
- a whistleblowing system for both internal and external stakeholders.

Arkema's Executive Committee is responsible for drawing up and disseminating the Group's Human Rights Policy, while the regional entities are tasked with its implementation, in compliance with the applicable laws and regulations. The CSR Steering Committee regularly takes stock of the situation, and risks relating to human rights fall within the scope of the Group's Risk Review Committee. The two committees comprise Executive Committee members, the heads of certain corporate departments, as well as managers involved in the Group's CSR policy and risk management process. The Sustainable Development Vice-President is a member of both committees and reports on the Group's CSR activity at least once every year to the Executive Committee, the Audit and Accounts Committee and the Board of Directors.

The Human Rights Policy highlights four areas that are monitored particularly closely:

- health, safety and security: programs, initiatives and results are presented in section 4.3.2 of this chapter. The progress made over the past three years confirms the validity of the approach adopted by the Group;
- health and safety of customers and end users: programs and initiatives on responsible product management are presented in section 4.2.4 of this document;
- suppliers and subcontractors: programs, initiatives and results are presented in section 4.4.4 of this document. In 2019, the scope of supplier assessments increased significantly, and initiatives were undertaken with regard to the suppliers most at risk; and
- promotion of diversity and equal opportunity: programs and achievements are described in section 4.4.1.6 of this chapter.

4.4.4 Suppliers and subcontractors

Arkema is primarily involved in the transformation of raw materials and works with a large number of subcontractors and service providers. Poor performances by its suppliers in any area, including those related to social and environmental issues, could therefore have an impact on the Group's performance and on its ability to serve its customers.

The Group has integrated employee, environmental and social issues into its procurement process and strives to build long-term, balanced and sustainable relationships that are based on trust with its suppliers and subcontractors. These relationships are managed transparently and in accordance with negotiated contractual terms, including those related to intellectual property. In its choice of industrial and business partners, Arkema favors those that respect its social commitments.

A Sustainable Purchasing Steering Committee meets at least once every three months, bringing together representatives from the Procurement departments (Goods and Services/Logistics/Raw Materials) and the Sustainable Development department. It meets at least once each quarter. The key items discussed during its meetings are reported to the CSR Steering Committee, and points covered by the vigilance plan concerning suppliers and subcontractors are submitted to the Risk Review Committee. To reduce risks and promote long-term relations with suppliers and subcontractors, the following resources have been deployed.

4.4.4.1 THE SUPPLIER CODE OF CONDUCT

The Group's responsible procurement process is guided by the ethical principles expressed in the Code of Conduct described in section 4.4.2 of this chapter. The Group has also signed the national inter-company charter of the French purchasing managers' organization and the state-sponsored inter-company mediation initiative (Médiation interentreprises), which is based on ten responsible procurement commitments. As part of this process, a dedicated Supplier Code of Conduct summarizing all of the related CSR aspects has been issued and circulated to all Group entities. In 2019, it was updated to enforce stricter practices, particularly on issues involving human rights, labor laws, health and safety, the environment, and ethics and compliance.

The Supplier Code of Conduct's guidelines particularly cover human and employee rights, respect for the environment, the quality and safety of the products and services provided, and compliance and ethics. As part of the focus on business integrity and transparency, suppliers must comply with laws governing competition, corruption, conflicts of interest, confidentiality and the transparency and accuracy of reported information. The Code can be accessed on the Group's website.

When selecting a new supplier, the Group looks for the bid that offers the best combination of performance, cost and quality, while also taking into account the supplier's CSR performance. New suppliers are systematically informed of the Code's provisions.

4.4.4.2 RESPONSIBLE PROCUREMENT TRAINING AND AWARENESS

Group buyers are all trained to apply the Supplier Code of Conduct and the CSR performance assessment process, with regular follow-up meetings to inform and maintain awareness. In 2019, sessions presenting the Group's corporate social responsibility approach were held with the procurement departments in each region. They were followed up with reminders and discussions about implementing the Together for Sustainability supplier assessment initiative.

4.4.4.3 ASSESSMENTS BY THE THREE PROCUREMENT DEPARTMENTS

The Goods and Services Procurement department has introduced a pre-approval questionnaire for suppliers that includes corporate social responsibility components. In addition, it regularly assesses the employee safety performance of the leading contractors working on Group sites. As explained in section 4.3.2 of this chapter, the safety of contractor employees is considered just as important as that of Group personnel, and their incidents are recorded in the consolidated indicator.

Logistics services contracts are awarded to transporters and warehouse operators on the basis of their safety, security and environmental performance, while highway hazardous materials transporters are selected based on third-party assessments, such as the Safety and Quality Assessment System (SQAS) in Europe and the Road Safety and Quality Assessment System (RSQAS) in China. Similarly, vessels chartered worldwide for the bulk transportation of Group products are first vetted by a third party. Inventory requirements were tightened for warehouse operators to obtain an itemized list of the Group's products in stock and their exact location in real time. Inspection processes and resources are currently being updated.

Raw materials suppliers are assessed based on pre-approval questionnaires used to assess their management system, compliance with the principles of the Responsible Care® program and certification to ISO-type standards.

FOCUS

Social performance as a factor in supplier selection

In 2017 and 2018, Arkema France assessed all of its suppliers based on Together for Sustainability criteria (see section 4.4.4.5 of this chapter) in the “electrical”, “instrumentation”, “fire detection and firefighting” and “weighing” categories to ensure that CSR performance was factored in when selecting the best suppliers. The average of the Ecovadis rating of the providers selected in this manner is 10 points above the overall average of ratings on the platform. In 2019, an audit plan was carried out for the selected suppliers, again in line with the Together for Sustainability initiative. It confirmed their very good performance in terms of social responsibility.

As a producer of high performance materials made from renewable resources, Arkema is participating in the Pragati initiative, alongside industrial partners BASF and Jayant Agro-Organics Ltd. and NGO Solidaridad. Launched in Gujarat, India in 2016, the initiative aims to provide a framework for the sustainable production of castor beans by taking into account all of the related social, environmental and economic issues. To date, Project Pragati has trained 3,000 farmers and awarded them with official project certificates. The results have been very positive and notably include a higher crop yield, improved health and safety conditions for farmers, and judicious use of fertilizers and irrigation water since the adoption of best agricultural practices in 26 villages. This project was renewed in 2019 for three years. The Sustainable Castor Association, an independent secretariat, was established to promote SuCCESS (Sustainable Castor Caring for Environmental and Social Standards), on which Project Pragati is based.

4.4.4.4 SUPPLIER AND PROCUREMENT PROCESS AUDITS

Under the Supplier Code of Conduct, suppliers agree to meet all of the Group’s CSR expectations and to cooperate with its audits of their Code compliance.

Supply chain service providers, for example, are regularly audited through visits to transportation companies and outside warehouses and assessments of their performance. These audits are supported by third-party assessments, such as the Safety & Quality Assessment System (SQAS) for overland transportation,

the Chemical Distribution Institute for maritime shipping, and the European Barge Inspection Scheme for river shipping.

In addition, every year, the Internal Audit and Internal Control department audits subsidiaries by conducting a range of tests on supplier approval and assessment processes and on the practices and risks associated with raw materials and goods and services procurement.

4.4.4.5 MEMBERSHIP OF THE TOGETHER FOR SUSTAINABILITY (TFS) INITIATIVE

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 is designed to encourage social responsibility across the chemical industry service chain, and is based on the principles of the United Nations Global Compact and the Responsible Care® Global Charter. It enables member companies to share the findings of assessments or audits of CSR performance of their suppliers or subcontractors conducted by Ecovadis or independent third parties. Ecovadis analyzes supplier documents and questionnaires on the basis of CSR criteria in line with international standards, and ensures a 360° watch on information reported by external stakeholders.

A procurement representative is specifically designated to lead the TfS drive within the Group. A TfS Steering Committee has been set up, bringing together representatives from the Procurement departments (Goods and Services/Logistics/Raw Materials) and the Sustainable Development department. It meets at least once each quarter and the issues discussed during its meetings are reported to the CSR Steering Committee and the Risk Review Committee.

At the end of 2019, more than 1,600 of the Group’s suppliers and subcontractors had been assessed according to CSR criteria over the last three years, compared with around 1,400 in 2018. The suppliers assessed account for more than 50% of the Group’s purchases. Thanks to these assessments, the Group has identified certain suppliers or subcontractors whose CSR performance is below standard and has requested that they improve their practices in this area. The resulting initiatives are tracked over time by the Group’s procurement teams in liaison with the suppliers and subcontractors in question. The results of these assessments are also taken into account by procurement teams during the supplier selection process.

In 2019, CSR scores had risen for 57% of suppliers whose assessments had been updated.

At-risk suppliers

In 2018, the Group's three Procurement departments defined criteria for identifying at-risk suppliers and subcontractors, which are those most likely to present a risk in terms of human rights, personal health and safety, corruption, or compliance with international labor and environmental standards. The criteria relate to the supplier's area of activity and its country of origin. The three departments organize the supplier assessment and audit process so that recurrent at-risk suppliers are systematically assessed and then contacted and audited if their assessment reveals unsatisfactory practices.

4.4.5 Institutional initiatives

As a responsible chemicals producer, the Group interacts with public authorities in every country where it operates, in particular to contribute to the development of legal and regulatory frameworks that are favorable to the growth of its businesses, in full accordance with its values and social responsibility commitments. As part of this process, it may take part in public debate on issues directly related to its businesses, while maintaining a position of strict political neutrality.

These public initiatives fully comply with the lobbying rules in each host country. For example, Arkema has been entered in the European Union Transparency Register and has pledged to comply with the related Code of Conduct. Similarly, in France, Arkema is registered as a lobbyist in the national digital registry of lobbyists set up in 2017, which is managed by France's High Authority for Transparency in Public Life (HATVP).

The Group is also active in several business federations or associations, such as the French Association of Private Enterprises (AFEP) and France Industrie in France, and chemical industry trade associations, such as France Chimie in France, CEFIC in Europe, the American Chemistry Council in the United States, as well as the Association of International Chemical Manufacturers and the China Petroleum & Chemical Industry Federation in China. In addition, the Group is a member of around 50 specialized

4.4.4.6 THE IMPACT OF SUBCONTRACTING

The Group subcontracts for two main purposes: for maintenance operations, and, to a very limited extent, for the production of certain finished products. Subcontracting therefore accounts for part of the €279 million in capital expenditure dedicated to safety, the environment and the maintenance of industrial units.

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

industry associations worldwide whose objectives are closely related to the activities of its Business Lines.

Employees in charge of institutional relations are responsible for monitoring public initiatives at the local, national or international level that may impact the Group and are tasked with defending or promoting the interests of the Group in this context. The priority issues addressed concern business competitiveness, both globally (i.e., at Group level, such issues as taxation, particularly on output, payroll taxes, employment law, regulation in general, etc.) and locally (i.e., at the plant level, such issues as health, safety and environmental legislation, and support for expansion projects and reorganizations), the energy and climate change transition, and the circular economy.

In the United States, Arkema Inc. files quarterly activity reports with both houses of Congress, as required under section 5 of the Lobbying Disclosure Act of 1995. Two Arkema Inc. employees have been registered as lobbyists to Congress, particularly on the issue of refrigeration gases.

Worldwide, the Group paid €3 million out a total of €4.5 million in membership fees to general or specialized industry associations and €0.4 million in consultants' fees for similar reasons, and recorded €1.1 million in related in-house expenses in 2019.

4.4.6 Corporate citizenship and philanthropy

In the 54 countries where it operates, the Group positions itself as a force contributing to the social development of the communities in which it operates, by creating and maintaining direct and indirect jobs, developing local skills and expertise, purchasing local goods and services, forming business partnerships and paying taxes.

In particular, the Group focuses on hiring locally at every level of the business, including the senior management teams of its non-French subsidiaries. In this way, more than 80% of the executives at the main operating facilities outside France were hired locally.

As seen in this document, and particularly in chapter 5, the Group's economic contribution to surrounding communities covers many items (sales, capital expenditure, operating expenses, wages and salaries and payroll taxes, income and other business taxes, dividends, etc.), which go together to shape the Group's economic and social footprint.

In addition to contributing to the local economy, the Group deploys a policy of revitalizing regional labor markets and supporting scientific research upstream from industrial innovation.

Lastly, as a responsible company in an increasingly interconnected world, the Group is particularly attentive to the need to nurture close ties with all its stakeholders. Around the world, the Group is deploying local communication initiatives to foster high-quality relationships with host communities that are based on trust. This open dialogue also helps the Group to better understand the expectations of people living in nearby communities and ensure that they are properly addressed in its CSR strategy.

4.4.6.1 SUPPORTING LOCAL COMMUNITIES THROUGH INNOVATION

The Group has a policy of supporting innovative small and medium-sized enterprises (SMEs) in related business areas through joint projects and equity investments. Each research center, for example, works closely with neighboring universities or research institutes 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 Auvergne Rhône-Alpes region in France. Since 2015, Bostik has been in partnership with the university of Warwick in the United Kingdom to develop transdermal patches made with hot melt pressure sensitive adhesives. This partnership resulted in the creation of the spinoff Medherant.

Support for small and medium-sized businesses

These kinds of local partnerships contribute to stimulating innovation, while deepening the Group's local roots. For example, at the Lacq site in France, we provide technical and infrastructure support to innovative young businesses setting up in the Chemstart'up business incubator.

It is also positioned as a key early-stage player in strategically crucial industries such as thermoplastic composite materials, renewable raw materials, new energies and 3D printing.

In 2019, Arkema inaugurated a new Global Center of Excellence for 3D printing at its Cerdato Research and Development Center in Serquigny, Normandy in the north of France. With the Normandy Region authorities as its partner, this center of excellence was created to manufacture additive powders made with high-performance polymers. It will benefit companies and training organizations in the region, as part of a collaborative initiative striving for swift adoption of these new production methods. Dedicated to printing by powder bed fusion, the center complements the Group's existing network, which comprises a center based in Exton (Pennsylvania, US) for photocure liquid resins inaugurated in 2018, and another in King of Prussia (Pennsylvania, US) for filament extrusion.

Also in 3D printing, Arkema signed two separate partnerships with SMEs in the United States. The first was with Continuous Composites based in Idaho to combine the power of composite materials with a snap-curing printing process. The other partnership was signed with the California-based company Carbon® to support the next generation of fully integrated digital manufacturing platforms.

Academic partnerships

Under its ambitious innovation policy, the Group maintains close ties with the scientific and educational ecosystems in its host regions worldwide, in particular through a wide variety of partnerships with universities and public and private research laboratories, such as the CNRS and the CEA in France. These partnerships, such as the ones in France with Compiègne Technology university for the Smart House by Arkema and with Hydro Québec in Lacq, are described in section 1.1.5 of this document.

In 2016, Arkema opened an innovation center in South Korea within the Hanyang university in Seoul. The center is specialized in high performance polymers and renewable energies, areas in which the university excels. More recently, Arkema forged a partnership in 2018 with Monash university Malaysia, which

is located just outside Kuala Lumpur. The aim is to enhance understanding of biocatalysis, a discipline that could lead to more efficient reaction processes than those achieved with traditional chemistry or the identification of alternatives to certain raw materials used in the production of sulfur products. The creation of this center for research into biocatalysis is in line with the Group's commitment to develop increasingly sustainable solutions.

4.4.6.2 CORPORATE CITIZENSHIP

As part of its commitment to societal issues, Arkema undertakes corporate sponsorship and philanthropy initiatives that are aligned with its CSR policy and values, particularly the value of solidarity, and focus primarily on education, integrating young people into active life, gender diversity and access to water. These initiatives are overseen at Group level by the Human Resources and Communication Executive Vice-President, who is a member of the Executive Committee. They are deployed worldwide and are supported at the local level by the Common Ground® initiative.

The Common Ground® initiative

Formalized and introduced over 15 years ago, the pioneering Common Ground® initiative takes community relations beyond the legal minimum requirements by actively encouraging local dialogue and exchange with stakeholders in every host country.

It is based on three key principles, designed to improve the social acceptability of chemical plants and develop understanding about the Group's business:

- **listening to understand expectations:** understanding the concerns of people living in nearby communities is key to

effectively addressing their concerns about industrial and chemical risks;

- **engaging in dialogue and informing communities about the Group's activities:** at the core of the initiatives are workshops that enable neighbors to discover what the plant does, the products it makes and the processes it uses, and get a first-hand view of how the site runs and what its projects are; and
- **risk prevention and progressing:** in addition to continuously improving the health, safety and environmental performance of its production facilities, the Group is deploying a risk prevention culture in every host country. As part of this proactive approach, incident or accident drills are regularly organized to test emergency response resources and procedures, along with the systems for alerting, informing and protecting employees and the local community.

Operational implementation of the Common Ground® initiative is overseen by the Group's site managers, who are supported by human resources or communication managers.

Common Ground® actions around the world

In 2019, 990 Common Ground® initiatives were carried out worldwide, with 78% of production plants actively participating. These initiatives break down by region as follows over the past three years:

NUMBER OF COMMON GROUND® INITIATIVES BY REGION

	2019	2018	2017
GROUP TOTAL	990	1,064	1,011
Europe	480	421	359
North America	369	486	409
Asia	92	126	204
Rest of the world	49	31	39

In 2019, 76% of production plants took part in these initiatives in the United States, 78% in Europe, and 95% in Asia.

These initiatives are aimed primarily at local stakeholders (businesses, individuals, local authorities and elected officials), the world of education (schools and universities) and associations.

NUMBER OF COMMON GROUND® INITIATIVES BY STAKEHOLDER CATEGORY

	2019	2018	2017
Local communities	529	252	379
Education	295	294	293
Associations	287	376	339

The number of Common Ground® initiatives edged down from 1,064 in 2018 to 990 in 2019, but reached a larger number of stakeholders. These outcomes reflect initiatives more targeted towards local communities on the one hand and the implementation of measures intended for several types of stakeholders on the other hand. In Europe, and especially in France, the increase in initiatives targeting local residents in large part reflected the sponsorship of the FIFA Women's World Cup, which was the starting point for countless initiatives in the fields of education, integration and diversity.

The percentage of production plants participating in the Common Ground® program decreased in 2019 due to the recent integration of newly acquired sites. However, the program is expected to be phased in at the new sites over time.

Initiatives involving local communities and the public

As they do each year, Group facilities conducted public tours, in particular to explain how chemistry offers solutions that can benefit everyone in their daily lives.

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

In addition to its regular participation in student forums, in France the Group has in recent years partnered with:

- 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; and
- the *Semaine de l'Industrie*, a week-long event that gives young people and career seekers insights into the world of industry and its job opportunities.

The Group also supports environmental initiatives. For example in 2019, 50 volunteers from the Bostik site in Tanay, Philippines participated in the *Let's MultiTreeply* program for the fifth year running. Group employees in India led initiatives to raise the awareness of the students and teachers of Poondiyankuppam primary school about plastic waste management and recycling.

The inauguration of the new Global Center of Excellence for 3D printing (additive manufacturing) in Serquigny, Normandy in the north of France, offered the opportunity to dialogue with various stakeholders: local and regional authorities and elected officials, journalists, research partners and manufacturers, as detailed in section 4.4.6.1 of this chapter.

Initiatives involving associations

The Group's values of solidarity and accountability show through in the initiatives undertaken in partnership with non-profit associations in its host regions. Many examples around the world attest to the dedication of Group employees to helping the neediest and to being actively involved in their local communities.

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

- jobs for people with a disability, with support for several associations that help people with a disability enter the workforce;
- health and community, with corporate and employee participation in a large number of charitable campaigns; and
- the environment, with programs to improve biodiversity (see section 4.3.3.4 of this chapter).

Lastly, in early 2018, Arkema introduced a "salary rounding" system. This participatory sponsorship program allows employees to donate the cents from their monthly salary to a pre-selected non-profit organization with Arkema donating the same amount as its employees. The non-profit organizations that benefit from this initiative are active in areas that relate to the Group's CSR policy, such as the issues of access to water or support for people with disabilities. Under this initiative, over 600 employees made donations to six associations in 2019.

Educational initiatives

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

Programs and events are regularly organized in cooperation with schools, to provide young people with information on careers in the chemicals industry and to promote the development of a scientific culture. Locally, the production facilities periodically organize tours for school groups, take part in educational initiatives, and speak at conferences at higher education venues.

In the United States, the Arkema Inc. Foundation, set up in 1996, runs a number of selfless initiatives focused on science and education at all levels. Since its creation, its yearly Science Teacher Program has reached countless researchers and teachers. In 2019, nearly 80 teachers from 41 schools benefited from the program.

In 2016, the Group began working with France's CGénial Foundation to support its programs designed to promote science and its different careers among college students in France. With the partnership, Arkema reaffirmed its commitment to attracting young people to science and developing bridges between business and academia by taking part in the Foundation's flagship programs. In 2019, almost 130 teachers were welcomed at the Group's plants and research centers, and over 800 middle and high school students benefited from the experience of Arkema's volunteer speakers in classroom presentations.

4 CORPORATE SOCIAL RESPONSIBILITY

Open dialogue and close relations with stakeholders

Driven by its commitment to corporate social responsibility, Arkema created a fund for education on its 10th anniversary. The aim is to finance projects submitted by employees who volunteer on education-related initiatives. The fund is a way for the Group to support the volunteer work carried out by its employees, as well as their engagement and commitment to non-profit organizations. Since its creation, 33 educational projects carried out by non-profit organizations have been selected for sponsorship in 14 countries. The employees sponsoring these projects come from nine of the Group's host countries.

Youth inclusion

The Group also offers opportunities for socially disadvantaged young people, and helps them to earn academic qualifications. To promote access to the prestigious ENSIC chemical engineering school, *Fondation de France* and the 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.

In France, Arkema has been a patron of the *Théâtre des Champs-Élysées* in Paris since 2017, and in 2019 furthered its involvement by supporting the theater's youth program. Through this initiative to provide disadvantaged children aged 6 to 12 with greater access to music and opera is aligned with Arkema's focus on youth inclusion and with the values of solidarity and accountability championed by the Group.

Gender diversity

In keeping with its internal policy of promoting gender diversity and making all positions accessible to women, including at its plants, Arkema signed a three-year deal with the French Football Federation in 2019 to become the main partner of the Division 1 Women's Football League in France. The competition has been renamed *D1 Arkema*. This commitment is a natural extension of Arkema's sponsorship of the Women's World Cup France 2019™. The partnership offers an invaluable opportunity to showcase the role of women in sport and business. The aim is to illustrate that women have an important role to play in industry – including in the chemicals sector – just as they do in football,

despite the fact that both are still viewed as male domains. The partnership also gives the Group an opportunity to highlight that some of its products, such as Pebax® elastomers, are used in the production of soles for soccer shoes.

This support for women's soccer has been extended outside France through local actions with amateur clubs near our sites, for example in the United States, where Arkema works with a team of young women in New York.

Water

After supporting the Sail for Water association from 2015 to 2017, Arkema continued its efforts to promote universal access to drinking water through the distribution of filtration kits in 2018. In 2018, this was reflected in a mission to Nepal led by non-profit organization No Thirst Initiative, which distributed 300 filtration kits to villages, schools, hospitals and clinics, thereby providing access to drinking water to more than 3,000 people in isolated areas. In 2019, 100 kits were supplied to the organization Soleil d'or, partner to the NGO Secours Populaire Français to offer aid to populations in the Bahamas struck by Hurricane Dorian.

Innovation

A partnership with the world of sailing enables the Group to demonstrate and explain its performance-oriented innovation approach to the general public. Arkema has been supporting the construction of highly innovative sailing boats and their race programs since 2013. Its innovative materials have been used to design and improve the performance of a Multi50 trimaran and a Mini 6.50 monohull. Further high-performance solutions developed by Arkema will be applied in the construction of a next-generation Multi50 trimaran, which began in 2018. The vessel is set to launch in spring 2020.

At the start or finish of a race, in France and the United States, the Group invites its stakeholders to tour the boats and meet the skippers. This gives employees and their families, students from partner schools, customers and technical partners the opportunity to discover and discuss the direct ties between innovation and performance that exist thanks to Arkema's advanced materials.

4.5 REPORTING METHODOLOGY

4.5.1 Reporting organization

The CSR reporting organization is designed to enable the Group to manage and measure the effectiveness of its social responsibility policy in favor of sustainable development.

REPORTING SCOPE AND PERIOD

The reporting scopes for employee and environmental data are presented below. To optimize the organization, coordination and integration of the financial and CSR reports, these data are reported on a calendar year basis.

REPORTING ORGANIZATION AND PROTOCOL

The Group has defined directives governing the reporting of safety, environmental, employee and social data for all facilities. Data are generally reported once a year, but for certain specific issues, interim data are reported quarterly so as to identify trends and implement required corrective measures on a timely basis. The interim data are not published.

COMPLIANCE AND STANDARDS

The Group publishes employee, environmental and social information in compliance with article L. 225-102-1 of the French Commercial Code, as amended most recently by French Law no. 2018-938 of 30 October 2018, and with articles R. 225-105 and R. 225-105-1 of said Code, as amended by French Decree no. 2017-1265 of 9 August 2017. Arkema also follows the recommendations of ISO 26000. In compliance with the abovementioned article L. 225-102-1, this information is reviewed by an independent third-party auditor, who issues a report attesting to the consistency and fairness of the CSR information. The report is presented in section 4.5.6 of this chapter.

The reporting process follows the GRI Guidelines. The GRI content index can be found in section 4.5.5 of this chapter.

4.5.2 Methodological note on environmental and safety indicators

4.5.2.1 ENVIRONMENTAL REPORTING TOOLS AND SCOPE

Absolute data

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

The values of the absolute indicators, once published after review by the independent third-party auditor, are not amended in the REED system. Any subsequent retroactive modifications made due to a change in the estimation method or a correction are addressed in section 4.3.3 of this chapter.

The data are entered by the plant Health, Safety and Environment (HSE) departments and validated at two levels, geographic and corporate.

The scope of consolidation for environmental reporting covers all Group industrial sites for which operating and emissions permits were held in the name of the Group or a majority-owned subsidiary at 31 December 2019. On this basis, the scope covered more than 99% of the Group's industrial operations in 2019. Given its contribution to the climate, American Acryl's Bayport facility, 50% owned by the Group, has been included in the scope of the greenhouse gas emissions strategic indicator. Scope 1 and 2 emissions from previous years have been recalculated to take account of this integration.

The scope of consolidation for energy reporting covers all of the industrial sites operated by the Group or by majority-owned subsidiaries, head offices and research and development centers, corresponding to more than 91% of the total scope. It should be noted that this scope covers more specifically 98% of the industrial sites operated by the Group or by majority-owned subsidiaries.

Operations sold or discontinued in 2019 were removed from the scope of reporting for the year but remain in prior-year data.

Operations acquired in 2019 are included in 2019 reporting for all of their 2019 activities, except for the activities of ArrMaz, Lambson and Prochimir, which were acquired in 2019 but not covered in 2019 reporting.

Operations that started up in 2019 reported data from their start-up date.

Intensive data (EFPIs)

To manage its environmental performance more efficiently and report consolidated data that more accurately track this performance year by year, Arkema uses a methodology that enables production facilities to report relative indicators, known as Environmental Footprint Performance Indicators (EFPIs). This method of calculating the intensity of emissions or resource consumption relative to production volumes, compared with 2012 as a baseline year, minimizes the impact of any changes in the business base and plant output, as well as any changes to the method used to estimate or calculate environmental footprint variables.

These relative 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 facility HSE departments and validated first by the factory manager then at 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 2018 and which are among the biggest contributors of the Group's sites. In all, these sites account for at least 80% of the Group's prior-year emissions or consumption.

Any activities sold or terminated in 2019 are not included in the scope of EFPI reporting for 2019, but are still included for previous years.

Operations started up in 2018 will be included in the EFPI reporting in 2020 compared with their 2019 performance.

Operations acquired in 2019 will be included in the 2021 scope of EFPI reporting for all of their 2021 activities, compared with their 2020 performance.

The EFPI methodology allows new reporting units to be included in prior-year performance data. Should the inclusion of a large number of new units result in a significant change to the confidence interval in the calculation of the Group's EFPIs, consideration will be given to whether an adjustment factor should be applied or whether the use of a new baseline year should be used.

4.5.2.2 SAFETY DATA REPORTING TOOLS AND SCOPE

Safety data:

- are compiled by the proprietary Reporting of Environmental and Energy Data (REED) system, which is accessible worldwide via the web platform of a service provider;
- are entered by the reporting units and validated at corporate level; and
- cover all of the production facilities operated by the Group or by majority-owned subsidiaries, head offices and research and development centers. ArrMaz, Prochimir and Lambson's sites are not included in accident safety reporting (see section 4.5.2.4 of this chapter), nor are they subject to peer observation.

4.5.2.3 CHOICE OF INDICATORS, MEASUREMENT METHODS AND USER INFORMATION

The Group has designed indicators to track the emissions and consumption levels that concern its operations, in accordance with the information required by articles R. 225-105 and R. 225-105-1 of the French Commercial Code. These indicators enable the Group to assess the impact of its policies and monitor changes over time for certain types of emissions and uses that have been identified as risks.

They were introduced at the time of the Group's creation in 2006 and have been tracked ever since, in compliance with the social and environmental reporting requirements set out in the French New Economic Regulations Act (the so-called NRE Act) of 15 May 2001.

The environmental reporting system is governed by an Environmental Reporting directive, an EFPI Reporting directive and an Energy Reporting directive issued by the Group Safety and Environment (DSEG), Sustainable Development (DDD) and Raw Materials and Energy Procurement (DAMPE) departments and accessible to all employees on the corporate intranet.

Calculation and estimation methods are subject to change, for example due to changes in national or international legislation, measures to improve consistency among regions, or problems with their application.

The directives may then be expressed in guidelines and handbooks, which are supported by training sessions in each region as required.

The safety reporting process is covered by a Monthly Safety Reporting directive issued by the Group Safety and Environment department and accessible to all employees on the intranet.

“SBT” setting method for the target to reduce GHG emissions

Targets adopted by companies to reduce greenhouse gas (GHG) emissions are considered “science-based” if they are in line with what the latest climate science says is necessary to meet the goals of the Paris Agreement – to limit global warming to well below 2 °C above pre-industrial levels and pursue efforts to limit warming to 1.5 °C.

The methodology is based on a breakdown over time of the carbon budget in choosing a global GHG emissions scenario adapted to a trajectory well below 2 °C (2018 report of the Intergovernmental Panel on Climate Change, or IPCC). Next, an allocation mechanism is applied taking the approach of a contraction of absolute emissions, in line with Science Based Targets recommendations and based on a 41% to 72% reduction in GHG emissions between 2010 and 2050. For the Group, this comes out to an annual reduction in GHG emissions of 2.5% for Scopes 1 and 2.

4.5.2.4 CLARIFICATIONS CONCERNING THE ENVIRONMENTAL AND SAFETY INDICATORS

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

Total acidifying substances

This indicator is calculated using sulfur oxide (SO_x), ammonia (NH₃) and nitrogen oxide (NO_x) emissions converted into tonnes of sulfur dioxide (SO₂) 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).

Emission figures for US sites are therefore obtained by adding figures for products such as fluorinated organic compounds to national reported data.

Chemical oxygen demand (COD)

For reporting purposes, COD is measured in effluent released into the natural environment.

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

In cases where a Group facility takes in COD-laden water, the reported data concern the net COD load effectively produced in the ecosystem by the Group (outgoing less 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 use

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

Energy use

Reported use corresponds to net energy purchases.

It does not include self-generated energy, which corresponds to the energy produced by exothermic chemical reactions and therefore does not draw down the planet’s energy resources.

Sales of energy are deducted from purchases of energy. This is the case, for example, for facilities fitted with combined heat and power plants 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, while HCFC emissions are those targeted by the Montreal Protocol.

Their impact is calculated in equivalent tonnes of carbon dioxide (t CO₂ eq.).

In this report, 2019 emissions have been calculated using the Global Warming Potential values published in 2007 by the Intergovernmental Panel on Climate Change (IPCC).

For the GHG emissions produced by American Acryl’s Bayport facility, the estimate is based on the net consumption of fuel gas reported in REED, this being the site’s sole combustion activity. The readings are compared with those of prior years with a good degree of reliability (data available from 2007 to 2010), in proportion to the quantity of acrylic acid produced. For process-related emissions, estimates are made based on past data in proportion to the production of acrylic acid. Since assessments have been conducted, the most penalizing data have systematically been used.

Indirect greenhouse gas (GHG) emissions

For the purposes of this report, indirect Scope 2 CO₂ emissions were calculated using electricity and steam consumption and emission factors in tonnes of CO₂ equivalent per input unit (KWh tonnes of oil equivalent) reported by 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, and SEMARNAT data issued by Mexico’s Federal Environmental Agency for Mexico. In the absence of specific regional values, calculations were made

using national energy-mix emission factors published by the International Energy Agency in 2017.

For the purposes of this report, indirect Scope 3 CO₂ emissions were calculated using the default scenarios in the GHG Protocol guidance for the chemical sector, issued by the World Business Council for Sustainable Development (WBCSD). Indirect Scope 3 emissions relate to the Group's value chain, including both upstream and downstream emissions, and have been calculated for 11 categories. A detailed explanation of the calculation methodology is available to stakeholders upon request.

- Category 1 – Purchased goods and services: emissions are estimated based on raw material and industrial gas purchases in 2019, it being specified that the accounting of data relating to purchases of packaging does not currently allow their emissions to be estimated reliably. The calculation is first performed on the basis of purchases representing at least 80% of the total volume and by applying an emission factor specific to each chemical (in CO₂ equivalent per metric ton). The resulting emissions are then extrapolated in proportion to the total volume of raw materials purchased. The emission coefficients used are those in the Ecolnvent base (version 3.4).
- Category 2 – Capital goods: emissions are estimated based on the amount of capital expenditure split into 14 categories (Development, R&D, Maintenance, ArkEnergy, etc.). An emission factor from the 2019 Carbon Base is assigned to each investment category (in kg eq.CO₂/€k). This new methodology, through more precise mapping, offers greater precision in estimating emissions than the default WBCSD approach used in 2018. The WBCSD's default approach of splitting investment expenditure between 25% cement and 75% steel resulted in an overestimate of the GHG emissions of capital expenditure by a factor of more than 4. The very significant drop in GHG emissions in this category in 2019 is the result of this change in methodology.
- Category 3 – Fuels and energy-related activities: emissions are estimated applying the default rule set out in the WBCSD guide. These emissions include (i) losses expressed in CO₂ equivalent in relation to electricity and steam transmission and distribution networks in each of the countries in which Arkema has industrial operations, (ii) upstream emissions for fossil fuel, steam and electricity consumed in each country by Arkema industrial sites, and (iii) upstream emissions for fossil fuels, steam and electricity sold by certain Arkema industrial sites. Emission coefficients for losses on the electricity and steam transmission and distribution networks in each country, and upstream of fossil fuel, steam and electricity are as given in the 2017 version of the DEFRA database⁽¹⁾.
- Category 4 – Upstream transportation and distribution: estimated emissions are based on the list of main raw materials representing at least 80% of purchasing volumes (see Scope 3 – category 1), an average journey of 1,000km by truck and a factor of average emissions for road transport (in kg of CO₂ per t.km). For the main raw material, the real mode of transportation was used, without modifying the average journey assumption of 1,000km. The resulting emissions are then extrapolated in proportion to the total volume of raw materials transported. The average emission factors by mode of transportation are the same as those used to estimate category 9 emissions.
- Category 5 – Waste generated in operations: the emissions calculated are those related to the waste generated during the Group's operations. The WBCSD rule is applied, with emission estimates based on the Group's waste treatment breakdown and the emission factors given in the Ecolnvent base (version 3.4) for incinerated, landfilled and recycled waste. Calculations are based on the actual quantities of waste from each site that is treated in the various ways. As a first step, all of the landfilled waste was considered as organic waste and therefore totally decomposed.
- Category 6 – Business travel: the emissions calculated correspond to travel by plane (the type of transportation that emits the most GHGs) by Group employees representing 97% of the global scope. Total air travel distances come from travel agency data, and emissions are calculated applying emission factors given in the 2017 version of the DEFRA database.
- Category 7 – Employee commuting: emissions were estimated using the least favorable scenario, assuming that all 20,000 employees use their own cars to get to work, traveling an average distance of 33km per day in France⁽²⁾, 26km in the United States⁽³⁾, and 50km in other countries. The emission factors applied correspond to the average CO₂ emissions per kilometer by vehicle type and fuel type given in DEFRA database (2017 version).
- Category 8 – Upstream leased assets: emission figures in this category are for energy consumption at leased real-estate assets (head offices, sales offices and research centers), except for those already included in Scope 2 reporting. Where site energy consumption data are not directly available, estimates are made working from the energy consumption ratio (all usages) per employee and by type of establishment, mainly offices and research centers. Emissions were then calculated by applying the emission factor for the national electricity mix in the country where each site is located.

(1) UK Department for Business, Energy and Industrial Strategy.

(2) Source: National Transportation and Travel Global Survey (2008) by the Observation and Statistics department (SOeS) of the French Ministry of Ecology, Energy, Sustainability and the Sea (MEEDDM).

(3) Bureau of Transportation Statistics.

- Category 9 – Downstream transportation and distribution: the emissions were estimated using Group company logistics data, which account for 99% of consolidated shipments. The Group defines a shipment as the transportation of products to customers, as well as any post-production logistics. Emissions are calculated by taking such logistics data as tonnes transported, number of shipments, and average kilometers for each type of transportation (road, rail, air, etc.) and applying the emission factors. In 2019, the calculation was made by EcoTransit, whose methodology (<https://www.ecotransit.org/methodology.en.html>) is based on the EN 16258 standard (Methodology for calculation and declaration of energy consumption and GHG emissions of transport services [freight and passengers]). In particular, the standard emission factors for road transport are based on the EURO I to VI standards in Europe, the 1994 to 2010 EPA standards in the USA and the 1994 to 2009 JP standards in Japan. For maritime transport, the method is based on the data and methodology developed by the Clean Cargo initiative (<https://www.clean-cargo.org/>). This method covers 80% of transport. For each line that EcoTransit was unable to process, an average distance was applied for each mode of transportation, as well as an average emission factor for the quantity transported. The total was then added to the emissions previously estimated by EcoTransit. The reporting period runs from 1 October to 30 September of the following year. This new automatic calculation methodology allows for better use of the data available in the Group's various information systems, an extension of the reporting scope, and greater reliability in terms of distances declared and emission factors.
- Category 12 – End-of-life treatment of sold products: the products sold by the Group have been classified into 23 different categories based on their chemical composition and, by extension, the GHG emissions that they may generate. A scenario was applied to define the end-of-life treatment method for each product category: incineration, landfilling or recycling. Emission factors were then applied in accordance with the WBCSD guide. For this estimate of Category 12 emissions, all of the Group's products were taken into account except Fluorogases, for which a reliable methodology has not been identified, and packaging, for which the current

recording of data does not permit reliable estimates of end-of-life emissions.

- Category 15 – Investments: the emissions recorded in this category are those related to purchases of companies by the Group in 2019. The total amount of these purchases has been multiplied by the appropriate emission factor available in the February 2019 version of the carbon base expressed in kg eq.CO₂/€k.

Accidents

Total recordable injury rates (TRIR) and lost-time injury rates (LTIR) are calculated for both Group and on-site subcontractor employees on the basis of US standard 29 CFR 1904. In 2019, accident rates do not include the ArrMaz, Prochimior or Lambson activities, acquired in 2019.

Process safety

The safety performance of a plant's production processes is assessed by means of performance indicators that measure and analyze process safety incidents. The Group reports and classifies process safety indicators in accordance with European Chemical Industry Council (CEFIC) guidelines. Until the end of 2016, the definition used for process safety events was the one proposed by CEFIC. During 2016, the International Council of Chemical Associations (ICCA) proposed new criteria to be used globally. Like CEFIC, Arkema decided to use these new criteria to measure its process safety event rate (PSER), starting in 2017.

AIMS-audited sites

The Group tracks the increase in the percentage of facilities that have been audited in accordance with the AIMS standard. Depending on their specific features and size, some sites have had the option since 2016 of performing simplified self-assessments. This is the case for Bostik in particular.

4.5.3 Methodological note on employee, social and R&D information/indicators

4.5.3.1 SCOPE AND REPORTING TOOLS

Employee data are taken from several different reporting processes.

The workforce data presented in section 4.4 of this chapter:

- are recorded in the AREA 1 application, accessible *via* the corporate intranet;
- are entered by the human resources managers or company Managing Directors (depending on their size);
- are validated at the Arkema, Altuglas International, ArrMaz, Bostik, Coatex, Den Braven and MLPC group levels; and
- cover all companies in which the Group has at least a 50% interest.

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

- are recorded in the AREA 2 application, accessible *via* the corporate intranet;
- are entered by human resources employees of the companies or regional organizations;
- are validated by the regional Human Resources directors or subsidiary managers; and
- cover all companies of 60 or more employees in which the Group has at least a 50% interest at 30 June of the reporting year, which accounts for 90.6% of the Group's total headcount.

Any changes or corrections to prior-year data are noted in section 4.4.1 of this chapter.

4.5.3.2 CHOICE OF INDICATORS, MEASUREMENT METHODS AND USER INFORMATION

The Group has defined and tracks indicators relevant to its activities and its main risk and opportunity challenges.

The indicators relating to employee numbers and safety performance have been tracked since the Group's creation in 2006.

Additional employee information and indicators and social data have been reported since 2012 *via* the AREA 2 compilation system, in particular the number of training hours.

Employee data reporting is covered by different procedural documents in the form of AREA 1 and AREA 2 guidelines, which have been provided to all of the contributors and validators.

The calculation methods may have limitations and be subject to change, for example due to varying national labor legislation and practices, difficulties in reporting certain information in some regions, or the unavailability of certain data in some countries.

Food waste, food security and the responsible, equitable and sustainable production of food are not considered as risks for Arkema. As a result, this reference document does not include any information about combating food waste, ensuring food security or promoting the responsible, equitable and sustainable production of food.

4.5.3.3 DETAILS ON EMPLOYEE INFORMATION AND INDICATORS

Headcount

For reporting purposes, the headcount includes employees on payroll (employees present and employees whose employment contract, of any type, 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 France, employees hired on fixed-term contracts for periods of more than 12 months and renewed more than once are also included among permanent employees.

Employee categories

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

New hires

These data cover only the hiring of employees under permanent contracts, including the transformation of contracts (fixed-term into permanent contracts in France, for example).

Compensation

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

Health and welfare

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

Training

The data relate to training hours recorded for Group employees excluding e-learning courses.

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.

Departures

Since 2016, departures are recorded only when the person leaves the Group, so that reported data no longer include inter-subsiary transfers.

Percentage of non-French nationals in senior management and executive positions:

Regulations do not allow the nationality of employees to be entered in information systems in all the countries where the Group operates. This is notably the case in the United States. By convention, it has been assumed that the employees exercising their activity in these countries are not French nationals. This statement does not apply to expatriate employees.

4.5.3.4 DETAILS ON R&D INFORMATION AND INDICATORS

Sustainable development patents

Number of original patent applications filed in the reporting year by the Group in response to sustainable development issues related to the UN Sustainable Development Goals, as described in section 4.2 of this chapter.

Percentage of sales from products made from renewable raw materials

Sales derived from renewable raw materials correspond to sales of products that use renewable raw materials in the proportion of more than 20%. Renewable content is calculated by ascertaining the proportion of raw materials (carbon and heteroatoms) of renewable origin. A renewable raw material is understood to be either bio-sourced (i.e., from biomass, plant or animal), or certified renewable by a mass balance approach. For a large number of product lines, the most penalizing data have been systematically used.

R&D expenditure

R&D expenditure is expressed as a percentage of consolidated revenue for the year.

Number of non-disclosure, cooperation and intellectual property agreements

The number of contracts corresponds to the non-disclosure, cooperation and intellectual property contracts signed by Arkema France during the year and recorded by the R&D department in its Athena database.

4.5.4 Indicators ⁽¹⁾

		2019	2018	2017
SUSTAINABLE SOLUTIONS				
Innovation				
Percentage of sales that contribute significantly to Sustainable Development Goals ⁽²⁾	%	46	43	nd
Number of patent applications filed during the year relating to sustainable development		149	154	150
R&D expenditure as a percentage of consolidated revenues	%	2.7	2.7	2.8
Number of non-disclosure, cooperation and intellectual property agreements signed by Arkema France		437	476	415
Management of the solutions portfolio				
Percentage of sales from products made from renewable raw materials	%	9	9	9
Percentage of sales volume covered by a full life-cycle assessment	%	22	20	10
Product stewardship				
Number of substances with REACH registration		425	425	406
RESPONSIBLE MANUFACTURER				
Safety and environment				
Percentage of sites audited according to Arkema Integrated Management System (AIMS) standards	%	80	74	69
Safety, environment and maintenance expenditure	€M	279	270	242
Safety				
Percentage of ISO 45001 or OHSAS 18001 certified sites	%	57	47	46
Percentage of ISO 45001 or OHSAS 18001 certified sites in Europe	%	59	53	45
Percentage of ISO 45001 or OHSAS 18001 certified sites in the Americas	%	47	48	43
Percentage of ISO 45001 or OHSAS 18001 certified sites in Asia	%	65	58	49
Total recordable injury rate (TRIR)	per million hours worked	1.4	1.3	1.6
Lost-time injury rate (LTIR)	per million hours worked	0.7	0.8	0.6
Percentage of sites practicing peer observation	%	62	64	59
Process safety event rate (PSER)	per million hours worked	3.7	4.4	3.9
Environment				
MANAGEMENT SYSTEMS				
Percentage of ISO 14001-certified sites	%	53	48	43
Percentage of ISO 14001-certified sites in Europe	%	65	60	53
Percentage of ISO 14001-certified sites in Asia	%	76	63	54
Percentage of RCMS-certified sites in the Americas	%	18	17	17

		2019	2018	2017
GREENHOUSE GAS (GHG) EMISSIONS ⁽³⁾				
Direct greenhouse gas emissions corresponding to the Kyoto Protocol	kt CO ₂ eq.	2,698	2,807	3,085
• of which CO ₂	kt CO ₂ eq.	1,490	1,567	1,515
• of which HFC	kt CO ₂ eq.	1,174	1,210	1,530
• of which other	kt CO ₂ eq.	34	30	40
Direct greenhouse gas emissions corresponding to the Kyoto Protocol, by region				
• Europe	%	30	31	33
• Americas	%	56	55	54
• Rest of the world	%	15	14	13
Direct greenhouse gas emissions corresponding to the Montreal Protocol	kt CO ₂	247	277	340
Scope 2 indirect greenhouse gas emissions of CO ₂	kt	1,142	1,183	1,107
• of which in Europe	kt	290	291	302
• of which in the Americas	kt	401	401	405
• of which in the Rest of the world	kt	451	491	400
Climate indicator: Scope 1 and Scope 2 GHG emissions as defined in the Kyoto Protocol + substances listed in the Montreal Protocol	kt	4,087	4,267	4,531
Scope 3 indirect greenhouse gas emissions of CO ₂ (to within 10%) ⁽⁴⁾	Mt	12.56	9.56	3.56
ADAPTING TO THE CONSEQUENCES OF CLIMATE CHANGE				
Number of sites exposed to a severe risk of storms and/or flooding		25	22	22
AIR EMISSIONS				
Acidifying substances	t SO ₂ eq.	2,620	3,040	3,380
Carbon monoxide	t	950	940	860
Volatile organic compounds (VOCs)	t	3,810	4,150	4,280
Volatile organic compound (VOCs) EFPI		0.60	0.62	0.66
Dust	t	203	235	230
EFFLUENT RELEASES				
Chemical oxygen demand (COD)	t O ₂	1,950	2,170	2,440
Chemical oxygen demand (COD) EFPI		0.50	0.59	0.70
Suspended solids	t	571	535	920
WASTE				
Total hazardous waste	kt	178	187	184
Hazardous waste recycled into materials	%	14	15	15
Hazardous waste burned as fuel	%	49	48	49
Non-recycled hazardous waste	kt	65	69	67
• of which landfilled	kt	3.8	4.0	3.4
Total non-hazardous waste	kt	247	278	242
Recycled non-hazardous waste	kt	101	119	107
Non-recycled non-hazardous waste	kt	146	159	135
• of which landfilled	kt	26	37	27

		2019	2018	2017
RESOURCES				
Total water withdrawn	millions of cu.m	113	119	118
Net energy purchases	TWh	8.05	8.07	8.12
• of which in Europe	TWh	4.26	4.33	4.37
• of which in America	TWh	2.57	2.53	2.47
• of which in the Rest of the world	TWh	1.22	1.21	1.28
Energy EFPI		0.91	0.88	0.89
Net energy purchases by type				
• fuel	TWh	3.98	4.06	4.11
• electricity	TWh	2.71	2.72	2.76
• steam	TWh	1.36	1.29	1.25
Natural gas in net purchases of fuels	%	98	97	93
Low-carbon electricity in net energy purchases	%	22	22	18
Number of Arkenergy investments		51	50	60
• of which in Europe		28	26	41
• of which in America		12	14	11
• of which in the Rest of the world		11	10	8
Number of ISO 50001-certified sites		33	30	29
OPEN DIALOGUE				
Employment				
HEADCOUNT				
Total headcount at 31 December		20,507	20,010	19,779
• of which permanent employees		19,783	19,301	18,701
• of which fixed-term employees		724	709	1,078
Total headcount as at 31/12 by geographical area				
• France		7,309	7,193	7,144
• Europe (excluding France)		3,899	3,904	3,936
• North America		4,074	3,880	3,742
• Asia		4,319	4,195	4,104
• Rest of the world		906	838	853
Managers	%	27.9	27.3	26.9
DIVERSITY				
Women	%	25.3	25.3	25.0
Women by region				
• France	%	27.2	26.9	26.6
• Europe (excluding France)	%	25.7	25.2	24.8
• North America	%	22.7	22.9	22.3
• Asia	%	25.1	25.4	25.4
• Rest of the world	%	22.4	21.8	21.7
Percentage of women managers (all levels)	%	29.9	29.6	29.1
Women in senior management and executive positions (Hay grade 15 or higher)	%	23	21	19

		2019	2018	2017
Non-French nationals in senior management and executive positions (Hay grade 15 or higher)	%	40	39	37
RECRUITMENT				
Recruitments in 2019		1,593	1,833	1,616
• France		366	393	364
• Europe (excluding France)		260	252	254
• North America		437	528	463
• Asia		403	533	438
• Rest of the world		127	127	97
Manager recruitments		494	497	471
Non-manager recruitments		1,099	1,336	1,145
Women recruitments	%	28.2	28.2	28.5
New hires aged 50 and over	%	10.3	9.5	9.4
New hires aged under 30	%	34.4	37.6	38.5
DEPARTURES				
Departures during the year		1,741	1,852	1,705
• of which resignations		945	1,004	862
• of which dismissals		342	322	332
• of which retirement		285	330	321
• of which following a divestment/merger		27	0	0
• of which other reasons		142	196	190
WORK ORGANIZATION				
Full-time employees	%	96.3	96.3	96.3
Part-time employees	%	3.8	3.7	3.7
Employees who telework	%	13.8	nd	nd
ABSENTEEISM				
Overall absenteeism rate	%	4.2	3.9	3.9
Absenteeism rate on medical grounds	%	2.8	2.8	2.6
TRAINING				
Number of training hours	thousands	463	456	484
Average number of training hours per employee		25	25	25
Average number of training hours per manager		24	nd	nd
Average number of training hours per non-manager		25	nd	nd
Number of employees who received training, excluding e-learning		15,997	17,111	16,161
Number of employees who took an e-learning course		9,517	9,403 ^[5]	10,496
Number of safety training hours	thousands	182	193	207
Number of safety training hours per employee trained		13	14	15
Number of employees who received safety training (excluding e-learning)		14,142	13,588	13,556
Number of employees who took safety-related e-learning courses		6,684	6,863 ^[5]	6,276
Number of environment-related training hours		10,210	15,795	22,665
Number of environment-related training hours per employee trained		2	4	6.6

		2019	2018	2017
Number of employees who received environment-related training (excluding e-learning)		4,686	3,919	3,398
Breakdown of training hours by topic:				
• Technical expertise	thousands	203	nd	nd
• HSEQ	thousands	196	nd	nd
• IT/digital technology	thousands	19	nd	nd
• Management	thousands	45	nd	nd
Percentage of apprenticeships (Arkema France)	%	4.4	4.1	3.7
Proportion of Group employees benefiting from annual performance reviews	%	99	99	99
HEALTH AND WELFARE				
Percentage of employees benefiting from regular medical check-ups	%	94	93	94
Employees benefiting from supplementary disability cover	%	90	90	90
Employees benefiting from supplementary life cover	%	95	92	93
Employees covered by death benefits representing at least 18 months' salary	%	84	82	81
COMPENSATION				
Employees benefiting from minimum compensation guarantees	%	100	100	99.6
Employees benefiting from collective variable compensation components	%	73	68	67
Employees benefiting from individual variable compensation components	%	36	35	32
REPRESENTATION				
Percentage of employees benefiting from personnel representation and/or trade union representation	%	91	90	89
Societal				
Number of Common Ground® initiatives		990	1,064	1,011
Group industrial sites taking part in Common Ground®	%	78	84	78
European industrial sites taking part in Common Ground®	%	78	73	73
North American industrial sites taking part in Common Ground®	%	76	73	85
Asian industrial sites taking part in Common Ground®	%	95	69	64

(1) Indicators are defined in detail in the methodological note in section 4.5.2 of this chapter.

(2) The scope assessed covered 44% of the Group's sales to third parties in 2019.

(3) In 2019, GHG emissions include those of American Acryl's Bayport facility. Emissions from previous years have been recalculated to take account of this consolidation (see section 4.5.2.1 of this chapter).

(4) The Scope 3 categories covered by this estimate are detailed in section 4.3.3.2.3 of this chapter.

(5) This amount corrects the figure indicated in the 2018 reference document following the detection of double counting of participants in certain e-learning modules.

4.5.5 GRI content index

DECLARATION OF GRI COMPLIANCE

Arkema applies the reporting principles and prepared its reporting in compliance with GRI: essential compliance.

In order to ensure a good quality approach, in line with GRI standards expectations, Arkema ensured the implementation of the tests indicated for each principle by Materiality-Reporting, GRI DATA PARTNER for France.

The GRI content index below presents the general and specific items of information, in accordance with their materiality for the Group.

GRI standard	Item	Description	Location or omission
GRI 101: GENERAL PRINCIPLES – 2016			
GRI 102: GENERAL STANDARD DISCLOSURES – 2016			
ORGANIZATIONAL PROFILE			
	102-1	Name of the organization	6.1.1 – Information about the Company
	102-2	Activities, brands, products and services	1.2 – Business overview
	102-3	Location of the organization's headquarters	6.1.1 – Information about the Company
	102-4	Location of operations	6.1.2 – Subsidiaries and shareholdings of the Company
	102-5	Capital and legal form	6.1.1 – Information about the Company
	102-6	Markets served	1.2 – Business overview
	102-7	Scale of the organization	1.2 – Business overview
	102-8	Information on employees and other workers	6.1.1 – Information about the Company 4.4.1.1 – Talent management/Total headcount and employees by region, gender and age
	102-9	Supply chain	1.4 – Raw materials and energy supply contracts 4.1.6 – Stakeholders and materiality assessment 4.2.1 – Management of the sustainable solutions portfolio 4.2.3 – Management of the solutions portfolio
	102-10	Significant changes to the organization and its supply chain	2.2 – Comprehensive internal control and risk management procedures
	102-11	Precautionary principle or approach	2.1.1 and 2.1.3 – Industrial safety, environmental and climate change risks
	102-12	External initiatives	4.1 – Introduction 4.4.4.5 – Membership of the Together for Sustainability (TfS) initiative
	102-13	Membership of associations	4.4.6 – Corporate citizenship and philanthropy
STRATEGY			
	102-14	Statement from senior decision-maker	Message from the Chairman and CEO in the introduction of this document
ETHICS AND INTEGRITY			
	102-16	Values, principles, standards and norms of behavior	4.4.2 – Compliance and ethics
CORPORATE GOVERNANCE			
	102-18	Governance structure	4.1.5 – CSR governance 3.2 – Composition of administrative and management bodies

GRI standard	Item	Description	Location or omission
APPROACH TO STAKEHOLDER ENGAGEMENT			
	102-40	List of stakeholder groups	4.1.6 – Stakeholders and materiality assessment
	102-41	Collective bargaining agreements	4.4.1.7 – Active social dialogue with employee representatives
	102-42	Identification and selection of stakeholders	4.1.6 – Stakeholders and materiality assessment
	102-43	Approach to stakeholder engagement	4.1.6 – Stakeholders and materiality assessment
	102-44	Key topics and concerns raised	4.1.6 – Stakeholders and materiality assessment
REPORTING PRACTICE			
	102-45	Entities included in the consolidated financial statements	4.5.2.1 – Environmental reporting tools and scope 4.5.2.2 – Safety reporting tools and scope 4.5.3. – Social, employee and R&D reporting tools and scope
	102-46	Defining report content and topic boundaries	4.1.6 – Stakeholders and materiality assessment
	102-47	List of material topics	4.1.6 – Stakeholders and materiality assessment
	102-48	Restatements of information	1.2.1.3 – Overview of the High Performance Materials division – Highlights 1.2.2.3 – Overview of the Industrial Specialties division – Highlights 1.2.3.3 – Overview of the Coating Solutions division – Highlights
	102-49	Changes in reporting	4.5 – Reporting methodology
	102-50	Reporting period	4.5.1 – Reporting organization
	102-51	Date of most recent report	Page 1 footnote
	102-52	Reporting cycle	4.5.1 – Reporting organization
	102-53	Contact point for questions regarding the report	8.2 – Person responsible for the information
	102-54	Claims of reporting in accordance with the GRI Standards	4.5.5 – GRI content index
	102-55	GRI content index	4.5.5 – GRI content index
	102-56	External assurance	4.5.6 – Independent third-party opinion pursuant to the provisions of article L. 225102-1 of the French Commercial Code
SPECIFIC ITEMS			
GRI 200: ECONOMIC STANDARDS			
GRI 103: Managerial approach – 2016	103-1	Explanation of the material topics and their scope	4.1.6 – Stakeholders and materiality assessment
	103-2	Description of managerial approach	4.4 Open dialogue and close relations with stakeholders
	103-3	Evaluation of the managerial approach	4.5.4 Indicators
ECONOMIC PERFORMANCE			
GRI 201: Economic performance – 2016	201-1	Direct economic value generated and distributed	Profile, ambition and strategy 4.2.3 – Management of the solutions portfolio 4.4.6 Corporate citizenship and philanthropy 5.3.2 Consolidated financial statements at December 31, 2019
MARKET PRESENCE			

GRI standard	Item	Description	Location or omission
	202-2	Proportion of senior management hired from the local community	4.4.1.6 – Diversity, equal opportunity and equal treatment
INDIRECT ECONOMIC IMPACTS			
GRI 203: Indirect economic impacts – 2016	203-1	Infrastructure investments and philanthropy	4.4.6 – Corporate citizenship and philanthropy
	203-2	Significant indirect economic impacts	4.4.6 – Corporate citizenship and philanthropy
PROCUREMENT PRACTICES			
GRI 204: Procurement practices – 2016	204-1	Proportion of spending on local suppliers	4.4.4 – Suppliers and subcontractors
Anti-corruption			
GRI 205: Anti-corruption – 2016	205-1	Operations assessed for risks related to corruption	4.4.2 – Compliance and ethics
	205-2	Communication and training on anti-corruption policies and procedures	4.4.2 – Compliance and ethics
TAXES			
GRI 207: Tax – 2019	207-1	Approach to tax	4.4.2.6 – Tax policy
	207-2	Tax governance, control and risk management	4.4.2.6 – Tax policy
GRI 300: ENVIRONMENTAL STANDARDS			
GRI 103: Managerial approach – 2016	103-1	Explanation of the material topics and their scope	4.1.6 – Stakeholders and materiality assessment
	103-2	Description of managerial approach	4.3.1 – Health, safety and environmental management
	103-3	Evaluation of the managerial approach	4.5.4 – Indicators
MATERIALS			
GRI 301: Materials – 2016	301-1	Materials used by weight or volume	4.3.3.3.3 – Raw materials consumption
	301-2	Recycled materials used	4.3.3.3.4 – Circular economy
	301-3	Reclaimed products and their packaging materials	4.3.3.3.4 – Circular economy
ENERGY			
GRI 302: Energy – 2016	302-1	Energy consumption within the organization	4.3.3.3.4 – Circular economy
	302-3	Energy intensity	4.3.3.2.2 – Energy
	302-4	Reduction of energy consumption	4.3.3.2.2 – Energy
	302-5	Reduction in energy requirements of products and services	4.3.3.2.2 – Energy
WATER AND EFFLUENTS			
GRI 303: Water and effluents – 2018	303-1	Interactions with water as a shared resource	4.3.3.3.2 – Water use
	303-2	Management of water discharge-related impacts	4.3.3.4.2 – Emissions into air, water and soil
	303-3	Water withdrawal	4.3.3.3.2 – Water use
	303-4	Water discharge	4.3.3.4.2 – Emissions into air, water and soil
	303-5	Water use	4.3.3.3.2 – Water use
BIODIVERSITY			

GRI standard	Item	Description	Location or omission
	304-2	Significant impacts of activities, products and services on biodiversity	4.3.3.4 – Protecting Biodiversity
EMISSIONS			
GRI 305: Emissions – 2016	305-1	Direct GHG emissions (Scope 1)	4.3.3.2.1 – Scope 1 and 2 greenhouse gas emissions
	305-2	Indirect GHG emissions (Scope 2)	4.3.3.2.1 – Scope 1 and 2 greenhouse gas emissions
	305-3	Other indirect GHG emissions (Scope 3)	4.3.3.2.3 – Scope 3 emissions inventory
	305-4	GHG emissions intensity	4.3.3.2.1 – Scope 1 and Scope 2 greenhouse gas emissions/Intensive indicator for direct greenhouse gas emissions
	305-5	Reduction of GHG emissions	4.3.1 – Health, safety and environmental management 4.3.3.1 – Environmental management 4.3.3.2 – Climate change
	305-7	Emissions of nitrogen oxides (NO _x), sulfur oxides (SO _x) and other significant atmospheric emissions	4.3.3.4.2 – Emissions into air, water and soil
	EFFLUENTS AND WASTE		
GRI 306: Effluents and waste – 2016	306-1	Water discharge by quality and destination	4.3.3.4.2 – Emissions into air, water and soil – Discharge into water
	306-2	Waste by type and disposal method	4.3.3.3.4 – Circular economy – Waste
	306-3	Significant spills	4.3.3.4.2 – Emissions into air, water and soil
	306-4	Transportation of hazardous waste	4.3.3.3.4 – Circular economy – Waste
ENVIRONMENTAL COMPLIANCE			
GRI 307: Environmental compliance – 2016	307-1	Non-compliance with environmental laws and regulations	4.3.1.2 – Management systems and audits
SUPPLIER ENVIRONMENTAL ASSESSMENT			
GRI 308: Supplier environmental assessment – 2016	308-1	New suppliers that were screened using environmental criteria	4.4.4 – Suppliers and subcontractors
	308-2	Negative environmental impacts in the supply chain and actions taken	4.4.4 – Suppliers and subcontractors
GRI 400: SOCIAL STANDARDS			
GRI 103: Managerial approach – 2016	103-1	Explanation of the material topics and their scope	4.1.6 – Stakeholders and materiality assessment
	103-2	Description of managerial approach	4.4.1 – Employee information
	103-3	Evaluation of the managerial approach	4.5.4 – Indicators
EMPLOYMENT			
GRI 401: Employment – 2016	401-1	New employee hires and employee turnover	4.4.1.1 – Talent management
	401-2	Benefits provided to full-time employees that are not provided to temporary or part-time employees	4.4.1.2 – An agile and collaborative organization – Organization of working time 4.4.1.4 – Employee engagement and wellbeing – Social protection 4.4.1.5 – A motivating and competitive compensation system 5.3.3 – Notes to the consolidated financial statements – note 27: Personnel expenses 6.2.7 – Share capital increase reserved for employees
OCCUPATIONAL HEALTH AND SAFETY			

GRI standard	Item	Description	Location or omission
GRI 403: Occupational health and safety – 2018	403-1	Occupational health and safety management system	4.3.2.2 – Employee health and safety
	403-2	Hazard identification, risk assessment and incident investigation	4.3.1.2 – Management system and audits
	403-3	Occupational health services	4.3.1.3 – Safety and environmental culture
	403-4	Worker participation, consultation and communication on occupational health and safety	4.3.2.2 – Employee health and safety
	403-5	Worker training on workplace health and safety	4.3.1.3 – Safety and environmental culture
	403-6	Promotion of worker health	4.3.2.2 – Employee health and safety
	403-7	Prevention and mitigation of occupational health and safety impacts directly linked to business relationships	4.3.2.2 – Employee health and safety
	403-8	Workers covered by an occupational health and safety management system	4.3.2.2 – Employee health and safety
	403-9	Work-related injuries	4.3.2.2 – Employee health and safety
	403-10	Work-related ill-health	4.3.2.2 – Employee health and safety
TRAINING AND EDUCATION			
GRI 404: Training and education – 2016	404-1	Average hours of training per year per employee	4.4.1.3 – Training and personal development
	404-2	Programs for upgrading employee skills and transition assistance programs	4.4.1.3 – Training and personal development
	404-3	Percentage of employees receiving regular performance and career development reviews	4.4.1.3 – Training and personal development
DIVERSITY AND EQUAL OPPORTUNITIES			
GRI 405: Diversity and equal opportunity – 2016	405-1	Diversity of governance bodies and employees	4.4.1.6 Diversity, equal opportunity and equal treatment 4.4.1.1 – Talent management – Total headcount and employees by region, gender and age
	405-2	Ratio of basic salary and remuneration of women to men	4.4.1.6 – Diversity and equal opportunity, equal treatment – Measures to promote gender equality
FREEDOM OF ASSOCIATION AND COLLECTIVE BARGAINING			
GRI 407: Freedom of association and collective bargaining – 2016	407-1	Operations and suppliers with the right to freedom of association	4.4.1.7 – Active social dialogue with employee representatives
CHILD LABOR			
GRI 408: Child labor – 2016	408-1	Operations and suppliers at significant risk for incidents of child labor	4.4.3 – Human rights
FORCED OR COMPULSORY LABOR			

GRI standard	Item	Description	Location or omission
GRI 409: Forced or compulsory labor – 2016	409-1	Operations and suppliers at significant risk for incidents of forced or compulsory labor	4.4.3 – Human rights
HUMAN RIGHTS ASSESSMENT			
GRI 412: Human rights assessment – 2016	412-1	Operations that have been subject to human rights reviews or impact assessments	4.4.2 – Compliance and ethics 4.4.3 – Human rights
	412-2	Employee training on human rights policies or procedures	4.4.2 – Compliance and ethics 4.4.3 – Human rights
	412-3	Significant investment agreements and contracts that include human rights clauses or that underwent human rights screening	4.4.2 – Compliance and ethics 4.4.3 – Human rights
LOCAL COMMUNITIES			
GRI 413: Local communities – 2016	413-1	Operations with local community engagement, impact assessments, and development program	4.4.6 – Corporate citizenship and philanthropy
SUPPLIER SOCIAL ASSESSMENT			
GRI 414: Supplier social assessment – 2016	414-1	New suppliers screened to environmental criteria	4.4.4 – Suppliers and subcontractors
	414-2	Negative social impacts in the supply chain and actions taken	4.4.4 – Suppliers and subcontractors
PUBLIC POLICY			
GRI 415: Public policy – 2016	415-1	Political contributions	4.4.5 – Institutional initiatives
CUSTOMER HEALTH AND SAFETY			
GRI 416: Customer health and safety – 2016	416-1	Assessment of the health and safety impacts of product and service categories	4.2.4 – Product stewardship
	416-2	Incidents of non-compliance concerning the health and safety impacts of products and services	4.2.4 – Product stewardship
MARKETING AND LABELING			
GRI 417: Marketing and labeling – 2016	417-1	Requirements for product and service information and labeling	4.2.4.2 – Product stewardship
	417-2	Incidents of non-compliance concerning product and service information and labeling	4.2.4.2 – Product stewardship
	417-3	Incidents of non-compliance concerning marketing communications	4.2.4.2 – Product stewardship
CUSTOMER PRIVACY			
GRI 418: Customer privacy – 2016	418-1	Substantiated complaints concerning breaches of customer privacy and losses of customer data	4.4.2.4 – Personal data protection
SOCIOECONOMIC COMPLIANCE			
GRI 419: Socioeconomic compliance – 2016	419-1	Non-compliance with social and economic laws and regulations	4.4.2 – Compliance and ethics

4.5.6 Independent third-party opinion pursuant to article L. 225-102-1 of the French Commercial Code

REPORT BY ONE OF THE STATUTORY AUDITORS, APPOINTED AS INDEPENDENT THIRD PARTY, ON THE CONSOLIDATED NON-FINANCIAL STATEMENT

This is a free English translation of the statutory auditor's 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.

For the year ended 31 December 2019

To the Annual General Meeting,

In our capacity as statutory auditor of your company (hereinafter the "entity") appointed as independent third party, and accredited by the French Accreditation Committee (*Comité Français d'Accréditation* or COFRAC) under number 3-1049⁽¹⁾, we hereby report to you on the consolidated non-financial statement for the year ended 31 December 2019 (hereinafter the "Statement"), included in the Group Management Report pursuant to the requirements of articles L. 225-102-1, R. 225-105 and R. 225-105-1 of the French Commercial Code (*Code de commerce*).

Responsibility of the entity

The Management Board's is responsible for preparing the Statement, including a presentation of the business model, a description of the principal non-financial risks, a presentation of the policies implemented considering those risks and the outcomes of said policies, including key performance indicators.

The Statement has been prepared in accordance with the entity's procedures (hereinafter the "Guidelines"), the main elements of which are presented in the Statement and available upon request at the entity's head office.

Independence and quality control

Our independence is defined by the requirements of article L. 822-11-3 of the French Commercial Code and the French Code of Ethics (*Code de déontologie*) of our profession. In addition, we have implemented a system of quality control including documented policies and procedures regarding compliance with applicable legal and regulatory requirements, the ethical requirements and French professional guidance.

Responsibility of the statutory auditor appointed as independent third party

On the basis of our work, our responsibility is to provide a report expressing a limited assurance conclusion on:

- the compliance of the Statement with the requirements of article R. 225-105 of the French Commercial Code;
- the fairness of the information provided in accordance with article R. 225-105 I, 3° and II of the French Commercial Code, i.e., the outcomes, including key performance indicators, and the measures implemented considering the principal risks (hereinafter the "Information").

However, it is not our responsibility to comment on the entity's compliance with other applicable legal and regulatory requirements, in particular the French duty of care law and anti-corruption and tax avoidance legislation, nor on the compliance of products and services with the applicable regulations.

(1) Accreditation scope available at www.cofrac.fr

Nature and scope of our work

The work described below was performed in accordance with the provisions of Article A. 225-1 *et seq.* of the French Commercial Code, as well as with the professional guidance of the French Institute of Statutory Auditors (*Compagnie nationale des commissaires aux comptes* or CNCC) applicable to such engagements and with ISAE 3000⁽¹⁾:

- we obtained an understanding of all the consolidated entities' activities, and the description of the principal risks associated;
- we assessed the suitability of the criteria of the Guidelines with respect to their relevance, completeness, reliability, neutrality and understandability, with due consideration of industry best practices, where appropriate;
- we verified that the Statement includes each category of social and environmental information set out in article L. 225-102-1 III as well as information regarding compliance with human rights and anti-corruption and tax avoidance legislation;
- we verified that the Statement provides the information required under article R. 225-105 II of the French Commercial Code, where relevant with respect to the principal risks, and includes, where applicable, an explanation for the absence of the information required under article L. 225-102-1 III, paragraph 2 of the French Commercial Code;
- we verified that the Statement presents the business model and a description of principal risks associated with all the consolidated entities' activities, including where relevant and proportionate, the risks associated with their business relationships, their products or services, as well as their policies, measures and the outcomes thereof, including key performance indicators associated to the principal risks;
- we referred to documentary sources and conducted interviews to:
 - assess the process used to identify and confirm the principal risks as well as the consistency of the outcomes, including the key performance indicators used, with respect to the principal risks and the policies presented,
 - corroborate the qualitative information (measures and outcomes) that we considered to be the most important presented in Appendix. Concerning certain risks (ethics and compliance, human rights, climate change, failure of suppliers and subcontractors in social and environmental issues, exposure to chemicals), our work was carried out on the consolidating entity, for the other risks, our work was carried out on the consolidating entity and on a selection of entities⁽²⁾;
- we verified that the Statement covers the scope of consolidation, i.e. all the consolidated entities in accordance with article L. 233-16 of the French Commercial Code within the limitations set out in the Statement;
- we obtained an understanding of internal control and risk management procedures the entity has put in place and assessed the data collection process to ensure the completeness and fairness of the Information;
- for the key performance indicators and other quantitative outcomes that we considered to be the most important presented in Appendix, we implemented:
 - analytical procedures to verify the proper consolidation of the data collected and the consistency of any changes in those data,
 - tests of details, using sampling techniques, in order to verify the proper application of the definitions and procedures and reconcile the data with the supporting documents. This work was carried out on a selection of contributing entities⁽²⁾ and covers between 14% and 100% of the consolidated data selected for these tests;
- we assessed the overall consistency of the Statement based on our knowledge of all the consolidated entities.

We believe that the work carried out, based on our professional judgment, is 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.

Means and resources

Our work was carried out by a team of nine people between August 2019 and February 2020 and took a total of ten weeks.

We were assisted in our work by our specialists in sustainable development and corporate social responsibility. We conducted around twenty interviews with the people responsible for preparing the Statement.

(1) ISAE 3000: international standard on assurance engagements other than audits or reviews of historical financial information.

(2) Arkema France S.A. of which La Chambre, Jarrige, Rion des Landes and Carling sites (France); Arkema Srl (Italy); Arkema Inc. of which Calvert City and Houston sites (USA); Bostik Ltd of which Stafford site (UK); Casda Biomaterials Co., Ltd. (China).

Conclusion

Based on the procedures performed, nothing has come to our attention that causes us to believe that the non-financial statement is not presented in accordance with the applicable regulatory requirements and that the Information, taken as a whole, is not presented fairly in accordance with the Guidelines, in all material respects.

Comment

Without modifying our conclusion and in accordance with article A. 225-3 of the French Commercial Code, we have the following comment:

- Regarding the training hours, improvements remain to be made in the reporting of data by the Arkema France subsidiary.

Paris-La Défense, 26 February 2020

KPMG S.A.

Anne Garans
Partner
Sustainability Services

Éric Dupré
Partner

Appendix

Qualitative information (actions and results) considered most important

Actions implemented in terms of work organization
Actions implemented in terms of individual development and training
Measures taken for employee engagement and well-being
The policy on diversity and equal treatment
The Group's safety, health and environment management systems
The policy on responsible product management
Internal identification systems for sites exposed to severe risks of storms and/or floods
Actions taken to prevent corruption
Actions taken in favor of Human Rights
Importance of subcontracting and consideration, in the relationship with subcontractors and suppliers of their social and environmental responsibility

Key performance indicators and other quantitative results considered most important

Total headcount as at 31 December and breakdown by age, gender and geographical area
Percentage of women in senior management and executive positions
Percentage of non-French nationals in senior management and executive positions
Average number of training hours per employee per year
Percentage of employees benefiting from personnel representation and/or trade union representation
Percentage of employees benefiting from regular medical check-ups
Total Recordable Injury Rate (TRIR)
Lost Time Injury Rate (LTIR)
Process Safety Event Rate (PSER)
Percentage of sites implementing peer observation of tasks
Percentage of AIMS (Arkema Integrated Management System) audited sites
Net purchases of energy
Direct greenhouse gas emissions (Scope 1)
Indirect greenhouse gas emissions (Scope 2)
Indirect greenhouse gas emissions (Scope 3 – Categories 1, 9, 12)
Volatile Organic Compounds (VOC)
Total water withdrawn
Chemical Oxygen Demand (COD)
Hazardous waste
HFC emissions (hydrofluorocarbons)
Number of patent applications filed during the year relating to sustainable development
Percentage of plants taken part in Common Ground® program
Sales from products made in full or in part from renewable raw materials

4.5.7 Contacts

See section 8.2 of the 2019 Universal Registration Document.



APPENDIX 1 : INNOVATION STRATEGY



1.1 INNOVATION STRATEGY

Clearly defined in a Group policy in 2018, innovation is a component of Arkema's targeted growth strategy and of its contribution to sustainable development. Innovation enables Arkema to:

- design and develop products and solutions while continually improving their performance;
- anticipate market trends, by capitalizing on the Group's commercial excellence, and develop today the products its customers will need in the years ahead; and
- enhance the Group's operational excellence by providing production facilities with new technologies and processes, thereby enabling the Group to produce safely and competitively while limiting its environmental footprint, in line with its commitment to being a responsible chemicals producer.

Whether aimed at manufacturing technologies, products or their applications, innovation makes it possible to create sustainable solutions.

This strategy of growth through innovation is supported by:

- a dedicated organization;
- a portfolio of research and development (R&D) projects;
- patent and trademark management;
- a research incubator;
- a collaborative innovation ecosystem; and
- the development of digitalization.

1.1.1 A dedicated organization

The Group's innovation structure is organized in a way that allows all stakeholders to contribute. It is based on:

- a Research and Development department that reports directly to the Chairman and Chief Executive Officer. The R&D department coordinates all of Arkema's research programs worldwide, the development of long-term research platforms and the implementation of partnerships. It also ensures that all innovation projects funded by Arkema's various Business Lines and activities are scientifically and technologically relevant and in line with the Group's overall strategy. Lastly, it creates and steers corporate R&D programs and identifies disruptive development opportunities and new research areas;
- a Scientific Committee comprising representatives from the Sustainable Development department, the Process department, the Industrial Property department, the Business Lines' global R&D departments, the scientific departments and the Group's main R&D centers; and
- research centers spread across the three regional hubs (Europe, North America and Asia).

The scientific and technological knowledge of Arkema's R&D teams is further strengthened by world-renowned scientific advisors from the academic world, as well as numerous academic and industrial partnerships.

To stay up-to-date with the latest knowledge and technologies in their area of expertise, the Group's researchers regularly attend and speak at scientific seminars and conferences, participate in "innovation days" organized by key customers or suppliers, and collaborate with academic partners, notably by contributing to the supervision of doctoral theses.

In 2019, R&D expenditure totaled €249 million, representing 2.8% of Group sales. R&D expenditure as a percentage of sales varies between businesses. It is notably higher in specialty areas and particularly in the High Performance Materials division, where R&D helps find solutions for customers and respond to the major sustainable development trends. In 2019, Arkema's R&D teams comprised more than 1,600 researchers, spread across three regional research and innovation hubs.

R&D efforts break down among Arkema's three divisions and its corporate research program as follows:

- 10.5% for the corporate research program. Defined by the R&D department and subject to the approval of Arkema's Executive Committee, the program aims to prepare the breakthrough innovations that are driven by megatrends and that will be developed commercially by the Group's divisions at a later stage;
- 53% for the High Performance Materials division. Its R&D efforts focus in particular on the materials of tomorrow and the techniques for producing and assembling them. Innovations combining performance with sustainable

development include materials made from renewable feedstocks, materials and adhesives with a low environmental impact, lightweight materials for transportation as well as structural adhesives used to join these materials, and functional adhesives for construction and industry. The High Performance Materials division fuels its growth by expanding its product range and by adapting the performance and functions of its products to new market demands. The division's technical excellence is reflected in the strength of brands such as Rilsan®, Pebax®, Luperox®, Kynar®, Sartomer® and Bostik®, and in the widespread consumer awareness of retail brands like Sader® and Quelyd®;

- 20% for the Industrial Specialties division. Its R&D objectives focus on ensuring that the division's processes are competitive and finding new applications and end markets for its products. One of its primary objectives is to continuously improve its main processes, such as those used

for fluorochemicals, thiochemicals and hydrogen peroxide, in order to make them safer, more reliable, more productive and therefore more competitive, while minimizing their environmental impact. To this end, R&D teams study the benefits of new raw materials, test new catalysts and reactor types and develop new synthesis pathways. They also contribute to the development of new products such as the new HFO low global warming potential (GWP) refrigerants; and

- 16.5% for the Coating Solutions division. Its R&D teams develop innovative solutions for the coatings market while combining technical performance with sustainable development. In addition to working closely with customers to provide responsive technical support, the division's R&D teams also carry out process research, which enables them to optimize production costs and produce new formulas on an industrial scale.

1.1.2 A portfolio of research and development projects

Global population growth is already having an impact on demand for drinking water and energy, and in the areas of health, on well-being and transportation. It is also affecting climate change, biodiversity and the availability of resources. Against this backdrop, and based on a forward-looking analysis of global megatrends, the Group is driving growth through innovation via a portfolio of R&D projects that provide solutions to economic and social challenges and contribute to the United Nation's 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (SDGs). For further details, see section 4.1.1 of this document.

The Group's analysis led to the definition of the following six cross-business platforms, which target areas with strong development potential and form the base of its portfolio of R&D projects:

- bio-based products;
- lightweight materials and design;
- new energies;
- water management;
- electronics solutions; and
- home efficiency and insulation.

In addition to these six market-oriented innovation platforms, the Group also has a number of technology platforms focused on generating innovative production methods that promote the principles of eco-design. These platforms are described in section 1.1.2.7 of this chapter.

The innovation work carried out within these platforms is supplemented by the Business Lines' ongoing efforts to improve their product ranges, in order to meet market and customer expectations.

Arkema's corporate social responsibility dimensions are integrated into all its R&D projects. When identifying the risks and opportunities of each project, Arkema takes into account the entire value chain, from raw material extraction to product end-life, as well as the UN Sustainable Development Goals. For further details, see section 4.2.3 of this document.

1.1.2.1 BIO-BASED PRODUCTS PLATFORM



Global population growth, rising living standards and industrial intensification are all driving an increase in the use of fossil fuels and therefore contribute to global warming. Mindful of the need to reduce the use of non-renewable fossil resources, Arkema has long been involved in the development of bio-based products, thereby supporting the United Nations' SDG 12: "Ensure sustainable consumption and production patterns."

Arkema has developed a wide range of bio-based polyamides derived from the castor oil plant, which is mainly cultivated in water-scarce regions of India. These unique products are used in a wide variety of markets, including the automotive, energy, optics and electronics markets.

Arkema's portfolio of bio-based polyamides has expanded considerably since production began over 70 years ago. With the Pebax® Rnew® range, for example, Arkema has developed thermoplastic elastomers that deliver outstanding energy return, lightness, shock resistance and durability. Offering a very broad spectrum of flexibility, this range of polymers has become the standard for ski boots and sports shoe soles. Moreover, Rilsan® Clear can now also be produced from bio-based raw materials, creating interesting new design possibilities for injection-molded

parts. These transparent polymers offer greater flexibility and easier processing capabilities than existing solutions. Combining ultra lightweight, high transparency and chemical and mechanical resistance, Rilsan® Clear products offer new opportunities in various markets.

FOCUS

The Pebax® elastomer performs on all fronts

This constantly evolving, ultra-high performance elastomer continues to attract attention. After the 2018 World Cup in Russia, where two-thirds of the players wore shoes containing Pebax® elastomer in the soles, this material also received significant exposure during the Women's World Cup 2019, of which Arkema was an official sponsor. The advantages of Pebax® material will continue to be highlighted during matches of D1 Arkema, the French women's football championship that the Group is sponsoring for three seasons. Our R&D teams have also developed a Pebax® foam that retains the exceptional properties of the Pebax® elastomer in its rigid form. The new foam has rapidly been integrated into high-end running shoes, boosting runner's performance thanks to an energy return of around 85%, twice the rate offered by standard materials. Pebax® technology was used in the shoes that enabled Kenyan runner Eliud Kipchoge to break the two-hour marathon barrier in Vienna on 12 October 2019, and in those worn by his compatriot Brigid Kosgei when she beat the women's world record at the Chicago Marathon the following day. A growing proportion of the Pebax® range comes from bio-based Pebax® Rnew® products.

Through its expertise and innovation in renewable polyamides, the Group offers:

- innovations in the iconic Rilsan® polymer range, a reference in the automotive and oil extraction industries;
- products that are both flexible and heat-resistant, such as the Rilsan® HT range for the transportation market. These polyamides offer outstanding performance, enabling them to replace metal parts to help lighten vehicles and, by extension, reduce vehicle emissions;
- highly transparent materials such as Rilsan® Clear Rnew®, for applications in the eyewear industry;
- light, resilient elastomers capable of returning the elastic energy absorbed during deformation, like those used in Pebax Powered® sports shoes (see focus above);

- rigid materials designed to serve as reinforcements in composites, such as the Platamid® or the Rilsan® XDM50 and XZM60 ranges designed for the numerous structural parts found in telephones, tablets and other mobile devices;
- Rilsan® Invent Natural fine powders, used in additive manufacturing via laser sintering; and
- Orgasol® Green Touch high-performance polyamide powders, used in cosmetics primarily for their sensorial properties.

Arkema has also developed a special sulfur-based intermediate for the production by its partner, South Korea-based CJ CheilJedang, of L-methionine, a methionine from renewable sources produced by replacing the use of propylene with a unique fermentation process. These innovations have been implemented at the Kerteh production facility in Malaysia. The remarkable results obtained have led Arkema to study enzyme catalysis as a synthesis process for other products in its portfolio (see section 1.1.5 of this chapter).

The Group's ongoing commitment to bio-based products is demonstrated by the fact that products at least 20% made from renewable raw materials account for around 9% of Group sales.

1.1.2.2 LIGHTWEIGHT MATERIALS AND DESIGN PLATFORM



Global population growth, rising living standards, increased transportation and urbanization, as well as the faster pace of industrialization in emerging markets are all factors that contribute to global warming. By developing solutions that can be used to reduce the weight of land and air vehicles and thereby lower fuel consumption, Arkema contributes to the United Nations' SDG 13: "Take urgent action to combat climate change and its impacts."

The polymers developed by Arkema are ideally positioned to support this trend, be they high-temperature polyamides designed to replace certain metal components in car engines (Rilsan® HT), structural adhesives that substitute for mechanical bonding systems, or composite materials.

3D printing, or additive manufacturing, also helps to meet this goal. By enabling the design of complex parts, these technologies simplify assembly and make it possible to replace the metal parts traditionally derived from smelting or tooling, with a subsequent reduction in weight. Additive manufacturing optimizes design, driving a reduction in the raw materials used and in the losses incurred during the prototyping phase.

Composite materials

The development of thermoplastic composite materials, and their assembly with adhesives, is a good illustration of the research platform's work. Current carbon- or glass-fiber-based composites make heavy use of thermoset polymers, for which the cross-linking

process is irreversible. These resins present two limitations: they cannot be recycled and their production cycle time makes them difficult to use in high throughput industries such as automotive.

To address this challenge, Arkema has developed thermoplastic polymer-based composites with innovative resins (Elium®, Kepstan® and Rilsan®), which are adapted to the specific needs of various markets. The recyclable Elium® resin, for example, is used in applications in the automotive, wind turbine and civil engineering industries, while Kepstan® PEKK makes it possible to obtain particularly hard-wearing and flame-retardant parts that meet the stringent specifications of the aerospace industry. In terms of performance, replacing steel parts with Elium® substitutes is expected to deliver weight savings of between 30% and 50%.

In addition, Arkema's R&D teams are assessing the processes for recycling the polymers used in thermoplastic composites, which will enable users to recycle their waste *via* dedicated channels.

FOCUS

Elium® resin, winner of the 2019 JEC Innovation Awards in the "Construction" category

Arkema received first prize in the "Construction" category at the 2019 JEC Innovation Awards. The award recognizes the development and manufacture of reinforcement bars (rebars) and cables for prestressed concrete applications, in partnership with SIREG (Arcore, Italy), the University of Miami, and the National Cooperative Highway Research Program (NCHRP).

Made from glass fiber and Elium® thermoplastic resin, these products have been processed through pultrusion using this technology's standard equipment. They do not rust or corrode, and they can be reheated and easily shaped or bent, reducing the cost of manufacturing rebars with custom shapes. As demonstrated by the University of Miami, the use of composite materials also allows concrete mixtures or salt-contaminated aggregates to be made using seawater instead of fresh water, with significant implications for island nations and arid coasts where fresh water is in short supply.

The use of composite materials for concrete prestressing is a major innovation, revolutionizing the durability of concrete construction to an unprecedented level since its invention in the 1930s.

3D printing

The lightweight materials and design platform places particular emphasis on additive manufacturing (3D printing) technologies, which are enjoying fast growth in the aerospace, electronics, automotive and healthcare industries. The Group's product range has grown significantly more diversified in recent years and now includes Rilsan® polyamide 11 powders, Kepstan® PEKK powders and UV curable N3xtDimension® resins. In this way, Arkema has stepped up development to occupy a unique position, with a range that now covers all additive manufacturing technologies: powder bed fusion, filament extrusion and UV curing.

To support the rapid development of 3D printing as an industrial manufacturing method, Arkema opened a new global center of excellence for 3D printing based on powder bed fusion technologies in Serquigny, France in 2019. The new center complements the Group's existing network, which comprises a center based in Exton, Pennsylvania in the United States for photocure liquid resins inaugurated in 2018, and another in King of Prussia, also in Pennsylvania, for filament extrusion. In addition, Arkema launched a commercial platform dedicated to 3D printing. Named "3D Printing Solutions by Arkema", the new platform aims to meet the needs of end customers by offering them development partnerships, a unique range of materials and services and Arkema's application-oriented expertise.

FOCUS

Carbon® and Arkema partner to step up the adoption of digital manufacturing

Carbon®, the world's leading digital manufacturing company, and Arkema, a pioneer in advanced liquid resins for 3D printing, forged a strategic partnership in 2019 that included a US\$20 million investment by Arkema in the start-up's capital. Since they started working together in 2013, Carbon® and Arkema have been driving innovation to scale process technology and resin manufacturing to enable parts made by Digital Light Synthesis™ technology to be increasingly reliable and cost-competitive. Their collaboration has generated solutions that have already proven their worth for the mass production of products for the sports, dental and consumer goods markets. This stronger alliance will deliver a new era of producing high-performance materials and supply chain model development for Carbon's customers and partners. It also represents an opportunity for both companies to expand their pipeline of production applications considerably, thanks to advanced materials technology expertise.

1.1.2.3 NEW ENERGIES PLATFORM



The development of new energies is a megatrend driven by the world transition to a less fossil-fuel-dependent economy. Through its platform and the innovative solutions it generates, the Group is contributing to the fight against climate change and to the United Nations’ SDG 7: “Ensure access to affordable, reliable, sustainable and modern energy for all” and SDG 13: “Take urgent action to combat climate change and its impacts.”

Innovative polymer materials and chemicals are used to varying degrees in the new energy solutions currently available, including rechargeable batteries, photovoltaic panels, heat-transfer fluids which transport the heat generated by solar energy, wind turbines and solar thermal power plants.

Thanks to its technological expertise, Arkema offers a number of innovative solutions aimed at improving the production, conversion, transportation and storage of these new forms of energy.

Solutions for batteries

Thanks to innovation in materials, binders and electrolytes, Arkema has a range of solutions designed for use in the development of batteries.

The Kynar® fluoropolymer, for example, is used in the main components of lithium-ion batteries – in the electrodes as the binder for the active phase and as a protective coating for the separator. These products play a very important role in the battery’s lifespan and performance. They are therefore the focus of continuous innovation.

Lithium salts, synthesized from the Group’s various chemistries are also used inside batteries, to move lithium ions from one electrode to the other. Battery manufacturers need lithium salts, like the Foranext® electrolyte, that can withstand the increasingly demanding conditions of use, including high temperatures and rising electrochemical potential.

Materials for photovoltaic cells

Photovoltaic cells are made up of a number of highly technical organic materials that protect the silicium layer from outside elements. Arkema harnesses its performance materials expertise to bring to this market a large number of innovations, such as:

- Apolhya® grafted polyolefins, which are used for the encapsulation or protection of photovoltaic cells;
- Kynar® fluoropolymers, for backsheet protection; and
- Bostik Vitel® polyester adhesives, which are used for binding photovoltaic backsheets.

Heat-transfer fluids for solar energy applications

The Jarysol® fluids developed by the Group are particularly well adapted to the transfer of heat from concentrated solar power plants.

Materials and products for the wind turbine industry

The Elium® resin developed by Arkema is a lightweight thermoplastic composite that notably enables the fabrication of 25-meter-long wind turbine rotor blades. The resin’s recyclability represents a major advantage for wind turbine manufacturers. The technology won an award at JEC Asia 2017 in Seoul.

1.1.2.4 WATER MANAGEMENT PLATFORM



Population growth and increased urbanization are having a major impact on the availability of water resources and are limiting access to drinking water, the focus of the United Nations’ SDG 6: “Ensure availability and sustainable management of water and sanitation for all.” Through its research, Arkema contributes to this goal by developing (i) a product range specifically aimed at water treatment, transportation and purification and (ii) technologies for more effective management of the water use and discharges associated with its industrial processes. To achieve the latter, a global project to improve water management, known as Optim’O, was launched at Arkema several years ago (for further details, see section 4.3.3 of this document).

In terms of product range, acrylic acid serves to manufacture polyacrylates that are used in water treatment plants to ensure the flocculation of suspended solids. Arkema is also pursuing its developments to use more Albone® hydrogen peroxide to disinfect cooling systems or as a water treatment product for drinking water and swimming pools. Unlike the chlorinated products traditionally used in water treatment, this solution avoids chlorinated water discharges.

Kynar® resins are used in filtration applications to treat wastewater or to make water suitable for drinking. They offer much finer filtration of suspended solids, bacteria and viruses, and a higher (+20%) volume of water filtered for constant energy consumption. They also double the lifespan of certain filtration systems, from five to ten years.

1.1.2.5 ELECTRONICS SOLUTIONS PLATFORM



The numerous innovations for electronics, and particularly mobile devices, contribute to the United Nations’ SDG 9: “Build resilient infrastructure, promote sustainable industrialization and foster innovation.”

Through its technical polymers range (specialty polyamides and fluoropolymers), Arkema offers innovative solutions for the mobile device market, which includes smartphones and tablets. These

solutions relate to the internal structural parts of these devices, which are required to be increasingly thin and made using the same simple injection molding process, as well as offering ultra-high rigidity, and to the external parts, which need to be stain and shock resistant. Arkema proposes materials that meet these increasingly demanding requirements.

With its fluorinated electroactive polymers (Piezotech®), Arkema provides an extremely innovative range of materials for emerging electronics segments, such as organic, flexible and printed electronics. Piezotech® fluorinated electroactive polymers and inks exhibit unique piezoelectric, pyroelectric, electrostrictive, electrocaloric and high-k properties, making them central to the development of next-generation sensors (pressure, deformation, infrared, etc.), actuators (haptic, medical, microfluidic, etc.) and flexible transistors for use in various next-generation products such as screens and solid-state cooling systems. Already being used in smartphones and acoustic sensors, these materials also offer interesting possibilities in such areas as the Internet of Things, wearables, virtual reality and home automation, as well as in the area of connected sensors for the factory of the future.

1.1.2.6 HOME EFFICIENCY AND INSULATION PLATFORM



Energy efficiency, health, comfort and environmental footprint are key concerns in developing the building of the future, with consumer demand in the field regularly becoming greater and more complex. The responses provided to these needs contribute to the construction of sustainable cities and communities, the focus of the United Nations' SDG 11: "Make cities and human settlements inclusive, safe, resilient and sustainable." Mindful that this trend is likely to continue over the long term, Arkema has made home efficiency and insulation a key focus of its R&D strategy.

Arkema offers solutions for the thermal insulation of buildings, which is achieved by combining vacuums or air, which have low thermal conductivity, with materials that provide mechanical strength, such as glass, metal and wood. In particular, Arkema markets a range of high-performance adhesives and sealants, such as adhesives for making double-glazed windows and adhesives for the manufacturing of doors and insulation panels.

This expertise continues to be actively developed within Bostik, where it forms a significant R&D focus. Particular attention is paid to formulations where the Company proactively limits the use of additives with unfavorable toxicity profiles. For example, the most recent floor covering adhesives are phthalate- and solvent-free and have sufficiently low volatile organic compound (VOC) emissions to obtain health certifications like EC1 Plus and to meet the environmental standards required for LEED® and BREEAM® certification.

The coating resins business also contributes to the development of healthier, more environmentally friendly homes. Most new grades of acrylic and alkyd emulsions, which are developed by

this business, can be used without the addition of a coalescing agent, enabling customers to prepare very low VOC coatings. Some grades also capture formaldehyde. In addition, the new binders for exterior paints offered by Arkema have enhanced dust and water resistance and excellent stability with regard to environmental conditions. Thanks to these improvements, consumers can use the coatings for a number of years, thereby reducing the environmental impact of maintenance and replacement works.

The innovation platform also benefits from the development of the Smart House by Arkema, which is located at the Venette R&D site in France. This one-of-a-kind laboratory-house was designed to bring together players in construction to cooperate on innovation and sustainable development. The purpose of the concept house is to test, develop and approve new solutions to major challenges facing the construction industry, particularly energy efficiency, environmental footprint and the health and comfort of building occupants. Since its creation, the project has offered a real-scale illustration of several innovative solutions, including solutions that improve occupants' acoustic comfort and new adhesive concepts that make it possible to recycle plastic flooring by simplifying the replacement process and reducing the associated costs. The improved functionality of construction components such as walls and floors is also under review. The approach developed at the Smart House is part of the Group's open innovation ecosystem, where input from such diverse participants as economists, rental companies, architects, customers, universities and suppliers provides a better understanding of future needs.

1.1.2.7 PROCESS TECHNOLOGY PLATFORMS



Innovation in the area of manufacturing technologies helps to improve reaction yield and reduce the environmental footprint of manufacturing processes by reducing energy and water use, limiting air emissions and effluent discharges, and minimizing waste generation. Arkema has thus deployed several technology platforms that enable it to contribute to the United Nations' SDG 12: "Ensure sustainable consumption and production patterns." These platforms focus primarily on:

- the use of the latest innovations derived from molecular modeling to more accurately predict chemical reactions;
- new solutions that intensify the separation of the primary product from the reaction by-products;
- the development of online analyses that monitor changes in the reaction process and the purity of products without the need for human intervention to obtain samples, thereby avoiding drifts in the production and ensuring consistent product quality; and
- the use of innovative technologies to recycle effluents and/or recover the chemical components present.

1.1.3 Patent and trademark management

Arkema uses patents to protect the innovations generated by its research and development efforts, whether in relation to its manufacturing technologies or its products. Intellectual property rights also enhance the value of the Group's products and brands in the eyes of its customers and enable it to be recognized as one of the most innovative companies in its industry. As a result, the Group's portfolio of patents and trademarks represents a key asset for its business.

1.1.3.1 PATENTS

Protecting the Group's technologies, products and processes with patents is key in optimally managing its business.

Consequently, Arkema files patent applications in its main markets in order to protect new chemical compounds, new high technical performance materials, new synthesis processes for major industrial products and new product applications.

The number of patents granted and the number of patent applications filed annually are good indicators of R&D investment and performance. In 2019, Arkema filed 222 priority patent applications. At 31 December 2019, it held 10,268 patents and had 5,585 patent applications pending ⁽¹⁾. The high ratio of pending patent applications to patents filed per year is due to the lengthy examination process.

Patent protection in countries where Arkema seeks it is typically granted for the maximum legal period of twenty years, calculated from the application date. The level of protection varies from one country to another, depending on the patent type and scope. Arkema seeks patent protection in many countries and regions, primarily in Europe, China, Japan, South Korea, India, North America and South America.

Arkema actively protects its markets. To this end, it monitors competitors and takes action against any third-party infringements of its patents. The Group also challenges third-party patents that are granted without justification and takes legal action to have them declared null and void.

The expiration of a basic patent for a product or process can lead to increased competition as other companies bring new products to market. In some cases, however, the Group may continue to benefit commercially from a patent after its expiration by leveraging expertise related to a product or process or by filing for application or improvement patents.

Arkema also has a policy of obtaining and granting patent licenses to meet operating requirements. For inventions by employees, the Group continues to use the system that it implemented in 1989, whereby it grants additional compensation to employees whose inventions have given rise to a commercially exploited patent.

1.1.3.2 TRADEMARKS

Trademark protection varies from country to country. While in most countries, trademark rights are the result of registration, in some, they may be based on usage regardless of registration. Trademark rights are obtained by registering the trademark nationally, internationally or even supra-nationally in the case of EU trademarks. Registrations are usually granted for a ten-year term and can be renewed indefinitely.

Arkema implements a centralized, dynamic trademark registration policy that draws on a worldwide network of intellectual property advisors.

In particular, Arkema holds the trademark rights to its main products. Examples of Arkema's flagship brands include Pebax[®], Rilsan[®], Forane[®], Careflex[®], Evolution[®], Altuglas[®], Plexiglas[®] (which is used exclusively on the American continent), Bostik[®], Sader[®] and Quelyd[®]. Arkema has also trademark protected the names of its latest innovations, such as Kepstan[®], Elium[®] and N3xtDimension[®].

Mindful of the importance of its brand portfolio, Arkema monitors trademark registrations by competitors in similar business sectors and has a policy of taking legal action against infringements.

(1) All patent applications filed as part of a centralized process – with the World Intellectual Property Organization (WIPO), for example – are counted as a single application, even though the application may result in several patents being granted depending on the number of countries subsequently selected.

1.1.4 Research incubator

The aim of the research incubator is to bring new products to market by carrying out disruptive innovation projects.

These projects are characterized by:

- their anticipation of changes in technologies or markets;
- significant project risks but high value added if successful;
- a market approach closely coordinated with that of the relevant Business Lines (one project may involve several Group Business Lines); and
- a portfolio that is balanced between projects that are expected to be brought to market within five years and projects with longer timelines.

Since its creation, it has notably developed nanostructured PMMA for automotive glazing under the Altuglas® ShieldUp brand and piezoelectric polymers via the Piezotech subsidiary. Working closely with academic and industrial partners, Piezotech is developing applications for electroactive polymers, notably in the area of haptics for virtual reality devices and sensors for consumer electronics.

The incubator was also behind the 2016 launch of Arkema's thermoplastic composites range, which includes:

- the Elium® range of solutions for infusion molding or resin transfer molding (RTM) technologies; and
- continuous glass-fiber-reinforced thermoplastic solutions, such as the Rilsamid® Matrix range, for automatic fiber placement and thermo-stamping.

The incubator also developed PEKK, a new polymer withstanding ultra-high temperatures, under the Kepstan® brand, for which production began in 2010. Production capacities were doubled in France in 2017 and a world-scale PEKK plant at the Mobile, Alabama site in the United States, started production early 2019. These investments will help to meet growing demand in the carbon fiber reinforced composites and additive manufacturing (3D printing) markets (for further details, see section 1.1.2.2 of this chapter).

1.1.5 A collaborative innovation ecosystem

The aim of collaborative innovation is to jointly develop innovative solutions with both academic research teams and industrial partners (customers, suppliers and even competitors). This open innovation approach takes the form of participation in industrial research chairs, sharing of laboratories with recognized research institutions, public-private research partnerships and industrial partnerships. The ecosystem also includes collaboration with start-ups or innovative companies, equity investments in such companies or the acquisition of specific technologies.

RESEARCH CHAIRS, SHARED LABORATORIES AND PARTNERSHIPS WITH UNIVERSITIES

The R&D department has forged numerous upstream partnerships with academic and scientific institutions, in the form of research chairs, shared laboratories, collaborative projects and doctoral and post-doctoral research contracts. The contribution made by these external experts enables the Group to advance its research in scientific areas related to its R&D projects.

In 2018, Arkema joined forces with France's *École polytechnique* and its Foundation to create an international research and teaching chair dedicated to innovative materials named

"Design and modeling of innovative materials." Theoretical and experimental modeling of materials and processes is a key topic for the chemicals industry. This multidisciplinary technique goes beyond materials chemistry to look at the physical and mechanical factors at play during product manufacturing and use. Arkema together with *École polytechnique* and its Foundation all aim to leverage innovation in order to meet the energy, technological, industrial and environmental challenges facing the world today and in the future. The research and development topics explored by the chair include polymer materials, thermoplastic composites and adhesives, with a particular focus on the relationship between process, structure and properties and on the optimization of mechanical properties and processes.

In Asia, Arkema forged a partnership with Monash University in Kuala Lumpur, Malaysia. The aim is to enhance understanding of biocatalysis, a discipline that could lead to more efficient reaction processes than those achieved with traditional chemistry or the identification of alternatives to certain raw materials used in the production of sulfur products. The creation of this center for research into biocatalysis is in line with the Group's commitment to develop increasingly sustainable solutions.

INDUSTRIAL PARTNERSHIPS AND TECHNOLOGY ACQUISITIONS

Arkema also forms downstream partnerships with industrial partners as part of joint research programs with customers, suppliers and even competitors to develop new products and technologies. As part of this, Arkema establishes many research partnerships with customers in order to better understand market demand and to accelerate the development and time-to-market of innovative technical solutions.

FOCUS

After forming a strategic alliance in 2018 to develop thermoplastic composite solutions for the aerospace industry, Arkema and Hexcel opened a joint research and development laboratory in 2019, combining the expertise of Hexcel in carbon fiber and that of Arkema in PEKK. The companies' objective at this new lab is to develop carbon fiber-reinforced thermoplastic pre-preg tapes to enable lightweight parts to be produced for future generations of aircraft. The goal is to offer cost-effective solutions to meet the need for lightweight parts and faster production speeds in the aerospace and defense sectors.

The R&D department has a technology acquisition policy that targets high value-added SMEs and start-ups and supports them in their development process, allowing them to grow in an application-oriented environment thanks to Arkema's resources and expert staff. These equity interests enable the Group to position itself in the ultra-innovative product and high-tech markets.

1.1.6 Development of digitalization

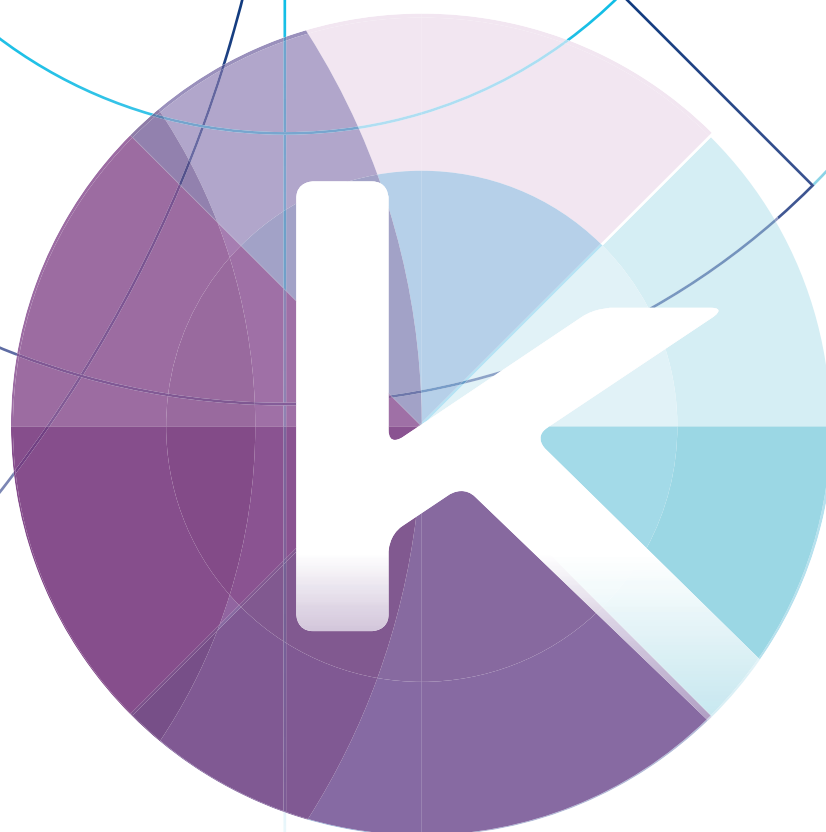
A Digital Transformation department was created in 2018 to set the Group's strategy in this field and drive more widespread use of the innovations associated with digital technology. This digital transformation concerns many of the Group's activities.

In relation to the initiatives launched as part of the digital transformation, the R&D department contributes its expertise in data management and digitization, modeling, software, and the associated computing power, algorithms and their interpretation. These tools enhance the effectiveness of innovation in the Group's

operating and industrial processes and in the development of new processes, products and materials. The R&D department has launched a "digital laboratory" project to gradually integrate artificial intelligence into R&D processes. This will notably include the analysis of images to clarify and characterize the structure of materials, the analysis of formulation data to speed up optimization and semantic data analysis to facilitate access to scientific information and accumulated expertise.



APPENDIX 2 : RISKS AND INTERNAL CONTROL



2.1 MAIN RISKS

Arkema carries out its business activities in a rapidly changing environment, which creates various risks that may be beyond its control. The items described below constitute the main risks and uncertainties to which Arkema considers itself to be exposed at the date of this document. The occurrence of one or more of these risks could have a material adverse impact on the Group's business activities, financial position, results or future prospects, as well as on its image and reputation.

The means implemented by Arkema to identify, assess and manage risks, particularly the set-up and regular update of its risk map, are outlined in the present section as well as in section 2.2 of this chapter.

At the date of this document, the main risks to which Arkema considers itself to be exposed have been categorized as follows without any order of precedence being established between the risks:

- industrial risks;
- risks relating to compliance, legal proceedings, societal expectations and internal control;
- operational risks;
- project and innovation risks;

- economic and business risks; and
- financial risks.

In accordance with regulation (EU) 2017/1129 of the European Parliament and of the Council of 14 June 2017 (known as "Prospectus 3") and ESMA Guidelines published in October 2019, the risks are ordered within each category. The risks are classified by descending order of importance at the date of this document, based on their potential negative impact and their probability of occurrence, after factoring in risk mitigation measures deployed by the Company. Each risk presented has a clear and direct link with the Group and its business activity. However, this list is not exhaustive and other risks of which Arkema is currently unaware or that it deems not to be significant at the date of this document could also occur and adversely affect its business activities, financial position, results or future prospects, as well as its image and reputation. Arkema may alter its assessment of the order of importance of the risks to which it is exposed at any time, notably as a result of external developments or changes in the Group's business activities.

Risks related to non-financial issues are identified by the CSR icon.

2.1.1 Industrial risks

Arkema's business activities are subject to frequently changing international and national laws and regulations in the areas of environmental protection and health and safety. These laws and regulations impose increasingly strict obligations, particularly concerning industrial safety, emissions and discharges into air, water and land of toxic or hazardous substances, use of resources, labeling, traceability, handling, transportation, storage and disposal of toxic or hazardous substances and exposure thereto, the clean-up of past industrial sites, and soil and groundwater remediation.

The industrial risks described below are considered in view of the potential impact they could have both on Arkema and on the environment and stakeholders (i.e., customers, suppliers and people living nearby).

Accidents at sites, external storage or warehouse facilities or during transportation CSR

Because of the very nature of the Group's operations and the level of hazard, toxicity or flammability of certain raw materials, finished products and production or supply processes, different

kinds of accidents (such as explosions, fires and pollution) may occur at Arkema's facilities, at storage and warehouse facilities used by Arkema or during the transportation of various products and raw materials by road, rail, sea or air.

In particular, Arkema operates many industrial facilities, including 35 "Seveso" classified sites in Europe (as defined by directive 2012/18/EU of the European Parliament and of the Council dated 4 July 2012 on the control of hazards linked to major accidents involving dangerous substances) i.e., more than half of the Group's 61 European sites. Outside Europe, the Group operates industrial facilities that fall under a similar classification – including 22 such facilities in the United States – where hazardous substances that are liable to present significant risks to the health or safety of neighboring communities and to the environment are used, produced or stored. These classified sites accounted for approximately 57% of Arkema's total sales in 2019.

Like other chemical sector players, Arkema also owns or uses a small number of pipelines to transport hazardous chemical products.

Arkema may suffer the consequences of possible malicious acts against its facilities or equipment, notably those manufacturing hazardous products and/or “Seveso” classified sites.

Any accident, regardless of whether it occurs at one of the Group’s production sites or during the transportation or use of products manufactured by Arkema, may adversely affect the operation of certain units at its industrial sites and cause delays in production. This could lead to commercial problems, generating significant losses in terms of sales and earnings for the activities concerned, and significant potential costs, in particular due to administrative authorizations or insurance deductibles and damages not covered by current insurance policies. Arkema could also be held liable (i) following injury or damage to property or people, notably due to exposure to hazardous substances being used, produced or destroyed by Arkema or present on its sites, or (ii) for having caused damage to natural resources. In addition, any accident may give rise to compensation claims on grounds of contractual liability (in particular in its role as the shipper, in the case of transportation), tort liability or, as appropriate, product liability.

Risk management

In order to best prevent the risk of accidents, the Group defines scenarios that enable it to assess and anticipate the consequences of various events such as the potential consequences of climate change, which could increase the frequency and intensity of certain weather events (storms, flooding, droughts).

As part of its preventive measures, all Arkema facilities and activities worldwide are covered by a Group-wide safety management program adapted to the risks that each may face. Details are provided in section 4.3 of this document.

In addition, in order to minimize the risk of accidents related to transportation and storage, Arkema endeavors to:

- use transportation means that are deemed less dangerous (barge, pipeline, road-rail or rail), when technical and financial conditions allow it;
- where possible, strictly select suppliers based on the Warehouse Safety and Quality Assessment System (SQAS) which was established under the aegis of the European Chemical Industry Council (CEFIC) by a consortium of European chemical manufacturers and which also covers the Middle East and Asia, and the Chemical Distribution Institute – Terminals (CDI-T) scheme at a global level;
- assess the quality and safety performance of the carriers used;
- ensure regular maintenance of the transportation equipment that it owns, hires or leases (freight cars, ISO containers, tankers and pipelines);
- carry out systemic risk assessment studies when a modal shift is required;

- implement a variety of operational risk assessment measures, including vetting bulk charter vessels and having the transportation safety management system maintained by the Transportation Safety team, which reports to the Group Safety and Environment department; and
- conduct storage audits prior to signing contracts – repeated every three years for warehouse facilities housing hazardous materials – under the responsibility of the relevant business management.

For pipelines, Arkema notably carries out hazard studies and develops compensatory measures to minimize risks where necessary, defines monitoring and response plans, and carries out drills with the emergency services.

Security directives are regularly updated in line with recommendations from the public authorities in order to strengthen the security of the Group’s industrial facilities. In France, the Group’s upper-tier Seveso sites have undergone and are regularly subject to security audits by the authorities, with no evidence found of significant deviations from required standards. The audits led to minor adjustments being made where necessary. In addition, Arkema has raised security levels at its industrial facilities and R&D centers since 2015 in response to terrorist attacks in France, Germany, the United Kingdom and elsewhere. In particular, additional security measures have also been taken in response to malicious acts at other industrial companies in France.

Furthermore, in order to effectively manage potentially critical situations on Group sites and during transportation, Arkema has defined crisis management procedures for its various plants based on the Group Crisis Management directive. A year-round on-call system enables the Group to supervise any crisis that may occur by setting up a dedicated crisis management team. The Group also regularly offers training courses in “Crisis management and communication” and conducts simulations of crises and of setting up of crisis management teams.

Exposure to chemicals CSR

Arkema has used toxic or hazardous substances to manufacture its products in the past, and continues to do so. Employees and former employees of Arkema and, in some cases, employees of external companies and service providers, Arkema customers and people living near Arkema’s industrial sites may have been exposed or may still be exposed to these substances (ingestion, inhalation, skin contact, etc.) and, as a result, may have developed or may develop specific illnesses from such exposure. In addition, for certain substances currently regarded as risk-free, chronic toxicity, even at very low concentrations or exposures, could be discovered in the future.

In 2019, 35 occupational illnesses were reported Group-wide, of which 15 were related to exposure to asbestos and 11 to exposure to chemicals. These figures include illnesses not yet

APPENDIX 2 : RISKS AND INTERNAL CONTROL

included in the tables listing occupational illnesses. In France, four Group sites have been included by ministerial decree on a list of sites whose current employees would be entitled to the early retirement provisions for asbestos workers. For further details, see section 4.3.2.2.4 of this document. Lastly, certain Arkema Group products may also be used directly or indirectly in sensitive applications, such as medical and food applications.

In the event that specific pathologies were to be linked to substances used by the Group or present in the products that it sells, the Group cannot rule out the possibility that it may be held liable.

Risk management

Through product stewardship, Arkema takes care to ensure that its products do not impact people's health or safety. These aspects are taken into account during the product design stage. Regulatory compliance plays a key role in ensuring product safety for customers, the entire value chain and stakeholders.

Arkema has put in place safety and monitoring procedures for its products and the products it uses in its manufacturing processes. It also regularly conducts research on the toxicity of its products and the products it uses, and in addition has developed a tool for monitoring individual exposure to toxic products. For this purpose, Arkema employs regulatory experts supported by a global network of correspondents based in the industrial sites, within the businesses and subsidiaries, and experts in physicochemistry, toxicology and ecotoxicology who work to improve knowledge and understanding of the hazard characteristics of the substances and products used, manufactured, imported and marketed by Arkema. The various procedures in place are described in section 4.2.4 of this document.

In the particular case of medical applications, Arkema has put in place strict rules governing the applications for which Arkema markets its products. In addition, two committees – the Europe/Asia Medical Device Risks Committee and its equivalent for the Americas – are responsible for giving their preliminary opinion regarding all decisions in this area. Arkema, if necessary, may also be forced to withdraw certain products from the market or to cease using certain substances or find substitutes for them in its manufacturing processes, particularly in certain sensitive markets.

Group employees who may potentially be exposed to toxic or hazardous substances in the workplace benefit from medical monitoring adapted to the specific risks related to their activities. When they leave the Group, particularly for retirement, they may benefit, in accordance with applicable legislation, from specific post-occupational medical monitoring established on the basis of information provided by Arkema on the hazardous chemicals they handled over the course of their professional career.

Pollution at sites, warehouse facilities or during transportation CSR

Arkema has activities in business areas that entail significant environmental liability risks, with respect to both the operation of its industrial units and to accidents at one of Arkema's production

sites, at a warehouse or during the transportation of products manufactured by Arkema.

The Group cannot rule out the possibility that claims will be made in connection with its operations or products, seeking to hold it liable for uninsured events or for amounts exceeding the cover limits. Should Arkema be held liable for environmental claims, the amounts covered by provisions or included in its investment plans could prove to be insufficient due to the intrinsic uncertainties involved in projecting expenditure and liabilities relating to the environment. The assumptions used to determine these provisions and investments may need to be adjusted, mainly due to changes in regulations, changes in the interpretation or application of regulations by the relevant authorities, the technical, hydrological or geological constraints of environmental remediation or the identification of as yet unknown pollutants. Achieving compliance with environmental protection regulations for Arkema sites that are still in operation or were previously operated, or for sites where operations have ceased, is likely to generate substantial financial costs for Arkema.

Contingent environmental liabilities are detailed in note 22 to the consolidated financial statements at 31 December 2019 presented in section 5.3.3 of the 2019 Universal Registration Document.

Risk management

Environmental risk is managed by the implementation of a policy defined and monitored by the Environmental Remediation team within Arkema's Safety and Environment department and rolled out within its various businesses under the responsibility of the industrial Vice-Presidents. The components of this policy are detailed in section 4.3.3 of this document.

Arkema also benefits from guarantees from subsidiaries of Total S.A. with respect to former industrial sites, which were granted prior to Arkema's stock market listing. A description of these guarantees can be found in note 31 to the consolidated financial statements at 31 December 2019 presented in section 5.3.3 of the 2019 Universal Registration Document.

Risk of loss of occupancy of certain industrial sites

Arkema owns most of the land on which its industrial sites are built, but some of the Group's industrial facilities in its worldwide network, especially in Asia, are located on land that belongs to third parties, either due to local regulations or for technical or strategic reasons. In such cases, Arkema occupies the land under the terms of leases or similar agreements. If these agreements were to be terminated or not renewed, or if a site were to be expropriated, it could lead the Group to incur significant expenses related in particular to the demolition of existing facilities, the clean-up or remediation of these sites and reconstruction of new facilities. The Company may even be forced to cease certain production activities, which could have a material adverse impact on its business activities, financial position and earnings. Such an event could lead to several scenarios, including having

to move production (and thus all the costs this would involve), or a loss of earnings or margins. For further details on the location of the Group's industrial sites around the world, see the "Group profile" section of this document.

Risk management

When negotiating contracts, Arkema secures its right to occupy land by implementing sufficiently long terms and lengthy notice

periods. Contractual expiration dates are monitored regularly to anticipate any problems regarding renewals. Where applicable, in the event of an expropriation, the Group endeavors to negotiate compensation with a view to reducing future costs related to rebuilding or relocating the units concerned.

2.1.2 Compliance, legal proceedings, societal expectations and internal control

Non-compliance with business practices CSR

The Group is present in 55 countries and uses commercial intermediaries throughout the world, including in Asia, the Middle East, Africa and South America, where it generates 32% of its consolidated sales.

As indicated in paragraph 4.4.2.2 of this document, Arkema pays special attention to the commercial intermediaries it uses in order to minimize the risk of corruption or fraud. Despite this vigilance, there is still a risk that an intermediary may violate anti-corruption laws, resulting in liability on the part of Arkema. If this were to happen, significant sanctions and/or fines could potentially be imposed on the Group, in particular based on US regulations with an extraterritorial reach.

Moreover, 20 of the countries in which the Group operates are subject to financial or commercial restrictions and some of the Group's products fall within the definition of dual-use goods regulated by international conventions (notably diethylamine and diisopropylethylamine).

The Group is exposed to the risk of anti-competitive business practices, including price-fixing and cartel-type arrangements. This risk is accentuated by the fact that there are a limited number of competitors in many markets in which the Group does business.

Non-compliance with regulations in the aforementioned areas in one or several countries may result in significant fines being levied on the Group or civil or criminal charges being brought against it and/or its employees.

Risk management

Arkema has put in place a business compliance and ethics program, which notably covers antitrust, export control and anti-corruption laws together with procedures and guidelines on each of these topics. Training is also given within the Group to prevent risky behavior and maintain a suitable level of awareness in these areas. For further details on this program and related procedures see section 4.4 of this document.

Furthermore, a specific map of corruption-related risks has been drawn up, as part of the general risk map exercise performed by the Group (see section 2.2.4 of this chapter). It is intended to serve as a guide for implementing procedures to assess customers, suppliers and intermediaries.

Regulatory requirements and CSR expectations CSR

Given the fact that it is present in 55 countries, Arkema is subject to complex and constantly changing local, national and international laws and regulations that differ depending on the countries in which it operates and may be lacking in clarity in certain countries. These laws and regulations encompass a large number of fields, including safety, environmental protection, antitrust legislation, company law, commercial law, patent protection, labor law, personal data protection, tax law, customs regulations, and product listing.

If existing product regulations were to be amended to become more restrictive for Arkema or if new regulations were issued, it could (i) compel Arkema to significantly scale back on or even discontinue the production and marketing of certain products, (ii) restrict Arkema's ability to alter or expand its facilities, and (iii) possibly compel it to abandon certain markets, incur significant expenditure to produce substitute substances, institute costly emissions control or reduction systems or (iv) exclude Arkema from certain markets if it could not develop substitute products. At the date of this document, fluorogases (which represented 8% of Arkema's sales in 2019) have been identified as most exposed to regulatory changes and Arkema is actively developing new blends or substitutes, given regulatory changes in recent years and possible future developments. These regulatory changes, which weigh on volumes, may lead to temporary pressure on selling prices. For example, EU F-Gas regulations, which aim to cut emissions by two-thirds between 2015 and 2030, have set up a system of quotas and gradual prohibitions on certain uses. Consequently, from 2020, the use of cooling gases with a Global Warming Potential (GWP) greater than or equal to 2,500 will be

prohibited in stationary refrigeration equipment. Between 2015 and 2019, the Fluorogases Business Line generated a significant share of earnings in the United States from the sale of HCFC-22, however, since 2020, the production and import of HCFC-22 are no longer allowed in the United States. Only sales of existing stockpiles and recycled products are authorized. There have also been discussions, particularly in Europe and the United States, on changes in regulations concerning per- and polyfluoroalkyl substances that could have an impact on certain Group fluoropolymer chemical activities. Moreover, the French Law of 10 February 2020 relating to the fight against waste and the circular economy, which introduced restrictions on the use of microplastics intentionally added to products, will have a limited impact on some of the Group's products used in cosmetic applications from 2027.

Similarly, amidst heightened geopolitical tensions, changes in customs regulations (particularly between the United States and China) could lead to a significant increase in the costs borne by the Group. Moreover, Arkema applies documented transfer pricing policies to its inter-company flows that are recognized by the OECD and reasonable with due regard to the risks and functions of Group entities. However, the tax authorities may disagree with these policies or the margins allocated to the various entities, which may lead to tax reassessments. For example, in 2013, the regional tax department of Lombardy carried out a tax audit of Arkema Srl for 2008, 2009 and 2010, subsequently extended to 2011, 2012, 2013 and 2014 after which it contested, *inter alia*, the purchase price of products for resale and the amount of commission paid to the Company in inter-company transactions, and it applied a withholding tax on inter-company financing. Tax reassessments, plus interest and penalties, for 2008, 2009, 2010, 2011, 2012, 2013 and 2014 amount to €14.7 million. All of these tax reassessments are being challenged, and all of the decisions handed down so far have been favorable to Arkema Srl.

Non-compliance with any of these laws or regulations could result in significant fines being levied on Arkema or civil or criminal charges being brought against it and/or its employees.

Lastly, the Group is especially attentive to the societal expectations expressed by civil society, non-governmental organizations and associations. For a chemical company like Arkema, higher expectations could, in certain cases, lead to more stringent requirements in various areas of the business, such as product stewardship, environmental management and increased consideration of impacts related to climate change and human resources management, resulting in significant additional expenditure and investment to adapt to these requirements. Failure to take action or delays in implementing measures to meet these requirements could result in financial losses through loss of market share or even a loss of reputation for the Group.

Risk management

Group's operational and corporate departments, both at the corporate and local levels, assisted by the Group's Legal department and, where necessary, specialist law firms or the relevant government authorities, work continuously to ensure that a high level of legal expertise and knowledge of applicable laws is maintained, and to anticipate any future developments in order to comply with the applicable laws and regulations at all times.

The Group is supported by a global network of regulatory experts based in the industrial sites, within the businesses and subsidiaries. These experts are more specifically responsible for monitoring regulatory changes (especially those that concern products being developed in several countries) and producing the documents required to comply with the regulations within the prescribed time limits. These experts are involved in professional associations that monitor proposed legislative or regulatory changes at the state or agency level, thus helping the Group to anticipate regulatory changes and prepare accordingly. For further details, see notably section 4.2.4 of this document.

In cases where regulatory changes lead to restrictions on the use of raw materials or the marketing of finished products, Arkema relies on its R&D to develop alternative solutions. For further details, see section 1.1 of this document.

Legal, administrative and arbitration proceedings

In the normal course of its business, Arkema is or may become a party to a number of administrative, legal or arbitration actions, suits and proceedings, as a result of which it and/or its employees may be found tortiously or contractually liable on various grounds, such as violating the various laws applicable to the Group, full or partial failure to fulfill contractual obligations, termination of established business relationships, pollution, non-conformity of products, exposure to chemical products, non-compliance with export control regulations, or violating anti-corruption laws, as well as over disagreements concerning the interpretation of the law, established case law, international treaties or tax authorities' commentaries in one of the many countries in which Arkema does business.

A description of the most significant current or potential litigation is given in note 22.2 to the consolidated financial statements at 31 December 2019 in section 5.3.3 of the 2019 Universal Registration Document.

To the best of the Company's and the Group's knowledge, there are no other administrative, legal or arbitration proceedings currently underway, or with which the Company or the Group are threatened, that are likely to have or have had over the course of the past twelve months a material adverse impact on the results or financial position of the Company or the Group. However, it cannot be ruled out that, in the future, new proceedings, related

or unrelated to existing proceedings, could be initiated against an Arkema entity. Should such proceedings have an unfavorable outcome, they could adversely impact Arkema's business activities, financial position or results.

Risk management

All legal risks related to current or potential litigation are subject to a quarterly review. On the first day of the last month of every quarter, each business, corporate department and subsidiary must provide Arkema's Accounting and Controlling department and Legal department with a written summary of any legal risks or proceedings that affect, or are likely to affect Arkema's business activities, results or financial position. These two departments analyze the risks and legal proceedings that were identified and they determine, in liaison with the internal contacts concerned, the amount of the provisions relating to such risks and legal proceedings based on the rules described in note B. "Accounting policies" to the consolidated financial statements at 31 December 2019 in section 5.3.3 of the 2019 Universal Registration Document.

Internal control failures linked to acquisitions of small and mid-sized businesses

As part of its overall corporate strategy, Arkema pursues a bolt-on acquisition program that targets small and mid-sized businesses. Over the past five years, the Group has assembled a portfolio of more than 80 industrial subsidiaries, representing total sales of over €2,300 million. Consequently, the number of subsidiaries included in the scope of consolidation, which appears in chapter 5 of this document, has increased rapidly. The internal control systems of the subsidiaries acquired vary in terms of their maturity. This may result in errors due to poor knowledge of best practices and attempts at internal or external fraud that may cause financial or even reputational damage to the Group. Potential internal control failure is a risk specific to Arkema due to the "Seveso" classification of some of its European sites or a similar-type classification for some of its non-European industrial sites, as well as for the products manufactured by the Group.

Risk management

Arkema needs an average of two years to deploy its internal control and risk management systems, and particularly its organization, main stakeholders and framework, as described in section 2.2 of this chapter.

2.1.3 Operational risks

Risks related to the disruption caused by the Covid-19 public health crisis (added following the Board of Directors' meeting of 26 February 2020)

The Covid-19 epidemic which emerged in China in January 2020 and which has now spread to several other regions throughout the world, such as Europe and the United States, has led the governments of a number of countries where Arkema operates to introduce lockdowns and adopt measures to restrict the movement of people and the transportation of goods. At the date of this document, these rules have caused disruptions for the Group at various levels. They have notably impacted the supply chain and weighed on customer demand in the different regions of the world. They could in some cases result in partial or total closures of production units. At the date of this document, the majority of our plants across the world are still operating, even though production has become difficult to organize at certain sites due to absenteeism. Some sites are at a standstill, particularly in India and Malaysia. At the end of February 2020, the impact of these disruptions on the Group's EBITDA was approximately €20 million.

If the current situation were to last, or worsen, this could have an impact on our employees' health and availability and create difficulties with respect to the supply of certain raw materials or the delivery of products to our customers. It could therefore lead to temporary shutdowns of the Group's production units. The epidemic could also impact the Group's financial performance (sales and operating income) and its ability to generate cash, although it is not possible to assess the impact with precision at the date of this document.

In compliance with the applicable regulations, Arkema is implementing the necessary measures to protect in priority its employees' health and limit the impact of the crisis on its business and results. The Group has put in place crisis management measures at the central level, as well as in the different countries in which it operates, in order to protect its employees' health, adapt to evolving local regulations, and more generally to the consequences of the crisis, as well as to prepare the return to more normal conditions. In this context, the Group will benefit from the strength of its balance sheet and the recent renewal of its financing capabilities.

Dependency on suppliers CSR

In the case of certain raw materials, equipment and services (storage in particular) that are essential to its business, Arkema is to a significant extent dependent on a limited number of suppliers and, in some cases, a single supplier. Default by a major supplier, the non-renewal of supply contracts for certain raw materials or their renewal on less favorable terms, and significant price increases could therefore have an adverse impact on Arkema's industrial and financial performance.

In particular, the Group entered into certain multi-year supply contracts, including those governing Arkema's supply of propylene and oxo alcohols, hydrofluoric acid (HF) and cyclododecane (CDAN), which are used as a main raw material for acrylic monomers, fluorogases and polyamide 12, respectively. With regard to the supply of propylene for the Acrylics business at the Carling site in France following the shutdown by Total Petrochemicals France of its steam cracker in

APPENDIX 2 : RISKS AND INTERNAL CONTROL

Carling, a new agreement was signed on 3 September 2015 with Total, covering the period to 30 April 2021. Arkema is working with the Total group on the supply of propylene to the site beyond the end of the current agreement. In addition, Arkema France signed an electricity supply agreement with EDF covering some of its industrial sites for a 25-year period (1996–2020) in return for payment to EDF of a sum corresponding to a drawing right. Beyond 2020, Arkema France will have to negotiate new supply conditions with electricity providers for its industrial sites. There is a possibility that these conditions will be significantly less favorable than the current ones.

Arkema's French industrial chemical plants, which consume and ship significant quantities of bulk raw materials classified as "hazardous materials" for transport purposes, are dependent on the quality of service provided by rail operators and storage authorizations at the sites in question, especially when there are constraints on transport solutions for operational or regulatory reasons (e.g., single wagons and not full trainloads; no road alternatives). They are therefore monitored very closely, in liaison with the authorities, infrastructure managers and freight operators.

Risk management

Arkema has implemented a policy of spreading supplier risk at product-line level and at geographic exposure level for its supplies of raw materials, energy resources, services and for some equipment.

The Group's centralized procurement policy for raw materials and goods and services aims in particular to analyze and, insofar as possible, comprehensively address its exposure to the risk of significant dependence on supplies and suppliers.

This policy is based on the following principles:

- diversification of sources of supply when technical conditions allow it;
- the development of long-term partnerships or contracts for supply situations that are subject to severe structural constraints due to the supply and demand balance or the limited number of suppliers; these partnerships also provide the Group with a competitive long-term cost of supply;
- careful management of the duration of contractual commitments;
- supply chain and inventory management adapted to both business and industrial requirements, particularly for strategic products;
- a thorough assessment of suppliers based on the following criteria: position in the relevant market, industrial and CSR performance, financial strength and development; and
- participation in certain investments or development projects.

Customer risks

For certain business activities, Arkema has entered into agreements representing significant income with certain customers, the most significant of which are described in section 1.2 of this document for each business concerned. Any crisis affecting an economic sector of Arkema's customers, together with termination, non-renewal or renewal on less favorable terms than those initially agreed for the main contracts, could lead to significant losses in sales and earnings for the businesses concerned and a sharp

deterioration in their profitability. In some exceptional cases, when the customer breaches its contractual commitments, Arkema may initiate legal proceedings or arbitration to enforce its rights. For more information on disputes, please refer to note 22.2 to the consolidated financial statements at 31 December 2019 in section 5.3.3 of the 2019 Universal Registration Document.

More generally, the Group's relationships with a large number of clients expose it to credit risk. At 31 December 2019, accounts receivable net of provisions amounted to €1,204 million. These accounts receivable are detailed by due date in note 24.4 to the consolidated financial statements at 31 December 2019 in section 5.3.3 of the 2019 Universal Registration Document. Arkema's exposure to credit risk is linked to the individual characteristics of its customers.

Risk management

In addition to a highly diversified customer base, the Group's sales are evenly balanced across the different regions in which it operates, thus limiting the geographical concentration of credit risk.

Lastly, regarding customer credit risk, Arkema has set up a global credit insurance program that, given the quality of its customer portfolio and low claim rate, allows it to cover a significant proportion of its accounts receivable. Arkema has also deployed a specific credit risk management policy that consists in regularly assessing the solvency of each of its uninsured customers. Uninsured customers whose financial situation does not meet Arkema's solvency requirements are only supplied after payment. For more information, please refer to note 24.4 to the consolidated financial statements at 31 December 2019 in section 5.3.3 of the 2019 Universal Registration Document. The policy concerning provisions for doubtful accounts on fully or partially uninsured accounts receivable is also detailed in this note.

IT and cybersecurity risk

The Group's industrial and management processes, and communication between employees and third parties, are highly dependent on information technology systems based on complex and ever-changing technical environments. Interruptions to the operation of critical applications or loss of sensitive data (due to system failure or intrusion or malicious use of IT systems) could have a material impact on the Group's business activities, earnings or financial position.

In the event of system failure or intrusion or malicious use of the IT systems, the Group may have to shut down or slow down all or part of one or more industrial units or departments. Given the nature of the Group's business and the sensitive nature of its industrial processes, any interruption in the operation of critical applications or loss of sensitive data (for any reason whatsoever) may result in the shutdown or slowdown of all or part of one or more industrial units or departments as a precautionary measure.

Risk management

The Group's IT department aims to provide systems access to authorized users while ensuring the integrity and confidentiality of sensitive data, in accordance with accreditations issued. Therefore, the Group constantly adapts its IT and industrial systems' prevention, detection and protection capabilities

and implements organizational measures (IT systems security policy, application of international standards, boosting user awareness, user access management, business continuity plan) and technical measures (global cybersecurity operational center, data protection, networks and infrastructures) that reduce the Group's cyber risk exposure.

To ensure the reliability of the Group's critical processes and compliance with security rules, the Group has set up an internal control system consisting of a number of general IT controls. The effectiveness of these measures, particularly in terms of cybersecurity, is assessed every year and action plans are put in place to address any identified weaknesses.

To boost cybersecurity at local level, each site must also comply with ten directives. Accordingly, the technical requirements of the Group's IT systems security policy comprise a behavioral component with the implementation of the iSafe program to raise employee awareness in the areas of data protection and cybersecurity throughout the world.

Contractual commitments

In the course of its business activities, the Group has entered into multi-annual raw materials and energy procurement contracts to guarantee the continuity and security of supplies to its plants. Based on standard market practices in the Group's business sector, some of these long-term contracts include "take or pay" clauses, requiring the buyer to draw down minimum annual volumes over the term of the contract. Group companies may therefore be obliged to pay for minimum quantities whether or not they actually take delivery of these. In the event of failure to fulfill these contractual commitments or of early termination of the agreements by Arkema, these suppliers could claim compensation or penalties.

In the event of unfavorable economic conditions, a fall in demand or a change in demand for certain Group products, the Group may not reach the minimum annual volume and may have to pay a penalty based on the total minimum annual volume cost. These contractual "take or pay" obligations may therefore have a negative impact on the Group's future operating income and cash flows. The Group's total financial commitments amounted to €654 million at 31 December 2019. For more information, please refer to section 31.1.2 "Contractual obligations relating to the Group's operating activities" in Note 31 to the consolidated financial statements at 31 December 2019 in section 5.3.3 of the 2019 Universal Registration Document.

Risk management

Each Group business deploys an industrial and commercial organization as well as a quality control system designed to help it fulfill its commitments. Furthermore, the Legal department supports the relevant businesses during the negotiation process for the various agreements.

After being reviewed by the Group's Legal department, material contractual commitments must be approved by the Executive Committee, which, depending on the situation, may request that a specific organizational structure be put in place.

Natural disasters and climate change CSR

Due to their geographic location, 37 of Arkema's 144 industrial sites (especially those located in Texas in the United States) are exposed to seismic and/or climate risks such as floods, drought and storms, the severity and frequency of which may evolve as a result of climate change. In 2019, 25 of these 37 sites were identified as being specifically exposed to climate risks. These classified sites accounted for approximately 23% of Arkema's total sales in 2019. If they were to become unavailable as a result of significant damage resulting from a natural disaster, this could significantly affect the business concerned, leading to material losses in sales and earnings, and resulting in significant costs due to insurance deductibles and damage not covered by current insurance policies.

In addition, in light of increasingly high expectations in the area of climate change response, the tightening of international, European and national regulations, notably those aimed at reducing greenhouse gas emissions (CO₂ allowance systems), could have a negative impact on Arkema's business activities, operating costs or profitability. Fluorogases, for example, have been identified as the products that have been most exposed to regulatory developments for many years.

Risk management

In order to prevent and limit the potential impact of natural disasters and climate change at the 37 exposed sites, insofar as this is possible, the Group has defined scenarios that take into account the evolution and potential consequences of climate change, including the increased frequency and intensity of certain weather events, such as storms, flooding and drought.

For most of these sites, there are alternative production arrangements within the Group to absorb all or part of the production and thus ensure continuity of customer service. Some others are the only production sites for the products in question.

Following the industrial accident that took place at the Crosby site in Texas in September 2017 as a result of Hurricane Harvey, a category 4 storm, the US Chemical Safety and Hazard Investigation Board (CSB) published a report on the accident on its website on 24 May 2018, as well as a press release entitled "CSB Releases Arkema Final report". Consequently, Arkema has strengthened its existing risk and hazard analysis procedures by devising a policy to ensure periodic assessment of the potential impact of a natural disaster or extreme weather event at its sites, within the deadline imposed by the CSB. At the same time, Arkema has developed an extreme weather planning and response toolbox to ensure that critical safeguards, such as backup power, function as intended during extreme weather events, including hurricanes or floods.

In addition, Arkema endeavors to reduce the greenhouse gas emissions generated by its operations and energy use, and also strives, through its innovation, to adapt its product range in order to reduce emissions across its value chain. Concerning fluorogases, Arkema is already anticipating the applicable regulatory changes by developing new blends or substitutes. The various initiatives taken and the results achieved as part of the fight against global warming are presented in section 4.3.3.2 of this document.

Supply chain disruption

Arkema's customer supply chain may be interrupted due to supplier failure, the unexpected shutdown of a Group production site (supplying other Group sites), a supplier, a customer, or a disruption affecting transportation, logistics or storage and warehousing facilities. These disruptions or extended shutdowns impacting a production site may result from problems with raw material or energy resource supplies, technical incidents, industrial action or natural disasters as well as serious government-declared health crises. They may lead to delivery delays over extended periods of time, which could adversely impact the Group's sales and earnings, as well as the quality of its customer relationships.

Moreover, in the event of difficulties with certain raw materials, alternative sources of supply may be limited or non-existent, or only be available at a very high cost.

Regarding transportation, due to stricter regulations on the transportation of hazardous materials, the temporary or permanent lack of transportation means for certain toxic or hazardous products to certain destinations, the market dominance of a single supplier, and industrial action affecting transportation, Arkema may face delays in delivery or even refusal by its carriers to collect shipments, difficulties in meeting certain customer demands, increases in certain shipping costs or shipping equipment rental costs and reductions in certain shipments.

Arkema uses many storage and warehousing facilities located on its industrial sites and elsewhere. The temporary unavailability of these storage facilities may lead to a production disruption or suspension at certain Group sites or to delivery delays for certain customers as alternative storage solutions are sometimes limited for certain Group-manufactured products.

Risk management

In order to minimize the risks related to the transportation and storage of its raw materials and own products, Arkema endeavors to strictly select suppliers based on the Warehouse Safety and Quality Assessment System (SQAS) which was established under the aegis of the European Chemical Industry Council (CEFIC) by a consortium of European chemical manufacturers and which also covers the Middle East and Asia, and the Chemical Distribution Institute – Terminals (CDI-T) scheme at the global level. Arkema also endeavors to diversify its service providers and, in particular, split its product shipments between several carriers where possible. Lastly, the Group develops alternative solutions that combine transportation plans and distribution schemes, with a lag time for implementation, and can set up geographical swaps with other manufacturers.

Insurance cover default risks

Arkema's insurance policy is part of the overall risk management framework and, as such, is described in detail in section 2.2.6 of this document.

At the date of this document, Arkema believes that the limits of insurance cover described in said section take into account the type of risks it incurs. However, in some cases, the possibility that Arkema could be required to pay substantial compensation for claims that are not covered by the existing insurance program, or that it will incur very substantial expenses that will not be reimbursed or only partially reimbursed under its insurance policies, cannot be excluded, notably in the event of an accident at a site or external warehouse, during transportation or in the event of natural disasters.

Arkema selects its insurers from the best and most financially sound companies when taking out policies. However, the possibility cannot be ruled out that, at the time of settling a claim, one or more of these insurers could be in a difficult, even compromised, financial situation that puts payment of the compensation in doubt. Furthermore, recent developments in the insurance market could result in unfavorable changes to the Group's insurance policies and an increase in policy premiums.

The Group's insurers, under certain conditions deemed customary in the insurance industry for those types of contracts, can prematurely terminate insurance policies in the event of a major claim. In such an event, the Group nevertheless remains covered throughout the notice period, which may vary depending on the policy.

Risk management

Since its creation, Arkema has maintained a department dedicated to the investment and management of the Group's insurance cover, backed by international insurance brokers to optimize and bolster its cover.

The Group issues regular calls for tenders to insurance brokers and insurers in order to ensure that it is always informed of the best offers available on the market. Insurance cover and insurers are selected based on objective criteria including price, the extent of coverage and the strength, experience and quality of the insurers.

Talent and skills risks CSR

Arkema's success is deeply linked to the quality and commitment of its employees and, as a result, to its ability to attract, integrate, motivate, promote and retain skilled employees across all regions.

Arkema's experienced and committed teams enable it to:

- innovate by creating sustainable product and application solutions (in 2019, Arkema's R&D teams numbered more than 1,600 researchers working in 15 research centers structured around three regional research and innovation hubs);
- deploy complex industrial projects (such as the construction of the thiochemicals platform in Malaysia in a new country using an innovative process);
- consolidate acquisitions (in particular within Bostik) ;

- and, more generally, adapt to different macro-economic environments and significantly improve Arkema's financial and CSR performance.

Given that 32.5% of Arkema's employees are over 50 years old at the date of this document, the Group needs to organize an effective skills transfer process from that generation to a new generation of employees over the coming years.

Difficulties in hiring or retaining skilled employees – especially those with particular expertise in the technologies required in sectors like Arkema's – or even the departure of experienced employees (due to resignation or retirement) could hamper the implementation of the Group's strategy and have a negative impact on its business activities and financial position.

Risk management

Arkema has implemented numerous initiatives aimed at attracting quality candidates, retaining top employees and reinforcing, notably thanks to targeted training, their skills and, as a result, the Group's overall expertise. For further details on the human resources development and talent management policy, see section 4.4.1 of this document.

Arkema's compensation policies value and reward fairly each employee's contribution to the Group's success. Arkema has also rolled out long-term incentives to motivate and retain employees (incentive schemes, profit-sharing plans, employee shareholding and performance shares). For further details, see sections 3.5 and 4.4.1.3 of this document.

Lastly, Arkema ensures that skills in certain sensitive technologies are shared by a sufficient number of employees in order to safeguard know-how within the Group.

2.1.4 Project and innovation risks

Investment and acquisition projects

As part of its targeted growth strategy, based in particular on developing new products and expanding the Group's geographic footprint, Arkema is involved in complex, sometimes very large-scale projects, such as the current investments in the thiochemicals platform in Malaysia and specialty polyamides in Asia, representing a total estimated investment at the end of 2019 of approximately €500 million, mainly concentrated over the period 2018 to 2021 and which are described in section "Profile, ambition and strategy". Arkema also invests around 2% of its annual sales in development projects designed to ensure its future growth. The completion of these projects may be delayed and/or result in expenses in excess of those initially budgeted for by the Group. These investments could weigh on the Group's growth prospects and the expected profitability of its other investments and thus have a negative impact on its business, earnings and financial position.

Arkema is also deploying a bolt-on acquisition program that targets small and mid-sized businesses to strengthen its portfolio and boost the share of its specialty activities from 72% of sales in 2019 to more than 80% by 2023. The Group has invested nearly €950 million in this program over the past three years. These acquisitions may expose Arkema to various risks, including in particular the risk of bearing potential liabilities or responsibilities related to the businesses acquired (notably

relating to real estate owned or leased by companies acquired by Arkema), in spite of the quality of due diligence performed. In addition, the assumptions on which the acquisitions were made may fail to materialize, notably those relating to the development prospects of these activities may not be achieved, or projected synergies may not be fully unlocked, which may adversely impact the valuation of goodwill together with the Group's growth prospects, earnings and financial position.

Furthermore, Arkema holds non-controlling interests in certain companies, which could lead to disagreements or deadlocks, and in certain cases that are beyond Arkema's control, to decisions that go against Arkema's interests. The interests included in the Group's scope of consolidation are described in the notes to the consolidated financial statements at 31 December 2019 in section 5.3.3 of the 2019 Universal Registration Document.

Lastly, as part of its program to dispose of non-strategic activities described in the "Profile, ambition and strategy" section of this document, Arkema may have to provide guarantees to third parties for certain operations. It cannot be ruled out that when some of these guarantees are invoked, the compensation claims could exceed the provisions made by Arkema.

For further details concerning the potential impact on the Group's prospects, see the "Profile, ambition and strategy" section of this document.

APPENDIX 2 : RISKS AND INTERNAL CONTROL

Risk management

Arkema has demonstrated its ability to carry out significant projects and has acquired solid experience in this area over the years. For each of its investments, the Group solicits the necessary internal and external resources and expertise to ensure its projects are implemented under the best possible conditions.

Before entering into any external growth transaction, Arkema takes precautions when identifying targets, in particular by conducting in-depth evaluations of the activities and companies concerned and the various liabilities related to the business being sold, and by negotiating appropriate guarantees from the sellers or putting in place insurance cover for the same purpose with the advice of external consultants with expert knowledge in this area. Furthermore, acquisitions are carried out by teams of qualified experts under the responsibility of the Strategy department.

Arkema has a small number of non-controlling or joint-controlling interests in joint ventures, and protects its interests by introducing, where possible, contractual provisions designed to resolve deadlocks and maintain the Group's decision-making powers.

Innovation and technologies

Group innovation policy, formulated in 2018 and described in section 1.1 of this document, is a strategic pillar in Arkema's targeted growth strategy and a key component in its contribution to sustainable development. Whether aimed at manufacturing technologies, products or their applications, innovation makes it possible to create sustainable solutions. Innovation enables Arkema to:

- launch innovative new products and solutions on the market while continually improving their performance and providing its customers with the technical support they need as well as the solutions its customers will need in the years ahead; and
- enhance the Group's operational excellence by providing production facilities with new technologies and processes, thereby enabling the Group to produce safely and competitively while limiting its environmental footprint, in line with its commitment to being a responsible chemicals producer.

In 2019, R&D expenditure totaled €249 million, representing 2.8% of Group sales. 222 patents were filed in 2019 (244 in 2018) and the number of sustainable development-related patents filed was 149 (154 in 2018).

Despite the investments made, the Group may be unable to develop new products and new applications or to develop new production processes. This inability, or a delay in the development of such new products, could prevent the Company from marketing certain products and could therefore have an adverse impact on its business and earnings.

Moreover, changes in processes used by customers or a switch from one technology to another in their products, particularly in

the batteries or hygiene products sector, could drag down the Group's sales.

In the course of its business, Arkema uses technologies that it owns or technologies under license from third parties. If Arkema were no longer able to use these technologies, it could have an adverse impact on its business activities or results.

Risk management

Each year, Arkema invests heavily in R&D to develop new products and processes that cater to both market demands and societal challenges: more than 1,600 researchers and €249 million in R&D expenditure spread across 15 research centers in three regional hubs (in Europe, Asia and North America). This major focus on innovation also enables the Group to adapt to regulatory changes. The R&D teams carry out important monitoring work which, beyond Arkema's own specialist technological fields, is also carried out downstream in technological monitoring of its main customers' businesses. The organization and policy priorities of the Group's R&D, as well as the resources dedicated to R&D are detailed in section 1.1 of this document.

Furthermore, Arkema has a technological development policy for its processes, in particular as part of its R&D programs, to give it ownership and control over the technologies that it uses in its major activities, and to help reduce its level of exposure to third parties in this regard.

Protecting data and know-how

Arkema is developing an innovation-based growth strategy structured around a dedicated organization, 15 research centers spread throughout the world and a research incubator. It therefore has a large R&D project portfolio. As such, the patents and trademarks that protect the innovations generated by Arkema's research represent a key asset for its business. At 31 December 2019, Arkema owned 10,268 patents and 222 new patent applications were filed in 2019, 149 of which relate to sustainable development. For further details, see section 1.1 of this document.

Consequently, aside from having an instantly negative impact on Arkema's results, patent or trademark infringements committed by a third party and any other types of intellectual or industrial property rights infringements could also harm the reputation and the perceived quality of the products concerned as well as the image of the Group. Arkema could also infringe a patent involuntarily, given the time during which patent applications are not made public. Patent applications filed by third parties and made public only on publication could therefore have an impact on ongoing developments or even products recently brought to market and could oblige Arkema to modify its product, thereby increasing the related R&D costs, or to negotiate a license to use the patented component.

For further details on patent and trademark management, see section 1.1.3 of this document.

Lastly, the disclosure of confidential documents or the copying of processes or technologies that are critical to its production and to maintaining its international competitiveness could also adversely affect its business activities or results.

Risk management

Arkema has developed an assertive policy to protect its innovations and know-how through the registration of patents and trademarks, particularly with the support of a global network of industrial property consultants. The Group's intellectual and industrial property rights are managed by the Intellectual Property department, which reports to the R&D department for patent matters and to the Group's Legal department for trademark and design matters. These departments are mindful of any infringements that may be committed against the Group's intellectual and industrial

property rights and can, where required, take whatever action they deem necessary to prevent those infringements, halt them and obtain redress for said infringements. When new products, applications and processes are being developed, the departments also verify whether a given technology can be freely used in order to prevent any patent infringement due to such use. For further details, see section 1.1.3 of this document.

When it comes to protecting sensitive data and their confidentiality, particularly in the area of technology, the Group has strengthened its security policy by updating its procedures and application guides, which are applicable at all of the Group's sites, and has introduced an awareness-raising and training program for its employees. Lastly, Arkema subcontracts equipment essential to its critical processes to specific companies bound by confidentiality agreements. Files and technical manuals are managed by a restricted number of individuals.

2.1.5 Economic and business risks

Geopolitical and macroeconomic instability

Arkema's global business, which generates a significant portion of sales in certain regions of the world or countries (36% in Europe, 29% in the United States and 12% in China in 2019), exposes it to the direct and indirect consequences of trade disputes, embargoes, epidemics or pandemics, sudden changes in customs duties, terrorist activities and political instability. These events could, in particular, result in delays or losses in the Group's product deliveries to its customers or in the supply of raw materials and could therefore have a material adverse effect on its sales and earnings. In addition, they could lead to increased costs for products manufactured by the Group as well as to higher safety costs.

Risk management

With its balanced geographic presence in Europe, North America and Asia, the Group is able to spread its risk between the different geographic regions in which it operates. In addition, as Arkema gradually establishes production plants in the main geographical regions, this secures local supplies to its customers present in the region and limits the flow of products between different regions.

In addition, to develop and implement effective policies and strategies in each of its foreign operations, Arkema relies on subsidiaries, which are placed under the supervision of a regional Vice-President, in most countries in which it has industrial and commercial operations. This organization helps the Group maintain relations with local authorities and economic players, defend its interests, and better anticipate changes in the local political and economic environment.

Lastly, as part of its compliance and business ethics program, Arkema has put in place procedures that cover export control and other restrictive regulations applicable in some countries.

Change in key raw materials prices

Upstream of its activities, the Group uses raw materials and energy resources to manufacture its products, some of which are indirectly linked to the price of crude oil like propylene or butadiene, while others, such as sulfur, castor oil and fluorspar, are only minimally connected or not at all. The prices of these raw materials and energy resources can be highly volatile and therefore lead to significant variations in the cost price of the Group's products. The delayed impact of raw material price increases may have a significant impact on the earnings of certain Group businesses, particularly downstream businesses, which represent a significant portion of its activities.

Risk management

Arkema strives to optimize the costs of its raw material and energy supplies by diversifying its sources of supply. In some cases, the Group may therefore use derivatives such as futures, forwards, swaps and options, on both exchange and over-the-counter markets. These derivatives are matched with existing contracts (see notes 24.5 and 25.2 to the consolidated financial statements at 31 December 2019 in section 5.3.3 of the 2019 Universal Registration Document).

The Group also forges partnerships with customers and suppliers who are leaders in their respective fields in order to build strong,

long-term business relationships and ensure a competitive cost of supply.

Lastly, Arkema strives to deploy an appropriate pricing policy, in particular in downstream activities like adhesives or activities like downstream acrylics, in order to pass on increases in the cost of the raw materials used to manufacture its products to its sales prices.

Strengthening competition

Arkema faces strong competition in each of its businesses, especially intermediate chemicals, the strengthening of some of its competitors and the emergence of new players that could impact its own competitive position. Regarding the Group's intermediate product lines, some competitors are larger and more vertically integrated, which could enable them to benefit from lower production costs for certain products that are also manufactured by the Group. The economic emergence of certain countries like China, has been accompanied by the rise of local competitors, resulting notably from new global capacities and leading to growing competition on certain product lines, such as

fluorogases and acrylics. This could result in lasting downward pressure on the selling prices of these products.

Risk management

With a view to consolidating its competitive position, Arkema has since its creation implemented a policy of operational excellence and cost optimization to enhance the competitive advantages that it enjoys in its various product lines and to guarantee the quality and performance of the products offered to its customers.

Thanks in particular to its innovation, the Group is also deploying a repositioning strategy to diversify its portfolio of products and application markets and strengthen its position in niche markets with higher added value.

Finally, the Group is forging long-term partnerships with customers who are leaders in their fields, enabling it to build solid and lasting commercial relationships with its main partners and support them in their development.

2.1.6 Financial risks

Arkema is exposed to two types of financial risks: foreign currency risk and liquidity risk.

The information provided below is based on certain assumptions and expectations that, by nature, may prove to be inaccurate, particularly with respect to changes in exchange rates and Arkema's exposure to the associated risk.

Foreign currency

Given its international operations, Arkema is exposed to various types of currency risks:

- transaction risks related to Arkema's day-to-day operations and development projects;
- translation risks related to the consolidation in euros of Arkema's subsidiaries' accounts in currencies other than the euro. Fluctuations in the exchange rates of these currencies, particularly the US dollar-to-euro exchange rate, have had in the past and may have in the future a material impact on Arkema's financial position and operating income. The translation effect of a 10% change in the euro/US dollar exchange rate, for example, would have an estimated impact on consolidated EBITDA of €50 million. For further details about the impact of the translation effect on Arkema's income statement and balance sheet, see sections 5.1.5 and 5.1.9 of this document; and

- risk of competitiveness related to the fact that, proportionately, in the euro zone, the Group incurs more operating expenses in euros than it generates sales in the currency owing to the fact that it is an export-focused company. As a result, Arkema's competitive position may be affected by the weakness of certain currencies, and in particular the US dollar against the euro, compared with its competitors positioned in countries with a weak currency. Furthermore, the weakness of certain currencies in countries with major imports from Arkema may affect its results.

Risk management

Arkema's objective is to minimize the impact of exchange rate fluctuations on its results and financial position.

Transactional risks are systematically hedged when recorded in the accounts: Arkema companies hedge their foreign currency assets and liabilities against their respective functional currencies. Revenues and costs in foreign currencies are hedged essentially by spot foreign exchange transactions and sometimes by forward transactions.

Foreign currency risk linked to future flows, such as capital expenditure or sales flows, particularly export sales, may also be hedged. The Executive Committee is responsible for deciding whether such hedging is necessary, and the Financing and Treasury department is responsible for its implementation using

simple derivatives. For further details, see notes 24.1 and 25 to the consolidated financial statements at 31 December 2019 in section 5.3.3 of the 2019 Universal Registration Document.

Translation risk is not hedged as Arkema considers that it is inherent to its worldwide operations. However, Arkema reduces its balance sheet risk through a policy of allowing its companies to contract debt only in their functional currencies, except when a foreign-currency loan is backed by a commercial risk in the same currency.

Arkema strives to mitigate the risk of lower competitiveness thanks to its strategy of achieving a greater balance in its geographic exposure.

Liquidity

Arkema has conducted a specific review of its liquidity risk and deems it is in a position to meet its future commitments.

Arkema uses bond issues and loans from banking institutions to finance its day-to-day operating requirements and development. However, unforeseen needs may also arise, resulting in particular from an increase in working capital or unfavorable market conditions. Additionally, market conditions may make it difficult to refinance bonds at maturity, or one or more banks may be

unable to meet their obligations to Arkema with respect to one of its main credit lines, which would significantly reduce its access to financing under equivalent terms. For further details on borrowing terms and in particular on early repayment clauses, see notes 23 and 24 to the consolidated financial statements at 31 December 2019 in section 5.3.3 of the 2019 Universal Registration Document.

Risk management

Arkema's financing policy, implemented by the Financing and Treasury department, aims to provide the Group with the necessary financial resources to fund its operations over periods of time adapted to its repayment ability. This policy is based on the following principles:

- having Arkema's long-term credit rated by two rating agencies and maintaining a solid investment grade rating;
- having a net debt to EBITDA ratio of less than 2;
- maintaining cash reserves in excess of €500 million;
- a Euro Medium Term Note (EMTN) program, to facilitate access to bond markets;
- maintaining average maturity at over three years; and
- diversifying its sources of financing.

2.2 GLOBAL INTERNAL CONTROL AND RISK MANAGEMENT PROCEDURES

2.2.1 General organization: objectives and scope of internal control and risk management

OBJECTIVES

Arkema applies the Reference Framework of the French financial markets authority (*Autorité des marchés financiers – AMF*), published in 2007 and subsequently reviewed and expanded in 2010, which it has adapted to its business activities, size and organization.

Internal control is a Group-wide process defined and implemented by executive management, management and employees. Its objective is to ensure:

- compliance with current laws and regulations;
- compliance with the instructions and guidelines issued by executive management;
- the smooth operation of internal processes, notably those serving to protect assets; and
- the reliability of financial information.

Generally, internal control contributes to the management of Arkema's activities, the effectiveness of its operations, and the efficient use of resources.

However, no internal control process can provide absolute assurance that these goals are met. Despite the processes and controls in place, it cannot guarantee that all Arkema employees will constantly comply with the internal control guidelines and apply all the defined procedures.

Arkema has also implemented a risk management system that enables the Executive Committee to ensure that risks are at a level that it deems acceptable. This system contributes to:

- creating and protecting Arkema's value, assets and reputation;

- securing Arkema's decision-making and other processes so that objectives may be achieved more easily;
- ensuring consistency between Arkema values and actions; and
- rallying Arkema employees around a common vision of the main risks.

SCOPE

The internal control and risk management procedures are adapted to Arkema's organization, which is structured around three components:

- the three divisions, each comprising Business Lines, which are responsible for their respective performance and the implementation of internal control procedures (see section 1.2 of this document);
- the corporate departments (or support functions), which assist the divisions and businesses in their area of competence, such as accounting, human resources, legal affairs, IT and procurement, and ensure the coherence and optimization at the Group level (see section 1.3 of this document); and
- the subsidiaries, in which Arkema performs its business activities (see section 6.1.2 of the 2019 Universal Registration Document).

These internal control and risk management procedures apply to all fully consolidated Arkema Group companies. Internal control is not limited to procedures that improve the reliability of financial and accounting information.

2.2.2 Persons involved in internal control and risk management

BOARD OF DIRECTORS AND COMMITTEES

The Board of Directors, the two committees in place (the Audit and Accounts Committee and the Nomination, Compensation and Corporate Governance Committee) and their members through their experience and expertise, contribute to the promotion of an internal control and risk management culture adapted to Arkema's activities.

In particular, it is the responsibility of the Audit and Accounts Committee to oversee the effectiveness of internal control and risk management systems, and assess the schedule of the internal auditors and the results of their work.

EXECUTIVE COMMITTEE

The Executive Committee implements the internal control process and ensures compliance by:

- defining the internal control framework and the rules for delegating responsibility;
- setting targets for each business, corporate department and subsidiary, and ensuring they have the resources for meeting these targets;
- supervising the implementation of the control procedures that help achieve the targets it has set;
- assessing the risks specific to each project submitted to the Executive Committee; and
- carrying out a review (annually and as deemed necessary) of Arkema's major risks, based on the work of the Risk Review Committee and its risk mapping presentation. In order to carry this out effectively, the Executive Committee relies on the Internal Audit and Internal Control department and the expertise of all its own members.

Each member of the Executive Committee is responsible for ensuring that the Internal Control Framework's Group-wide rules and principles (as described in section 2.2.3 of this chapter) are observed in the entities and, in particular, the businesses that he or she supervises.

RISK REVIEW COMMITTEE

A Risk Review Committee was set up in October 2007 to strengthen the formal framework of risk identification, analysis and management, and to regularly monitor the development of risk factors. It is made up of the Strategy Executive Vice-President (committee Chairman), the Industry Executive Vice-President, the Chief Financial Officer, the Legal Affairs Vice-President, the Sustainable Development Vice-President, the Group Safety and Environment Vice-President, the Insurance Vice-President, the head of Accounting, the head of IT and the Internal Audit and Internal Control Vice-President (committee secretary).

Every six months, or more often in response to specific events, the committee reviews:

- summaries of audits and assessments carried out by the Internal Audit and Internal Control, the Group Safety and Environment and the Insurance departments;
- reports on fraud or attempted fraud prepared by the anti-fraud unit;
- a summary and progress report of ongoing disputes presented by the Legal department;
- assessments of commercial intermediaries made by the commercial intermediaries review commission;
- a list of risks identified in the surveys carried out by the Internal Audit and Internal Control, Legal, and Accounting departments;
- a risk map prepared by the Internal Audit and Internal Control department; and
- the monitoring of corrective measures in all of these areas.

Following its review, the Risk Review Committee can decide on further corrective measures or request additional information, and can also request updates to the risk map.

The conclusions of its review are reported to the Executive Committee which, upon completion of the process, may decide whether or not to update the main risks described in section 2.1 of this chapter.

The Risk Review Committee met twice in 2019.

INTERNAL AUDIT AND INTERNAL CONTROL DEPARTMENT

The Internal Audit and Internal Control department is made up of the Internal Audit sub-department and the Internal Control sub-department, both of which are independent functions under the responsibility of the Strategy Executive Vice-President.

Our internal control system meets the three lines of defense principle as recommended by the IIA (Institute of Internal Auditors) and the IFACI (*Institut Français de l'Audit et du Contrôle Internes*). The first line is covered by all the operational functions, the second line by the support functions, including internal control, and the third by the internal audit functions.

The role of Internal Audit is principally to improve and develop controls in Arkema's management systems and processes and, more broadly, to ensure that its operating procedures comply with the Internal Control Framework.

All processes and management systems may be subject to an internal audit. The Internal Audit department discusses and agrees its findings with the audited entities before presenting them with a set of recommendations and related action plans that the entities commit to implementing.

An internal committee consisting of the Chief Financial Officer, the Strategy Executive Vice-President and the Internal Audit and Internal Control Vice-President regularly ensures that the recommendations have been followed.

The Internal Audit and Internal Control department defines a draft proposal for the audit plan based on:

- risk identification initiatives;
- interviews with Arkema's operational and corporate departments; and
- a selection of priorities from the various proposals gathered.

The final program is validated by the Executive Committee, and then approved by the Audit and Accounts Committee.

In 2019, the Internal Audit department, made up of eight internal auditors, carried out the following 36 audits:

- 10 audits of industrial sites in France and North America;
- 13 audits of subsidiaries in Europe, Asia, Africa, Oceania and North America;
- 7 process audits in Europe, Asia, North America and the Middle East;

APPENDIX 2 : RISKS AND INTERNAL CONTROL

- 5 audits of businesses in Asia, Europe and North America; and
- 1 follow-up audit in Europe.

The primary mission of Internal Control is to strengthen Arkema's internal control systems. Its initiatives are communicated and implemented, at subsidiary level, by a network of correspondents within the subsidiaries' Finance and IT departments.

Internal Control is involved in the analysis and formal implementation of processes that impact financial information, for which key controls have been defined.

The methodology consists of:

- analyzing the main risks of error, omission or fraud in processes or sub-processes, which could have a material impact on Arkema's consolidated financial statements;
- identifying and implementing control procedures to minimize any risk of error, omission or fraud;
- periodically checking the existence and effective operation of these controls, carried out by the Internal Control correspondents based in the subsidiaries (self-audit) or by the Internal Audit department; and
- defining corrective measures in the event of shortcomings and overseeing their implementation.

The list of procedures covered by this methodology is based on the 14 procedures of the AMF Reference Framework application guide published in 2007 and updated in 2010. It is adapted to the specific features and size of the subsidiaries.

All significant subsidiaries were covered by Arkema's internal control system in 2019. Its performance is measured annually, by self- or peer-assessment, and recorded in the dedicated GRC (Governance, Risk and Compliance) tool.

Additionally, the Internal Control department has sub-contracted a Data & Analytics analysis (mass data management) on payments and the risks related to double payments.

DIVISIONS, BUSINESS LINES, CORPORATE DEPARTMENTS AND SUBSIDIARIES

Arkema is organized into divisions as described in section 1.2 of this document. The divisions are made up of Business Lines, which coordinate the use of the resources required to meet the targets set in their respective areas. Each business is responsible for its own performance and for implementing suitable control procedures and processes, in accordance with the principles and procedures defined in Arkema's Internal Control Framework, Code of Conduct and Business Ethics, charters and guidelines.

The corporate departments ensure that Arkema's organization is consistent and optimized.

Each subsidiary is placed under the responsibility of a local executive who is responsible for employing the resources defined with the businesses and the support functions to meet the subsidiary's targets, in accordance with current laws and the rules and principles defined by Arkema.

2.2.3 Internal control framework

Arkema's internal control and risk management systems are based on three core principles:

- clear definition of responsibilities and delegations of authority, observing rules governing the segregation of duties (in particular distinguishing between those who perform actions and those who approve them), to ensure that any person who makes commitments to third parties on behalf of Arkema has the authority to do so;
- identification, analysis and management of risks; and
- regular reviews, notably *via* annual internal control assessments and the internal audit program, to ensure internal control and risk management systems operate correctly.

Arkema's Internal Control Framework defines its organization and the guiding principles behind its operating procedures. Approved by the Executive Committee and available to all employees, notably *via* the intranet, it is based on the Safety, Health, Environment and Quality Charter, the Users' Guide for IT Resources and Electronic Communication, and the Code of

Conduct and Business Ethics put in place by Arkema, available on Arkema's website under the heading "Ethics and integrity". In line with the AMF Reference Framework published in 2007 and updated in 2010, the Internal Control Framework is based on five components:

- control environment;
- risk management (detailed in section 2.2.4 of this chapter);
- control activities;
- information and communication; and
- continuous assessment of internal control systems.

CONTROL ENVIRONMENT

The control environment is the basis for the other components of internal control and refers primarily to Arkema's organizational principles, its values as set out in the Code of Conduct and Business Ethics and the level of awareness among employees.

All employees are informed of the importance attached to observing the rules of proper conduct set out in the Code of Conduct and Business Ethics, the Health, Safety, Environment and Quality Charter, and the Users' Guide for IT Resources and Electronic Communication.

Arkema has put in place a compliance program, which mainly covers antitrust, export control and anti-corruption laws. Each area is the subject of various procedures and/or guides, which are provided to employees. To ensure that the compliance program has been followed, the Group's Legal department sends a declaration of compliance each year to the heads of the businesses, the corporate departments and the main subsidiaries and sites, which they must sign and return to show that they are aware of the compliance program, that they have acted in accordance with it over the past year, and that they undertake to continue to do so in the coming year. These heads are then responsible for obtaining an identical declaration, signed by the employees concerned within their business, corporate department, subsidiary or site.

A fraud prevention procedure has been put in place to record and centralize situations of fraud and therefore improve their handling and prevention.

In general, the roles and duties of every operational and corporate manager are set out in a job description. Their objectives, which include an internal control dimension, are set by their respective line manager, to whom they must periodically report on their activities.

Lastly, Arkema has set up a dynamic human resources management approach and a policy of ongoing training designed to ensure that employees' skills are continuously adapted, and to maintain a high level of individual engagement and motivation.

CONTROL ACTIVITIES

Control activities involve applying the standards and procedures that help ensure that Group management directives are implemented at every level of the Arkema Group.

To this end, a set of regulations has been formally documented in the Internal Control Framework, and general principles applicable to all Arkema entities have been defined in order to be able to control the application of the operating procedures defined by the Executive Committee. For example, delegations of authority and investment management are the subject of specific notes.

- businesses and subsidiaries are responsible for operational processes and therefore for internal control;
- corporate departments are responsible for defining and communicating policy and best practice guidelines relating to their area of expertise and ensuring that they are correctly applied, particularly in the following fields:
 - compliance with laws and regulations,
 - safety and environmental protection, and
 - the reliability of financial information;
- controlling access to IT systems forms a key part of internal control and is subject to a formal management process,

which involves both the departments using the systems and the IT department.

The Internal Audit team conducts assessments of Arkema's compliance with its Internal Control Framework in accordance with the audit plan validated annually by the Executive Committee and approved by the Audit and Accounts Committee.

INFORMATION AND COMMUNICATION

IT systems are a key component of Arkema's organization.

Mindful of the opportunities and risks related to the use of information technologies, Arkema has set up an IT governance structure to control risks while creating value and improving performance.

This approach consists of deploying Group-wide the ten IT management practices drawn up formally by the French IT association for major companies, CIGREF (*Club informatique des grandes entreprises françaises*), as part of Arkema's IT systems security policy. For more details, please refer to section 2.1.3 of this chapter.

Additionally:

- Arkema has a highly detailed financial reporting system, an essential management tool used by executive management;
- the main internal control documents are available on Arkema's intranet; and
- each support function develops professional best practices and communicates them throughout Arkema via the intranet.

CONTINUOUS ASSESSMENT OF INTERNAL CONTROL SYSTEMS

The internal control system is assessed on an ongoing basis. The Executive Committee is responsible for the overall internal control system, its performance and its oversight. However, each subsidiary is responsible for improving internal control performance within its own scope.

In general, any weaknesses in the internal control system must be reported to line management and, if necessary, to the Executive Committee.

In addition, recommendations made by the Internal Audit department on completion of its audits are systematically reviewed, and a summary is presented to the Audit and Accounts Committee. When decisions to apply corrective measures are adopted, their implementation is monitored on a formal basis.

Furthermore, as part of their engagement, the statutory auditors may alert Arkema (represented by the Finance department and the Internal Audit and Internal Control department) and the Group's Audit and Accounts Committee regarding any weaknesses that they may have identified. These factors are taken into account by Arkema in its efforts to improve internal control.

2.2.4 Risk identification and management

In the course of its business, Arkema is exposed to a number of internal and external risks.

As Arkema's structure is highly decentralized, risk assessment and management is the responsibility of the businesses, corporate departments and subsidiaries. Each of these entities has a duty to reduce the risks inherent in their activities.

Arkema's risk management system is based on regular reviews of risk identification, analysis and treatment, as follows:

- every month, each business presents its results and indicators to its operational Executive Vice-President, member of the Executive Committee, and the Executive Committee reviews the results of the divisions and their respective businesses;
- the Accounting and Consolidation department organizes a quarterly review of risks and legal disputes that may have to be reported in Arkema's financial statements. The businesses, corporate departments and subsidiaries report on their entity's risks, which are analyzed and addressed at quarterly meetings with the Chief Financial Officer, the Accounting and Controlling department, the Legal department, and the Internal Audit and Internal Control department; and
- the Internal Audit and Internal Control department carries out an annual survey of risks amongst Arkema's main entities, namely the businesses, corporate departments and

subsidiaries. The risks are identified and analyzed and the most significant risks are grouped together and positioned on a risk map, which is presented to the Risk Review Committee. The Risk Review Committee then assesses the need to update the risk map and puts forward suitable action plans where necessary. As part of this map, certain specific risks may be presented on an additional map. The committee's conclusions are reported to the Executive Committee prior to the definition of the internal audit plan. This plan is drawn up on the basis of the risk map and the need to cover Arkema's scope of activity on a regular basis. Material risks known to Arkema are allocated to a member of the Executive Committee. They are also examined by the Audit and Accounts Committee and presented to the Board of Directors. The main risks are set out in section 2.1 of this chapter, where they have been classified into the following sections:

- industrial risks,
- risks relating to compliance, legal proceedings, societal expectations and internal control,
- operational risks,
- project and innovation risks,
- economic and business risks, and
- financial risks.

2.2.5 Accounting and financial control procedures

Operational and corporate managers' control and understanding of their business' financial performance represent one of the key factors in Arkema's financial control system.

ORGANIZATION OF THE FINANCE FUNCTION

The finance function is the responsibility of the Chief Financial Officer and includes:

- an Accounting and Consolidation department, which produces the consolidated financial and accounting information and ensures the reliability of the data constituting Arkema's financial information;
- a Controlling department, which provides management analyses and financial forecasts to Arkema's different entities to facilitate their management;
- a Tax department, which ensures compliance with the applicable laws and regulations on tax declarations and payment and carries out the overall tax planning process for the Group;

- a Financing and Treasury department, whose role is to optimize the Group's financing and liquidity and manage counterparty risk; and
- an Investor Relations department, whose remit is to establish, develop and maintain relations with investors, shareholders and financial analysts, and publish financial information once it has been approved by the Board of Directors.

Each business has its own management control team, which monitors and analyzes the business' performance monthly, and each subsidiary is responsible for its own monthly accounts and half-year and full-year financial information.

ACCOUNTING REPORTING AND MANAGEMENT CONTROL

The Accounting and Consolidation department and the Controlling department define the financial principles and guidelines set out in the financial reporting manual and Arkema's management framework. The Accounting and Consolidation department also monitors accounting laws and regulations for the Group and ensures that specific technical provisions applicable to Arkema are taken into account.

The purpose of the financial reporting process, established in accordance with these principles, is to analyze actual performance compared with forecasts and prior periods. The reporting schedule is structured around:

- a five-year plan drawn up each year by the Strategy department. The plan is reviewed and approved by the Executive Committee and enables it to understand the financial consequences of the Group's major strategic choices and the main threats identified in the environment under consideration;
- an annual budget, which sets out the financial performance targets for the following year in line with the medium term plan. The budget preparation process falls within the remit of the Controlling department. The budget represents a key benchmark for measuring the actual performance of the three divisions, their respective businesses, the corporate departments and Arkema's subsidiaries as a whole;
- a monthly forecast and reporting process, which enables business trends to be taken into account in order to refine end-of-period forecasts for the quarter and the year. The Controlling department prepares a consolidated report each month, by division and business, based on the consolidated data provided by the Accounting and Consolidation department, that includes the month's significant events, the performance indicators and the updated forecasts. These components are systematically reviewed by the Group's Executive Committee.

The fundamental financial reporting principles are set out in the financial reporting manual and Arkema's management framework. These reference documents are updated regularly by the Accounting and Consolidation department and the Controlling department, following approval by the Chief Financial Officer or the Executive Committee, depending on the type of amendment and its significance.

One of the main purposes of accounting-related reporting is to analyze actual performance compared with forecasts and prior periods based on the processes described below.

PARENT COMPANY AND CONSOLIDATED FINANCIAL STATEMENTS

Arkema publishes consolidated financial information on a quarterly basis. The half-year financial statements at 30 June are subject to a review by the statutory auditors and the full-year financial statements at 31 December to an audit. The quarterly information at 31 March and 30 September is presented in summary form only (balance sheet, income statement and cash flow statement). Press releases concerning financial information are prepared by the Investor Relations team and submitted to the Company's Board of Directors for approval.

At the end of each accounting period, the Accounting and Consolidation department reviews the financial risk portfolio with each business, corporate department and main legal entity of the Group.

The preparation of the parent company's financial statements is part of the general procedure for the preparation of annual financial information. Furthermore, the Company submits management forecast documents to the Board of Directors in compliance with regulatory provisions.

IT SYSTEMS

The IT department defines and coordinates the IT systems for the entire Group.

Arkema is continuing its transformation program using SAP integrated software, which is helping to improve the Group's control environment, particularly through procedure review, improved automated checks, and the removal of interfaces.

REPRESENTATION LETTERS

Each year, Arkema issues a representation letter attesting in particular to the accuracy and consistency of the consolidated financial statements. This letter is signed by the Chairman and Chief Executive Officer and the Chief Financial Officer and addressed to the Group's statutory auditors. In support of this representation letter, the operational and financial heads of each consolidated subsidiary make an annual undertaking to observe the internal control rules and ensure the accuracy of the financial information supplied, in the form of a representation letter to the Group's Chairman and Chief Executive Officer, the Chief Financial Officer and the statutory auditors.

Following the same procedure, Arkema's half-yearly representation letter is based on the main subsidiaries' half-yearly representation letters, which certify that the subsidiaries' half-yearly consolidated financial statements have been prepared in accordance with Arkema's financial reporting manual.

2.2.6 Arkema's insurance policy

Arkema implements an insurance cover strategy that combines a prevention policy designed in close cooperation with insurers (in particular for property damage, via joint periodic visits which result in the regular issuance of technical recommendations implemented by the Group), and the purchasing of insurance policies.

The Group's policy is to centralize its insurance against risks relating to the production, transportation and marketing of its products worldwide. Arkema uses international insurance brokers to optimize its cover of all Group companies. As a general rule, the Group's insurance cover limits apply either to each claim, or to each claim and each year, and vary according to the risks covered. In most cases, cover is limited both by certain exclusions standard to these kinds of contracts and by deductibles that are reasonable given the size of the Group.

For the financial year ended 31 December 2019, total premiums paid by the Group, and relating to the Group's insurance policies presented below, amounted to less than 1% of its sales for the period.

The Group's insurance policies are drawn up to cover current risks while also accommodating any new acquisitions or disposals that may take place during the year.

The Group retains a certain level of risk through the deductibles on its insurance policies, and centrally through a captive insurance company that is active only in property insurance. The objective of the captive company is to optimize the Group's external insurance costs.

Arkema believes that its insurance policies are consistent with those currently available on the insurance market for groups of similar size and involved in similar business activities.

Descriptions of the insurance policies taken out by Arkema are provided below to a level of detail that enables it to comply with confidentiality requirements and protect its interests and competitiveness.

CIVIL LIABILITY

The Group has contracted civil liability insurance policies with leading insurance companies. The civil liability policies are subject to applicable exclusions and sub-limits but cover the Group worldwide against the financial consequences of civil liability claims in the context of its business activities and in respect of physical, material or non-material damage or losses caused to third parties. These policies cover up to €1 billion for the Group. Deductibles vary, particularly depending on the subsidiaries' location.

PROPERTY DAMAGE

The Group's sites are covered by leading insurance companies against material damage and any resulting business interruption. This cover is intended to avoid any significant financial loss and to ensure the resumption of operations in the event of property damage. However, certain property and types of damage can be excluded from the insurance policy's cover depending on the country in which the loss occurs.

The cover includes a "direct damage" component and a "business interruption" component, with the compensation period for the latter limited to either 12, 24 or 36 months, depending on the site. These policies may include sub limits, particularly for machinery breakdowns, natural disasters and terrorism. Deductibles vary depending on the risk exposure and the size of the site concerned. In 2019, the maximum total retention in the event of a claim was €20 million.

The combined cover limit of the policies in place for direct damage and business interruption, over and above the total retention, is €500 million.

TRANSPORT

The Group is insured against the risk of damage to its manufacturing assets, equipment, finished or semi-finished products and raw materials during transportation or storage by third parties up to a limit of €12 million per shipment. The policy includes a deductible and several exclusions that are standard for this kind of agreement.

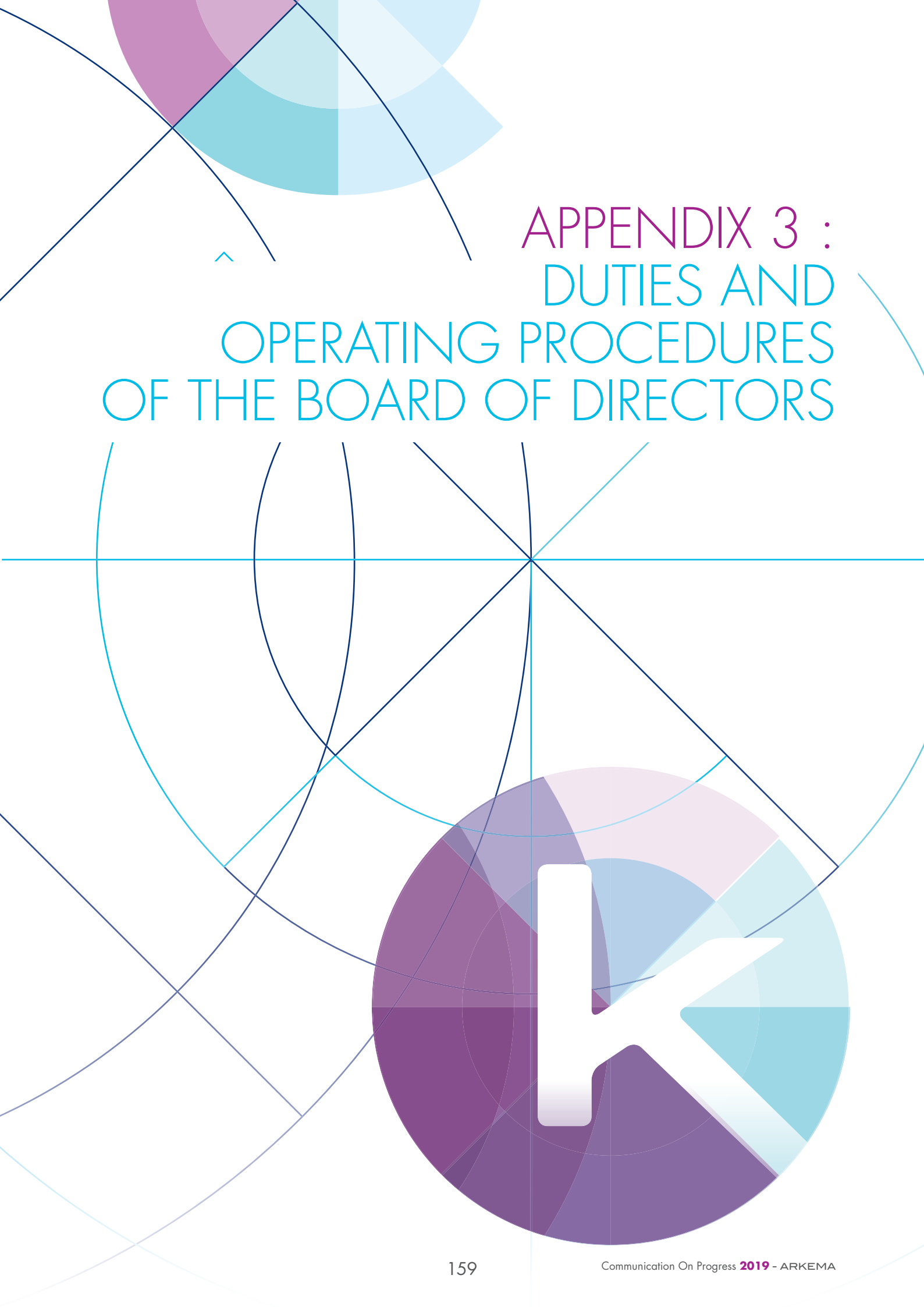
ENVIRONMENTAL RISKS

Arkema has taken out an environmental liability insurance program with leading insurance companies. For production sites located in the United States, the limit is US\$75 million. For production sites outside the United States, the limit is €80 million.

These programs cover, under certain conditions, environmental liabilities linked to the production sites of the Group. They include, in particular, damage sustained by third parties as a result of pollution generated either on Group production sites or as a result of transporting Group products.

CYBER RISKS

Arkema has taken out a cyber insurance program covering all subsidiaries worldwide. The coverage ceiling is €50 million with effect from 15 January 2019, with a deductible of €2 million.



APPENDIX 3 : DUTIES AND OPERATING PROCEDURES OF THE BOARD OF DIRECTORS

3.3.2 Duties and operating procedures of the Board of Directors

3.3.2.1 DUTIES

The Board of Directors is a collegiate body that takes decisions collectively. It is mandated by and accountable to all of the shareholders.

The Company's Board of Directors exercises the powers assigned by law in order to act in the Company's best interests in all circumstances. It decides the Company's overall business strategy and oversees its implementation. Subject to those powers expressly conferred upon it at shareholders' meetings and within the limits of the Company's corporate purpose, the Board of Directors considers any issue involving the proper operation of the Company and decides on any issue concerning the Company. Lastly, it strives to create value over the long term by factoring social and environmental challenges into the Group's business plans.

To this end, it must in particular monitor and review the Group's strategic developments, appoint the executive directors responsible for managing the Company in line with the corporate strategy, monitor the implementation of this strategy, take decisions regarding major operations, ensure the quality of information supplied to shareholders and the markets, particularly in the financial statements, and guarantee the quality of its operations. It analyses opportunities and risks – especially financial, legal, operational, social and environmental risks – on a regular basis in line with the Group's strategy and the related measures taken.

The Board of Directors can decide to set up one or more specialized committees. It defines the composition and remit of these committees, which operate under the responsibility of the Board of Directors. In accordance with the Internal Rules of the Board of Directors and each of its committees, some matters are therefore subject to prior review by the appropriate committee before being submitted to the Board of Directors for approval.

In accordance with the AFEP-MEDEF Code recommendations, the Board reviews the diversity objectives within the Group's governance bodies, how such objectives are implemented and the actions taken to achieve them, as presented to it by

executive management twice a year as part of its overall human resources review and, more specifically, its review of the career management plan. Additional information on these objectives, the implementation thereof and the results achieved is provided in section 4.4.1.6 of this document.

3.3.2.2 OPERATING PROCEDURES

The operating procedures of the Board of Directors are determined by current laws and regulations, the Company's Articles of Association and its Internal Rules as updated most recently on 26 February 2020, in compliance with the various legislative and regulatory changes that have occurred in 2019, as well as the AFEP-MEDEF Code.

The Board of Directors meets at least four times a year and whenever the interests of the Company so require. Meetings are convened by its Chairman. The convening notice may be delivered by any means, even verbally, eight days before the date of the meeting and, in urgent cases, without notice. It specifies where the meeting will take place. The convening notice and meeting support documents are made available via a digital platform that enables the secure exchange of data. In principle, meetings take place at the Group's head office but may in certain cases be held by conference call in accordance with the law, the Company's Articles of Association and the Board of Directors' Internal Rules.

The Board of Directors' meetings are chaired by the Chairman of the Board or, in his absence, by the oldest director in attendance.

The Board of Directors may legitimately deliberate even in the absence of a notice of meeting if all members are present or represented. In accordance with its Internal Rules, in all cases permitted by law and if specified in the notice of meeting, directors attending the meeting by means of videoconferencing or any other telecommunication method that meets the requisite technical specifications set by current laws and regulations are deemed present for the purpose of quorum and majority requirements.

Decisions are taken by majority vote of the members present, deemed present or represented. In the case of a split vote, the Chairman has the casting vote.

In accordance with corporate governance best practice and the recommendations of the AFEP-MEDEF Code in particular, the Board of Directors' Internal Rules also set out the rights and obligations of the directors and notably impose that:

- before accepting their duties as director of the Company, the directors must ensure that they are familiar with the Company's Articles of Association, the Board of Directors' Internal Rules, and the legal and regulatory provisions governing the functions of a director of a French joint stock corporation (*société anonyme*), and in particular the rules relating to the definition of the powers of the Board of Directors, multiple directorships, the agreements falling within the scope of article L. 225-38 of the French Commercial Code, the holding and use of insider information, the declarations of trading in the Company's shares and the black-out periods during which directors may not trade in those shares;
 - the directors are elected by all the shareholders and must act in all circumstances in the Company's best interests;
 - the directors must devote the necessary time and attention to their duties. Consequently, the directors may not hold more than four other directorships in listed companies, including foreign companies, outside the Group. Accordingly, the directors undertake to inform the Chairman of the Nominating, Compensation and Corporate Governance Committee of any new non-executive or executive directorship that they might accept in a company outside the Group or outside the group of which they are a member, including their participation in the committees of these companies' Boards; executive directors may not hold more than two other directorships in listed companies outside the Group and must seek the opinion of the Board of Directors prior to accepting any new directorship in a listed company;
 - the directors must be committed and, where possible, take part in all the Company's Board of Directors' meetings and the meetings of the committees to which they have been appointed, as well as general shareholders' meetings;
 - prior to each Board of Directors' meeting, except in the event of an emergency justified by exceptional circumstances, the agenda and information on items on the agenda that require special analysis and prior consideration are sent to each director with the notice of meeting or at least in sufficient time before the meeting, whenever this can be accomplished without any breach of confidentiality. The directors may also request from the Chairman and Chief Executive Officer any additional information they may consider necessary to properly fulfill their duties, particularly in the light of the meetings' agenda;
 - if they deem it necessary, the directors may also request additional training on the Group's specific features, businesses, and sector of activity, at the time of their appointment or during their term of office. This training is organized by the Company, which pays the related costs;
- all documents provided for Board of Directors' meetings and all information collected during or outside Board of Directors' meetings are confidential, without exception, whether or not the information collected is presented as being confidential. In this regard, the directors must consider themselves bound by strict professional confidentiality beyond the simple duty of discretion provided for by the law. Furthermore, the directors undertake not to express their individual views outside the boardroom on matters discussed during Board of Directors' meetings, or on the opinions expressed by individual directors; and
 - as required by law and regulations, the directors must refrain from trading in the Company's securities (including derivative financial instruments) insofar as, by virtue of their duties, they have access to insider information. They are therefore added, as soon as they take up their duties, to the list of people subject to the black-out periods implemented by the Company. Furthermore, the directors must disclose any transactions they have entered into in respect of the Company's securities.

The Internal Rules also provide that, when the positions of Chairman and Chief Executive Officer are held by the same person, the Board of Directors shall appoint one of the independent directors to serve as senior independent director, based on the proposal of the Nominating, Compensation and Corporate Governance Committee. For further details, see section 3.3.3 of the 2019 Universal Registration Document.

In accordance with the AFEP-MEDEF Code and with best governance practices, the Chairman and Chief Executive Officer does not take part in any discussions concerning his term of office and compensation. The Board members therefore discuss these topics without his presence. The Internal Rules, amended by the Board of Directors on 26 February 2020, now also provide that following the report on the annual assessment of the Board of Directors' operating procedures, the senior independent director shall hold an executive session from which the executive directors are excluded.

3.3.2.3 ACTIVITIES OF THE BOARD OF DIRECTORS

The Board of Directors met eight times in 2019. There was a high attendance rate at these meetings of 95% (*versus* 97% in 2018 and 90.5% in 2017). On average, the meetings lasted approximately four hours.

APPENDIX 3 : DUTIES AND OPERATING PROCEDURES OF THE BOARD OF DIRECTORS

The following table summarizes the individual attendance rates of directors at the meetings of the Board of Directors and its committees in 2019.

Directors	Board of Directors		Audit and Accounts Committee		Nominating, Compensation and Corporate Governance Committee	
	Attendance rate	Number of meetings	Attendance rate	Number of meetings	Attendance rate	Number of meetings
Thierry Le Hénaff	100%	8/8	-	-	-	-
Yannick Assouad	100%	8/8	-	-	-	-
Jean-Marc Bertrand	100%	8/8	-	-	-	-
Marie-Ange Debon	100%	8/8	100%	6/6	-	-
François Enaud ⁽¹⁾	100%	4/4	-	-	100%	2/2
Ian Hudson ⁽²⁾	100%	4/4	100%	4/4	-	-
Alexandre de Juniac	100%	8/8	-	-	100%	4/4
Victoire de Margerie	75%	6/8	-	-	75%	3/4
Laurent Mignon	75%	6/8	-	-	-	-
Hélène Moreau-Leroy	100%	8/8	100%	6/6	-	-
Thierry Morin	100%	8/8	-	-	100%	4/4
Nathalie Muracciole	100%	8/8	-	-	-	-
Marc Pandraud	88%	7/8	-	-	-	-
Fonds Stratégique de Participations represented by Isabelle Boccon-Gibod	100%	8/8	100%	6/6	-	-
TOTAL	95%	8	100%	6	92%	4

(1) Term of office expired on 21 May 2019.

(2) Appointed on 21 May 2019.

The agenda of the Board of Directors' meetings included recurring annual topics as well as more specific topics, as follow:

Operations, strategy and risk management

Recurring annual topics

- review and approval of the strategy and main operational priorities presented during the annual seminar
- monitoring the implementation of the targeted acquisitions and major capital expenditure programs
- review and, where necessary, update of the risk map
- presentation and approval of the insurance program
- changes in the competitive environment
- review of the Group's situation in terms of cybersecurity
- progress report on the Group digital transformation program
- business presentation by the industrial division
- presentation and review of the business of each division

Specific topics in 2019

- various strategic projects: acquisition of ArrMaz, Lambson and Prochimir, divestment of the Functional Polyolefins business, additional photocure resins capacity in China and increased production capacity for Kynar® fluorinated polymers, also in China

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Accounting and financial situation

Recurring annual topics

- approval of the annual budget
- approval of the annual consolidated and Company financial statements, proposed allocation of profit and distribution of dividends
- approval of the annual financial report, management report and, more generally, of the universal registration document
- preparation of the annual general meeting including approval of the draft resolutions
- approval of management forecast documents
- approval of the half-yearly financial statements and review of quarterly financial information
- review of reports on the work carried out by the Audit and Accounts Committee
- approval of draft results press releases
- review of the Company's needs in terms of financial resources and therefore of the *Euro Medium Term Notes* (EMTN) program and definition of the maximum issue amount
- feedback from roadshows

Specific topics in 2019

- partial refinancing of the Company's hybrid bonds: new, euro-denominated hybrid bond issue and redemption of existing hybrid bonds
- authorization to renew the *Euro Medium Term Notes* (EMTN) program for a maximum amount of €3.5 billion.

Corporate governance and compensation

Recurring annual topics

- assessment of the Board of Directors' operating procedures
- assessment of the independence of directors
- review of directors' terms of office and proposal of renewals/appointments
- review of reports on the work carried out by the Nominating, Compensation and Corporate Governance Committee
- review of related-party agreements and agreements entered into and authorized during previous years which were implemented during the year
- policy on the non-executive directors' compensation
- policy on the Chairman and Chief Executive Officer's compensation
- compensation due or awarded to the Chairman and Chief Executive Officer for the prior year
- compensation for Executive Committee members (fixed compensation, variable compensation for the prior year and criteria used to determine variable compensation)
- definition of share-based compensation for Group employees (performance share plan, capital increase reserved for employees, etc.)
- changes in the Executive Committee and its succession plan, including for the Chairman and Chief Executive Officer, as well as career management policy for executives
- definition of the Chairman and Chief Executive Officer's powers to issue deposits, commitments and guarantees
- activity report of the senior independent director
- approval of the report on corporate governance

Specific topics in 2019

- assessment of the Board of Directors' operating procedures by consulting firm Spencer Stuart
- appointment of Ian Hudson as director and reappointment of Hélène Moreau-Leroy, Victoire de Margerie and Laurent Mignon as Board members
- appointment of Hélène Moreau-Leroy as senior independent director to replace François Enaud
- acknowledgment of the fulfillment of the performance conditions applicable to the 2015 and 2016 performance share plans
- 2019 performance share plan: definition of criteria and introduction of a non-financial performance condition.

Corporate social responsibility

Recurring annual topics

- the Group's situation in terms of safety and the environment
- Group human resources policy, especially its diversity policy
- Group CSR approach and roadmap
- Non-financial performance report and duty of care

Specific topics in 2019

- detailed review of CSR aspects within the scope of recent acquisitions and investments.

At each meeting, the Chairman monitors the operations concluded since the previous meeting and seeks the authorization of the Board of Directors for the main projects underway that are likely to be completed before the next Board meeting.

Once a year, the Board of Directors dedicates a day to reviewing Arkema's strategy in the presence of the Executive Committee members and the head of R&D (CTO). During this meeting, the directors are given detailed presentations on key components of the Group's strategy, including R&D, with a demonstration of the recent innovations in various areas, the acquisition strategy, safety and sustainable

development, the digital strategy, the competitive landscape, and specific operational risks. This is also an opportunity for the Board to analyze the main challenges of the coming years and changes in the Group's profile. At the end of the seminar, the directors meet with around 20 of the Group's senior executives and high potentials.

The Board of Directors oversees the Company's quest for gender balance within the Executive Committee and its senior executives, and in general among the 10% of most senior positions. Each year it reviews the policy established by the executive management in this regard, including the objectives, actions implemented and results achieved. For further details on human resources diversity policy, see section 4.4.1.6 of this document.

Lastly, the Board of Directors, based on the preparatory work of the Nominating, Compensation and Corporate Governance Committee, and in complete cooperation with the Chairman and Chief Executive Officer, reviews every year with careful attention the succession planning for the Chairman and Chief Executive Officer and the members of the Executive Committee, and career management policy for Group executives. This work is used to prepare for reappointments and replacements in view of the different term of office renewal dates and to handle long-term succession planning scenarios or for dealing with crisis situations. Within this context, he set out the conditions for replacing the Chairman and Chief Executive Officer, notably in the event of an emergency (so-called "tramway" scenario), as well as the key principles for his long-term succession.

Since the beginning of 2020, the Board of Directors has met twice, with an attendance rate of 96%. In addition to recurring topics such as the approval of the 2020 annual budget, the approval of the annual consolidated and Company financial statements for 2019, the proposed allocation of profit and distribution of dividends and, more generally, the preparation of the annual general meeting including approval of the proposed resolutions, these meetings focused in particular on:

- reviewing the Company's governance structure and the confirmation of the continuing combination of the roles of Chairman and Chief Executive Officer and, within this context, the proposal to reappoint Thierry Le Hénaff as a director and as Chairman and Chief Executive Officer of the Company;
- the proposal to amend the compensation policy for directors excluding the Chairman and Chief Executive Officer, and the compensation policy for the Chairman and Chief Executive Officer;
- directors' compensation in accordance with the compensation policy applicable in 2019, as well as the compensation paid or awarded to the Chairman and Chief Executive Officer in 2019;

- the Executive Committee members' compensation for 2019 and their compensation policy for 2020;
- the conditions of the share capital increase reserved for employees;
- changes in the Executive Committee;
- the review of the Group's social and environmental challenges as part of CSR performance declaration pursuant to article L. 225-102-1 of the French Commercial Code and the report on the effective deployment of the *plan de vigilance* (duty of care plan);
- the adoption of a procedure for assessing the agreements relating to ordinary operations entered into under arm's length conditions;
- reviewing the Group's insurance policy;
- the annual assessment of the operating procedures of the Board of Directors and its committees performed by means of a self-assessment questionnaire; and
- changes in the Internal Rules of the Board of Directors in particular to take into account the strengthening of the senior independent director's duties.

One of the two sessions was held in Breda in the Netherlands and was followed by a site visit of Bostik B.V., which gave the directors a detailed overview of Bostik's activities in Holland, in particular the sealing and bonding business, and enabled them to meet the executives in charge of these activities. In addition to recurring topics, the Board focused on key strategic priorities and projects for 2020.

An executive session was held as provided for by the Internal Rules, following the meeting held on 26 February 2020.

3.3.2.4 ASSESSMENT OF THE OPERATING PROCEDURES OF THE BOARD OF DIRECTORS

In accordance with the AFEP-MEDEF Code and its Internal Rules, the Board of Directors conducts an annual assessment of its operating procedures by means of a questionnaire. Every three years in principle, a formal assessment is conducted by an external consultant. The form and terms of the Board's assessment are discussed by the Nominating, Compensation and Corporate Governance Committee every year. The Chairman of the Nominating, Compensation and Corporate Governance Committee and the Secretary of the Board of Directors are involved in the full assessment process (drafting/ updating the questionnaire, setting the schedule, reviewing the answers to the questionnaire, preparing the feedback, attending preparatory and feedback meetings with the consulting firm).

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For 2019, the annual assessment of the Board of Directors was performed, on the recommendation of the Nominating, Compensation and Corporate Governance Committee and in view of the assessment carried out by an external consultant in early 2019 and recalled below, by means of a questionnaire prepared by the Nominating, Compensation and Corporate Governance Committee. This notably included questions about the composition of the Board and its committees, the Board's collective performance during the year, the work of the committees and their report, the individual contributions of each director, the quality of the Board's discussions, and the Company's governance structure. The assessment was discussed by the aforementioned committee on 19 February 2020 and voted on by the Board of Directors at its meeting of 26 February 2020. After analyzing the answers given by the directors, the Chairman of the Nominating, Compensation and Corporate Governance Committee presented a report on this self-assessment to the Board of Directors. The report showed that the directors continue to be very satisfied with the overall operating procedures of the Board and that the main recommendations made after the previous assessment had all been taken into account, in particular with the arrival of Ian Hudson as member of the Board. The Company's governance structure, in the presence of Thierry Le Hénaff, was moreover reconfirmed within this context. The assessment shows, however, that the Board of Directors has not adopted a position of principle regarding the combination or separation of the roles of Chairman and Chief Executive Officer and that a separated governance structure may be prioritized in the future, notably in the context of Thierry Le Hénaff's succession at a given time.

It is recalled that in early 2019, the Board of Directors' 2018 operating procedures were assessed by the consulting firm Spencer Stuart. In this context, individual interviews of each director were conducted based on a guide that was drawn up in advance and specifically tailored to Arkema and to the objectives set for the performance of this external assessment. The guide was approved by the Chairman of the Nominating, Compensation and Corporate Governance Committee and the Secretary of the Board of Directors. Prior to the interviews, each director was invited to complete an online questionnaire.

The findings from this assessment process were detailed in a report that was first presented to the Nominating, Compensation and Corporate Governance Committee on 19 February 2019 and then to the Board of Directors on 26 February 2019.

In general, this assessment has shown that Arkema's governance is among the best in the industry in terms of governance

practices. More than 75% of directors consider that the operating procedures of Arkema's Board of Directors continued to improve compared with the last external assessment, which was carried out in 2016, and a large majority of directors who also sit on the Boards of comparable companies consider the operating procedures of Arkema's Board to be the best, in particular due to the Chairman's attitude towards the directors and the directors' active and positive contribution.

This assessment highlighted the following strengths:

- the current governance structure with the combined role of Chairman and Chief Executive Officer, which is entirely suited to Arkema, in particular due to the attitude of transparency of the Chairman and Chief Executive Officer towards the Board. Indeed, the Chairman and Chief Executive Officer listens to the Board's opinion and seeks discussion and interactions;
- the diverse expertise of the directors;
- the directors' genuine commitment to and interest in Arkema and the successful integration of new directors;
- the freedom of expression, friendliness and trusting relationship among the Board members, which has not been affected by the replacement of directors;
- increased interaction with the entire Executive Committee team thanks to more regular meetings with its members and better knowledge of the latter;
- committees that play an excellent role in fulfilling their duties and provide the Board with real support;
- high quality Board documents; and
- a highly successful strategy seminar and trip to China in early 2019, which brought genuine value-added.

Following this assessment, the following subjects were identified by the Board to be further developed or consolidated:

- strengthening of skills in the areas of chemicals and international exposure and the continued presence of a Chief Executive Officer or former Chief Executive Officer from the industrial sector with a strong international dimension on the Board;
- the ongoing succession plan for the Chief Executive Officer and the Executive Committee in general; and
- institutionalizing the holding of a Board meeting at one of the Group's foreign sites.

As specified above, all of these improvements were made in 2019.

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