ARKEMA INNOVATIVE MATERIALS FOR A SUSTAINABLE WORLD

SOCIAL RESPONSIBILITY 2021

COMMUNICATION ON PROGRESS

Extract from 2021 Universal Registration Document

CONTENTS

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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 2021, in the continuity of the Covid-19 pandemic and an especially demanding operating context, notably marked by strong pressure on supply chains, the group continued its strong mobilization to drive actions that benefit society.

Arkema's strategy is underpinned by an objective to create sustainable value for its stakeholders, which the Group pursues through its corporate social responsibility approach.

Benefiting from its expertise centered around materials science, the Group accelerates its contribution to address current and future challenges with high performing innovative materials. It covers solutions for low carbon mobility such as batteries, hydrogen and light weighting, 3D printing, more environmentally friendly paints, bio-sourced and recyclable solutions. The Group is mobilizing to increase to 65% the share of its sales that significantly contribute to the United Nations' Sustainable Development Goals by 2030, versus 51% currently.

Circularity progressively reshapes the way we make chemistry. On this agenda, Arkema has taken a step forward with the acquisition of Agiplast, a world leader in the recycling of high performance polymers, which gives our customers access to recycled raw materials and offers them opportunities to recycle their industrial waste.

Fully committed to the climate, Arkema again significantly reduced its GHGs in 2021, achieving a 34% reduction compared to 2015. Listening to recent IPCC reports, the Group is continuing its decarbonization efforts across the entire value chain and has recently reinforced its commitment by setting new Science Based Targets aligned with a 1.5°C trajectory.

Having consolidated its performance at the best ever in terms of occupational safety and process safety in 2021, the Group has strengthened its long-term ambitions. In addition, as a responsible manufacturer, Arkema has made a commitment to act4nature international for the preservation of biodiversity.

Convinced of the essential role of its 20,000 talents, Arkema has incorporated inclusion in its values. This recognizes the importance of tolerance, the acceptance of difference and the value of diversity.

Reflecting its commitment and CSR practices, Arkema improved its ranking in the DJSI World index and was included in the new CAC 40® ESG index. These are encouragement to continue its efforts and accelerate the full integration of sustainability together with our stakeholders, and to put our expertise and innovation at the service of a 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.

Thierry Le Hénaff

PROFILE, AMBITION AND STRATEGY

ARKEMA **AT A GLANCE**

Arkema is a major player in Specialty Materials whose business is structured around three coherent and complementary segments – Adhesive Solutions, Advanced Materials and Coating Solutions – as well as a competitive and well-positioned Intermediates segment. The Group has a leading industrial and commercial presence, and benefits from a balanced geographical sales split between Europe, North America and Asia.

2021 key figures

€9.5bn
Sales

20,200
Employees

A presence in
55
countries

141
Production sites

€243M
R&D expenditure

€758M
Recurring and exceptional capital expenditure

200
Patents filed relating to sustainable development

Thanks to its innovative and sustainable solutions, developed within its three business segments dedicated to Specialty Materials, Arkema contributes to addressing the major challenges arising from global megatrends such as urbanization and social change, climate change, resource scarcity and technological transformation. With leading positions in its main product lines, the Group supports its customers in their quest for sustainable performance and in their long-term development.

As a responsible manufacturer with a global footprint, Arkema is committed to achieving continuous improvement and operational excellence, driven by the collective energy of its 20,200 employees.

Since its stock market listing in May 2006, Arkema has deeply transformed its profile, strengthening its competitiveness and refocusing its business portfolio on specialty activities. The Group has thus developed unique expertise in materials science, centered around bonding and assembly solutions, substitution by lighter or bio-based materials, as well as coatings and protection.

In 2020, Arkema launched a new phase in its transformation around these competencies, with the ambition of becoming a pure Specialty Materials player by 2024.

To complete this next stage in its development, the Group plans to leverage four main drivers:

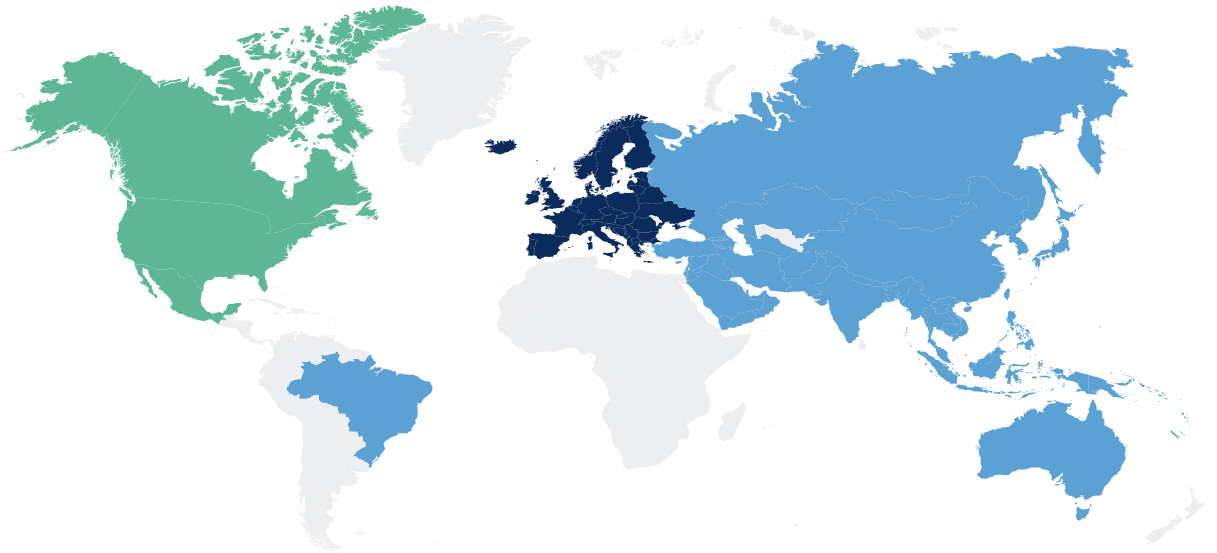
→ Accelerate organic growth and sustainable innovation

→ Strengthen Specialty Materials with bolt-on acquisitions

→ Rank among the best-in-class chemical companies in terms of Corporate Social Responsibility

→ Continue operational and commercial excellence initiatives

A global Company



NORTH AMERICA	31% OF SALES	
3,660 employees	39 prod. sites	4 R&D centers

EUROPE	36% OF SALES	
11,020 employees	60 prod. sites	7 R&D centers

ASIA AND REST OF THE WORLD	33% OF SALES	
5,520 employees	42 prod. sites	4 R&D centers

4 Segments

Adhesive Solutions

€2.3bn

As one of the world leaders in adhesives, Bostik offers high value-added solutions for construction and building renovation, as well as for many industrial applications.

Advanced Materials

€3.1bn

This wide range of highly technical products and solutions addresses the increasingly demanding requirements of our customers and supports them in their search for innovative and sustainable solutions.

Coating Solutions

€2.7bn

With a competitive upstream in acrylics, this range of high performance solutions, dedicated in particular to the industrial coatings and decorative paints markets, meets customers' growing need for increasingly environmentally friendly solutions.

Intermediates

€1.4bn

These intermediate chemicals activities, with more volatile results, include Fluorogases, Asia Acrylics, as well as PMMA until May 2021, in which the Group has strong positions and high-quality assets. On 3 May 2021, the Group finalized the divestment of its PMMA business to Trinseo.

SPECIALTY MATERIALS → 85.5% of 2021 sales

2021 data.

DIVERSIFIED **END-MARKETS**

Arkema offers innovative and sustainable solutions to meet the needs of its customers in diversified end-markets with attractive growth prospects.

1 General industry (28%)

- Chemical industry (additives and initiators)
- Industrial assembly and packaging (Bostik)
- Industrial equipment (Kynar® PVDF)
- Industrial refrigeration (Forane®)
- Mineral and metal extraction and processing (performance additives)
- 3D printing (Sartomer, high performance polymers)

Based on 2021 sales.

2 Paints and coatings (20%)

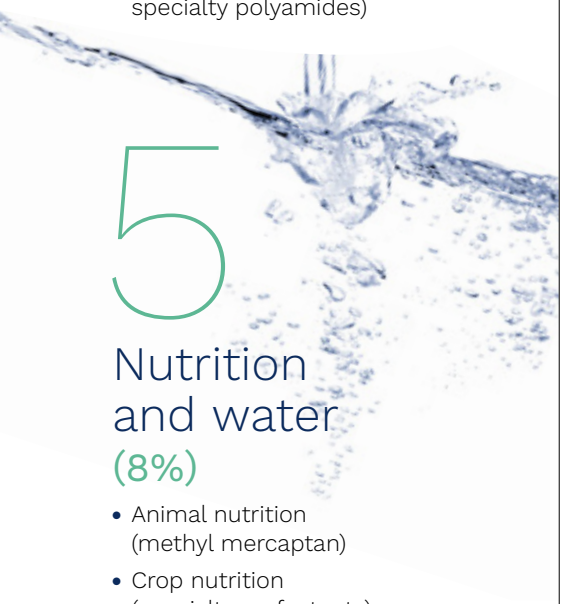
- Architectural and industrial coatings (resins and additives, Kynar® PVDF, specialty polyamide powders, Coatex)
- Inks, varnishes and graphic arts (Sartomer)

3 Building and construction (17%)

- Floor, wall and tile preparation (Bostik)
- Home thermal and acoustic insulation (Bostik, molecular sieves, Kynar Aquatec®, Forane®)

4 Consumer goods (15%)

- Hygiene and disinfection (Bostik, acrylics, hydrogen peroxide)
- DIY (Bostik)
- Sporting goods (Pebax® and Rilsan® specialty polyamides)
- Air conditioning (Forane®)
- Medical equipment (high performance polymers, molecular sieves)
- Paper industry (Coatex, hydrogen peroxide)
- Food industry (Sartomer, Bostik)
- Mass-market consumer goods (Rilsan® and Pebax® specialty polyamides)

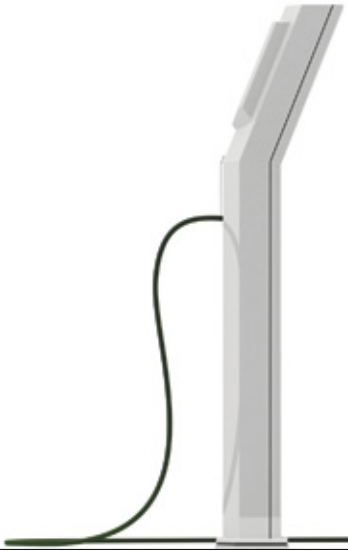


5 Nutrition and water (8%)

- Animal nutrition (methyl mercaptan)
- Crop nutrition (specialty surfactants)
- Water treatment (acrylics, Coatex, hydrogen peroxide) and filtration (Kynar® PVDF)
- Water transportation (specialty polyamide powders)

6 Electronics and energy (7%)

- Batteries (Kynar® PVDF, Foranext® electrolytes)
- Smartphones, tablets and TVs (Sartomer, Rilsan® specialty polyamides)
- Electrical cables and wires (high performance polymers, Bostik)
- Wind turbines (Elium®)
- Oil and gas industry (sulfur derivatives, Carelflex® service, molecular sieves, specialty surfactants, high performance polymers)



7 Automotive and transportation (5%)

- Cooling circuits and fuel lines (Rilsan® specialty polyamides)
- Car interiors (Bostik)
- Air conditioning (Forane®)
- Truck air brake systems (specialty polyamides)
- Aeronautics (high performance polymers, Bostik)

STRONG **ASSETS**

Arkema can leverage solid assets to roll out its strategy and successfully complete its numerous projects and acquisitions, enabling the Group to strengthen its position among the world leaders in Specialty Materials.

→ Recognized brands contributing to the Group's customer loyalty

BOSTIK RILSAN®

KYNAR® KEPSTAN®

PEBAX® NEXTDIMENSION®

Leadership positions
in ~90%
of total sales

→ Strong partnerships

formed over the long term with leading players in areas such as 3D printing, batteries, composites, water treatment or wind power.

ARK

→ 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 new world-scale plant in Singapore to produce amino 11 monomer and Rilsan® polyamide 11;
- **to ensure smooth integration** of bolt-on acquisitions, particularly in Adhesive Solutions; and
- **to adapt** to the different macro-economic environments that Arkema has faced for more than fifteen years, and to strongly improve its financial performance.

A group committed to a more sustainable world

with a Corporate Social Responsibility policy aimed at creating value for all stakeholders based on:

- an **offering of sustainable solutions** driven by cutting-edge innovation that contribute to its customers' performance;
- a commitment to act as a **responsible manufacturer**, through its actions for people's health and safety as well as for the climate and the environment; and
- an **open dialogue** with its internal and external stakeholders, in order to build a sustainable value chain and contribute to the development of the regions where the Group operates.

Strong R&D capabilities

enabling the Group to launch new innovative and sustainable solutions on the market, provide its customers with the technical support they need, and further improve the efficiency of its manufacturing processes, thanks to:

- the **expertise of more than 1,600 researchers** at 15 research centers worldwide;
- a large portfolio of **over 10,000 patents**;
- 222 new patent applications filed, 200 of which related to sustainable development; and
- **5 innovation platforms** linked to global megatrends.

A solid financial structure

giving the Group the financial flexibility needed to carry out its ambitious investment and bolt-on acquisition policy while ensuring an attractive dividend policy, thanks to:

- **an excellent cash generation** and a high EBITDA to cash conversion rate; and
- **a tightly-controlled net debt** including hybrid bonds, remaining below 2 times EBITDA.

A competitive and global presence

to support the Group's 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** combining cost and timing optimization, and superior technical implementation.

KEY **FIGURES**

Key financial data

(In millions of euros unless otherwise stated)	**2021**	2020	2019	2018	2017
Sales	**9,519**	7,884	8,738	8,816	8,326
EBITDA	**1,727**	1,182	1,457	1,474	1,391
EBITDA margin	***18.1%***	*15.0%*	*16.7%*	*16.7%*	*16.7%*
Recurring operating income (REBIT)	**1,184**	619	926	1,026	942
REBIT margin	***12.4%***	*7.9%*	*10.6%*	*11.6%*	*11.3%*
Net income – Group share	**1,309**	332	543	707	576
Adjusted net income	**896**	391	625	725	592
Earnings per share *(euros)*	**17.15**	3.98	6.45	8.84	7.17
Adjusted earnings per share *(euros)*	**11.88**	5.11	8.20	9.51	7.82
Dividend per share *(euros)*	**3.00** (1)	2.50	2.20	2.50	2.30
Payout ratio	**25%**	49%	27%	26%	29%
Shareholders' equity	**6,350**	5,235	5,324	5,028	4,474
Net debt and hybrid bonds	**1,177**	1,910	2,331	1,706	1,756
Net debt and hybrid bonds/EBITDA	**0.7**	1.6	1.6	1.2	1.3
Capital employed	**7,957**	7,364	7,917	6,996	6,554
Return on capital employed	**14.9%** (3)	8.2% (2)	11.7%	14.7%	14.4%
Working capital to sales	**12.7%** (4)	11.8%	13.8%	13.4%	13.1%
Free cash flow	**479**	651	667	499	565
Recurring cash flow	**756**	762	N/A	N/A	N/A
EBITDA to cash conversion rate	**43.8%**	64.5% (5)	52%	38%	41%
Recurring capital expenditure	**506**	460	511	500	420
Exceptional capital expenditure	**252**	140	96	61	10

Definitions of the main financial indicators are given in the glossary and in note 4 "Alternative performance indicators and information by segment" to the consolidated financial statements at 31 December 2021 in section 5.3.3 of this document.

(1) Dividend proposed at the annual general meeting of 19 May 2022.

(2) Return on capital employed adjusted for employed capital classified in 2020 as assets held for sale.

(3) Excluding recurring operating income (REBIT) from PMMA for the first four months of 2021, return on capital employed amounts to 14.4% in 2021.

(4) Excluding PMMA.

(5) The EBITDA to cash conversion rate is now calculated on the basis of recurring cash flow. 2020 data has thus been restated according to this new definition.

Key non-financial data

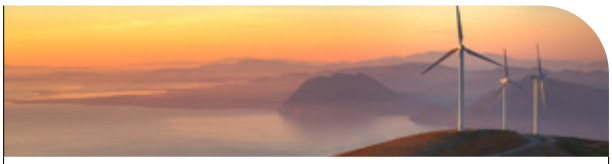
INNOVATION

	2021	2020	2019	2018	2017
R&D expenditure (in €m)	243	241	249	237	235
Number of patent applications filed	222	203	222	244	239
Number of patent applications filed relating to sustainable development	200	158	149	154	150
Percentage of sales that significantly contribute to the United Nations' Sustainable Development Goals [1]	51%	50%	46%	43%	N/A
Percentage of sales from products made from renewable or recycled raw materials [2]	10%	10%	9%	N/A	N/A

(1) On the basis of an assessment of 85% of the Group's third-party sales in 2021, 72% in 2020 and 44% in 2019 and 2018.

(2) Sales of products made with at least 25% renewable or recycled raw materials in 2021 and 20% for the previous years.

CLIMATE AND ENVIRONMENT



	2021	2020	2019	2018	2017
Greenhouse gas emissions	0.66	0.77	0.87	0.90	0.96
Volatile organic compound emissions	0.50	0.58	0.60	0.62	0.66
Chemical oxygen demand	0.45	0.45	0.50	0.59	0.70
Net energy purchases	0.85	0.90	0.91	0.88	0.89

In absolute terms compared with 2015 for greenhouse gas emissions.
In EFPI terms compared with 2012 for the three other indicators.

SAFETY

	2021	2020	2019	2018	2017
Total recordable injury rate (TRIR) [1]	1.0	1.0	1.4	1.3	1.6
Process safety event rate (PSER)	3.1	4.0	3.7	4.4	3.9

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

EMPLOYEES AND RESPONSIBLE PROCUREMENT

	2021	2020	2019	2018	2017
Headcount	20,209	20,576	20,507	20,010	19,779
Percentage of women in senior management and executive positions	24%	23%	23%	21%	19%
Percentage of non-French nationals in senior management and executive positions	40%	41%	40%	39%	37%
Percentage of purchasing spend with relevant suppliers covered by a Together for Sustainability assessment	71%	68%	68%	N/A	N/A

GLOBAL MEGATRENDS AND **MAIN CHALLENGES**

GLOBAL MEGATRENDS	MAIN CHALLENGES ARKEMA IS CONTRIBUTING TO 1 Boost new energies and clean mobility	2 Develop lightweight materials and design	3 Manage natural resources and promote circular economy	4 Enhance living comfort and home efficiency	5 Develop electronic solutions
Urbanization and social change The population is increasingly concentrated in urban areas, with cities expected to represent roughly 70% of the world population in 2050, compared with 55% today. Moreover, longer life expectancy and lower birth rates are leading to a higher proportion of senior citizens. → **Consequences** • Strong demand for the construction and renovation of buildings and for infrastructure, and increasing concern about housing comfort and energy efficiency • Increased needs for transportation, energy, water and services • Evolution of lifestyles and consumer behavior, as people seek better quality of life as well as innovative, higher performance products with innovative designs	✔	✔	✔	✔	✔
Climate change Increasing urbanization, the rise in transportation needs as well as greater industrialization, all contribute to gradual global warming of the planet and climate change, which is reflected in particular in an increase and intensification of extreme weather events. → **Consequences** Need to reduce CO_2 emissions, notably by: • limiting fuel consumption in transportation • improving energy performance in buildings • developing new low carbon energy sources	✔	✔	✔	✔	
Resource scarcity Based on current conditions, the consumption of raw materials could double by 2060. Availability and access constraints for non-renewable resources are therefore expected to increase considerably. → **Consequences** Need to speed up the transition to more sustainable lifestyles and economic models, thereby achieving development without increasing environmental impacts (decoupling), in particular through: • a responsible natural resource management • the development of eco-design and the circular economy approach • an optimized consumption of energy, raw materials and water • the development of new energy sources	✔	✔	✔		
Technological transformation New technologies such as artificial intelligence, the internet of the future and the metaverse, materials science and robotics are growing very fast, creating new commercial and industrial possibilities. → **Consequences** • Changing lifestyles and consumer behavior (percentage of the population equipped with connected objects) • Significant increase in available data • Increased production rates	✔	✔			✔

By 2050, the world population is expected to rise by over 25%, driven mainly by emerging countries, and reach nearly 10 billion people worldwide. This increase is reflected in particular by growing urbanization and changing lifestyles, has strong consequences on the climate, leads to increased use of resources and is accompanied by the emergence of new technologies. As a responsible manufacturer, Arkema contributes to addressing major challenges arising from these four global megatrends thanks to its innovative and sustainable solutions and the optimization of its industrial operations.

MAIN CHALLENGES ARKEMA IS CONTRIBUTING TO	EXAMPLES OF ARKEMA'S SOLUTIONS
① Boost new energies and clean mobility	→ Kynar® PVDF and Foranext® electrolytes for **batteries** → Kynar® PVDF, Apolhya® and Sartomer resins for **solar power** → Rilsan® polyamides for **hydrogen** storage → Elium® recyclable resin for **wind power**
② Develop lightweight materials and design	→ Advanced materials used as **substitutes for metal** in transportation: Rilsan® polyamides, Kepstan® PEKK and Elium® thermoplastic composites → Bostik adhesives for assembly as a **substitute for mechanical bonding** → Full range of resins for **3D printing**: N3xtDimension® photocure resins, Kepstan® PEKK, Rilsan® polyamides, Kynar® PVDF
③ Manage natural resources and promote circular economy	→ Rilsan® and Pebax® Rnew® **advanced bio-circular** polyamides, made from renewable castor seeds, notably for sports and consumer goods markets → Elium® **recyclable** resin for composites → Rilsan® polyamides for **water transportation** → Kynar® PVDF for **water ultrafiltration** → Hydrogen peroxide and acrylics for water disinfection and **wastewater treatment** → Cecabase RT® additive for asphalt, and specialty surfactants to **optimize mining yields** → Kercoat® and Opticoat® coatings to facilitate the **recycling** of glass bottles
④ Enhance living comfort and home efficiency	→ Bostik's adhesives and sealants for **insulation** and **waterproofing** → Forane® insulating foam for the **thermal insulation** of buildings → **Low-VOC** coating resins for paints → Siliporite® molecular sieves for **double glazing** → Kynar Aquatec® PVDF coatings for **cool roofs**
⑤ Develop electronic solutions	→ Advanced materials for **digital mobility** devices (high performance polymers for smartphones and tablets, Kynar® PVDF for batteries) → Sartomer® products used in high definition printed circuit boards for **5G technology** → Piezotech® solutions for **augmented reality** headsets and gloves

BECOME A PURE **SPECIALTY MATERIALS PLAYER**

Arkema has deeply transformed its profile since its creation, convinced that demand for innovative and sustainable materials can only continue to grow in response to new needs, linked in particular to global megatrends such as urbanization and social change, climate change, resource scarcity and technological transformation.

Unique expertise in materials

Since its stock market listing, Arkema has made significant changes to its business portfolio through numerous acquisitions and divestments, and has accelerated its investments in innovation for sustainable development.

The Group has thus developed unique expertise in materials, centered around bonding and assembly solutions, substitution by lighter or bio-based materials, as well as coatings and protection.

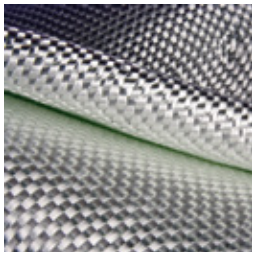
These skills in the field of materials science, combined with the Group's expertise in polymerization and formulation, as well as its application know-how, today enable Arkema to offer its customers a unique range of cutting-edge technological solutions, designed in particular to meet the challenges of new energies and clean mobility, materials lightweighting and design, natural resources management and the circular economy, living comfort and home efficiency, as well as the development of electronic solutions.

Structural materials

Bonding materials

Protective surfaces

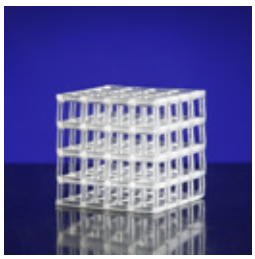
Composite materials



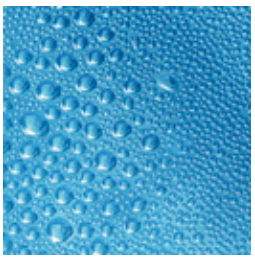
Recyclable materials

Bio-based resources

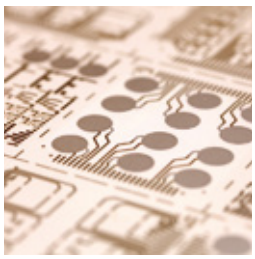
Additive technology



Surface science

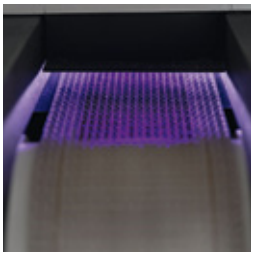


Piezoelectric materials

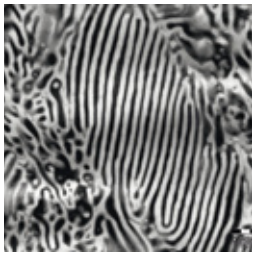


Rheology modifiers

UV curing technology



Nanoscience

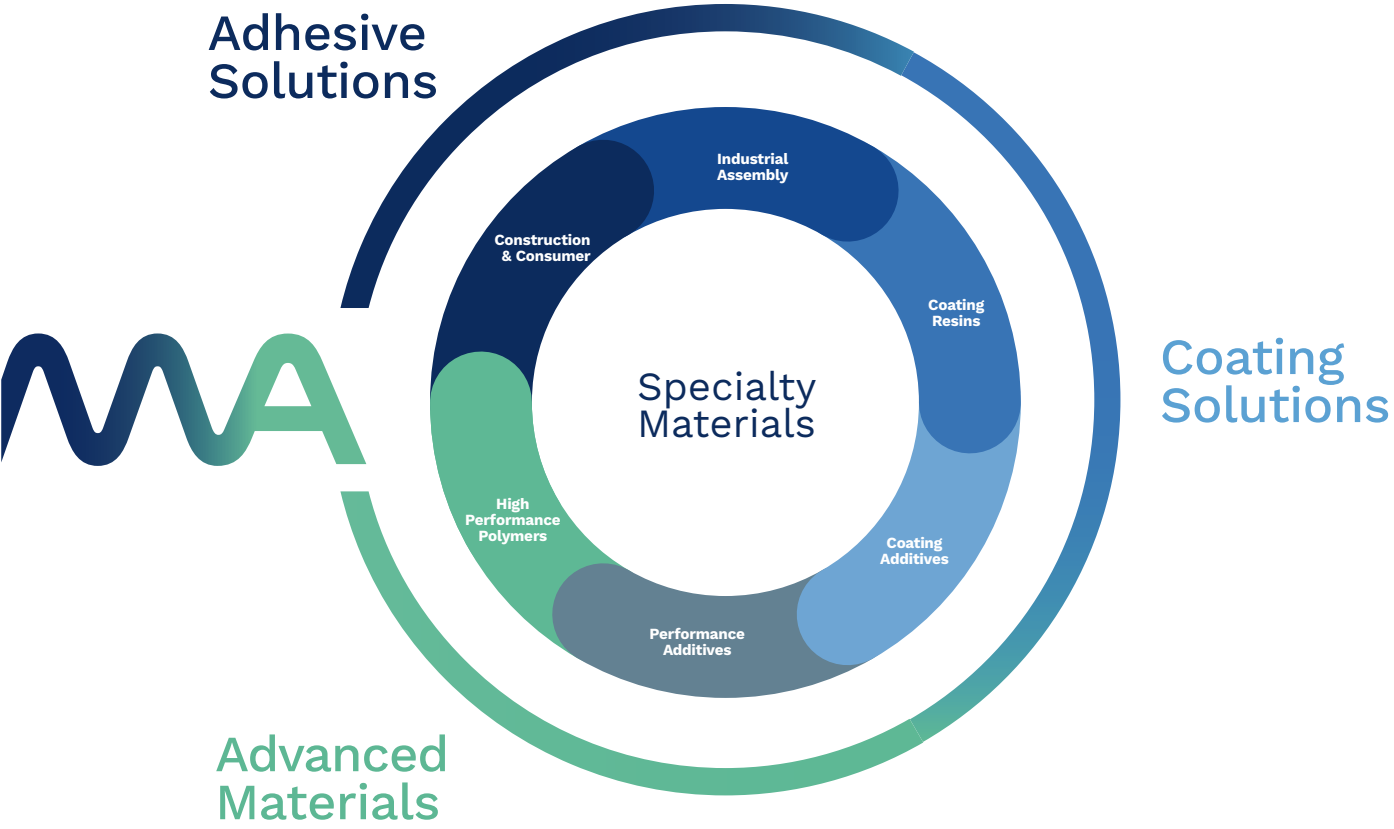


A new transformation phase

On 2 April 2020, during its Capital Markets Day, Arkema announced the launch of a new phase in its transformation based on these areas of materials expertise, now regrouped into three coherent and complementary segments: Adhesive Solutions, Advanced Materials and Coating Solutions.

These activities, which represented 85.5% of Group sales in 2021, constitute the Specialty Materials platform on which Arkema's long-term vision is built.

In the period 2020-2024, the Group will focus its efforts and development on this platform, in line with its ambition to become a pure Specialty Materials player offering the most innovative and sustainable solutions to meet its customers' current and future challenges.



In addition to this platform, there are the more cyclical intermediate chemicals activities, which now consist of Fluorogases and Asia Acrylics following the divestment of the PMMA business to Trinseo in May 2021. The Group will continue to implement differentiated strategies to reduce the share of these intermediates activities.

AMBITIOUS TARGETS **FOR 2024**

By 2024, Arkema's ambition is to become a pure Specialty Materials player, with a resilient and simplified portfolio.

→ SALES OF **€10 TO €11bn**

→ SUPERIOR **RESILIENCE**

→ HIGH PROFITABILITY OF **~17% EBITDA MARGIN**

→ ORGANIC GROWTH **>GDP**

→ STRONG **CASH GENERATION**

SPECIALTY MATERIALS

Organic sales growth
3-3.5% on average per year
More than doubled with M&A

EBITDA margin
Increase from 15.8% in 2019 to **~17%** (1)

Cash generation
>40% (2)

INTERMEDIATES

Implement **differentiated strategies** across businesses

To carry out this new step in its development, the Group will focus on organic and external growth in Specialty Materials and will gradually reduce the share of Intermediates.

Arkema notably intends to draw on its numerous innovation projects and its investments in major projects such as the expansion of its specialty polyamides in Asia, which will in particular contribute to meeting the challenges of materials lightweighting, 3D printing, new energies and energy efficiency in buildings. The Group also intends to play an active role in the consolidation of the adhesives market.

In this context, corporate social responsibility will more than ever be at the core of the Group's strategy. Arkema will also build on its commercial and operational excellence programs to achieve its objectives.

The 2024 targets outlined above are based on the Group's current best estimates, excluding a significant resumption of the Covid-19 health crisis.

(1) Including corporate costs corresponding to around 1% of sales.
(2) Recurring cash flow divided by EBITDA.

A **STRONG** CSR AMBITION

The Group has set and is rolling out its CSR roadmap to support the sustainable and responsible growth of its activities and meet the major challenges arising from global megatrends by providing its customers with solutions that contribute to their sustainable performance. The Group's CSR commitment is reflected in numerous objectives throughout the value chain.

SUSTAINABLE OFFERING

BY **2030**

- Percentage of sales that contribute significantly to Sustainable Development Goals [1]: **65%**

OPEN DIALOGUE

→ EMPLOYEES

BY **2030**

- Percentage of women in senior management and executive positions: **30%**
- Percentage of non-French nationals in senior management and executive positions: **50%**

→ SUSTAINABLE PROCUREMENT

BY **2025**

- Percentage of purchasing spend with relevant suppliers covered by a Together for Sustainability assessment: **80%**

RESPONSIBLE MANUFACTURER

→ SAFETY

BY **2030**

- Total recordable injury rate TRIR: **0.8**
- Process safety event PSER: **2.0**

→ CLIMATE AND ENVIRONMENT

BY **2030**

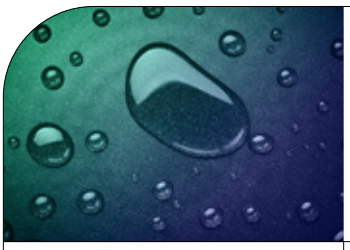
Climate [2]

- Greenhouse gas emissions: **-38%**

Environment [3]

- Volatile organic compound emissions: **-65%**
- Chemical oxygen demand: **-60%**
- Net energy purchases: **-20%**

(1) For further details concerning this target, named ImpACT+, see section 4.2.3 of this document.
(2) Greenhouse gas emissions in absolute terms relative to 2015 include Scope 1 direct emissions and Scope 2 indirect emissions and those of substances that deplete the ozone layer, in line with the Paris Agreement.
(3) In EFPI (Environmental Footprint Performance Indicator) terms compared with 2012.



OUR TARGETS IN
ADHESIVE SOLUTIONS

2021 key figures

€2.3bn
Sales

13.9%
EBITDA Margin

2.5-3.0%
Capex intensity (1)

2.3%
R&D intensity (1)

Following the integration of Bostik in 2015, the Group developed the Adhesive Solutions segment notably by making a number of bolt-on acquisitions in the construction sector – in particular in sealants and flooring solutions (Den Braven, XL Brands, LIP, etc.) – as well as in high performance industrial adhesives and engineering adhesives (Prochimir, Fixatti, Edge Adhesives Texas, etc.). Arkema achieved an important milestone with the acquisition (2) of Ashland's Performance Adhesives business, a first-class leader in high performance adhesives in the United States, boasting very strong technological and geographical complementarities with Bostik.

These transactions, combined with operational excellence initiatives and the product mix improvement toward higher value-added sustainable solutions, have contributed to significantly improving the segment's performance, with the EBITDA margin increasing from approximately 10% in 2014 to 13.9% in 2021.

(2) This acquisition was finalized on 28 February 2022.

"Our ambition: take part in the market's consolidation by targeting high performance adhesives and solutions in construction„

Main brands

BOSTIK
FIX & FLASH
Blu-Tack
Den Braven
SADER

(1) As a percentage of sales.

GROWTH DRIVERS

→ **Accelerate organic** sales **growth**:
- geographical expansion, particularly in Asia
- development of key technologies in high performance adhesives for industrial assembly and in construction (waterproofing and flooring adhesive systems)

→ **Launch** phase 2 of the operational excellence program

→ **Continue bolt-on acquisitions** in a fragmented market, contributing to approximately two-thirds of future sales growth

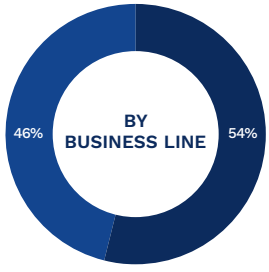
2024 AMBITION

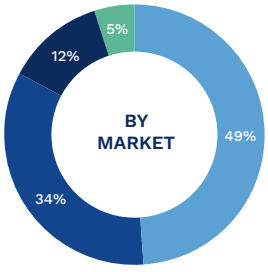
→ **Average annual sales growth** over the period 2020-2024:
high single-digit
including acquisitions around **3%** in organic terms

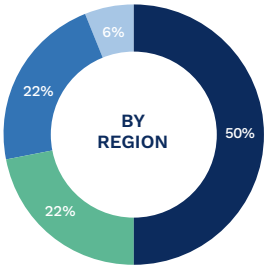
→ **Percentage** of Group sales
30-35% in 2024

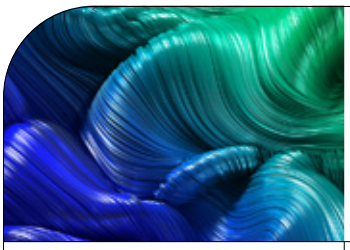
→ **EBITDA margin**
Target raised following the acquisition of Ashland's adhesives business
>17% in 2024
(*vs* around 16% previously)

Breakdown of 2021 sales









OUR TARGETS IN ADVANCED MATERIALS

2021 key figures

€3.1bn
Sales

21.4%
EBITDA Margin

7-8%
Capex intensity (1)

3.1%
R&D intensity (1)

The Advanced Materials segment includes High Performance Polymers and Performance Additives. Boasting exceptional technical and mechanical properties, High Performance Polymers offer innovative solutions with high growth potential that meet the major challenges arising from global megatrends. As for Performance Additives, they enable the improvement or the modification of the functional properties of materials and of production processes.

To develop this segment, the Group has made major industrial investments, notably in thiochemicals in Malaysia, PVDF in China and molecular sieves in France, and plans to start up the world's biggest integrated bio-factory dedicated to specialty polyamides in Singapore in 2022. These investments have been supplemented by some acquisitions, in particular ArrMaz or more recently Agiplast.

"Our ambition: invest and innovate to meet the exponential need for materials driven by global megatrends„

Main brands

High Performance Polymers

RILSAN® KYNAR®
KEPSTAN® PEBAX®

Additive Performance

LUPEROX®
SILIPORITE®
CARELFLEX® SERVICE

(1) As a percentage of sales.

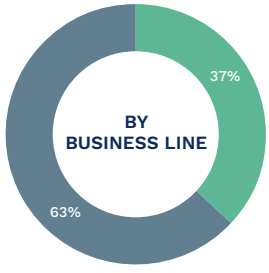
GROWTH DRIVERS

- → **Support growth** with major, highly profitable industrial projects (bio-based polyamides in Asia, PEKK in the United States, PVDF, etc.)
- → **Innovate for sustainable development** (bio-based materials, lightweighting, new energies, etc.)
- → **Be our customers' preferred partner** to meet their technological needs and challenges

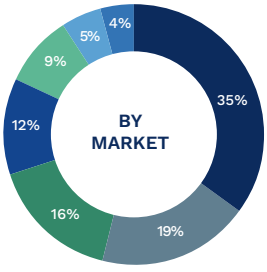
2024 AMBITION

- → **Organic sales growth** over the period 2020-2024: around **4%** on average per year
- → **Percentage** of Group sales **35-40%** en 2024
- → **EBITDA margin** stable at **22%** in 2024

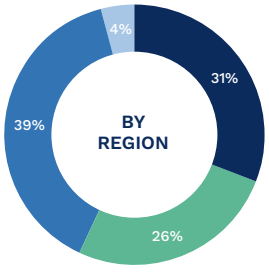
Breakdown of 2021 sales



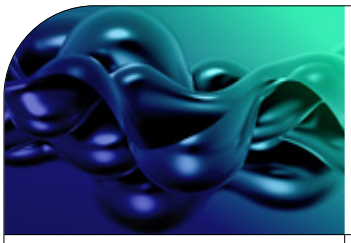
High Performance Polymers
Performance Additives



Industry
Electronics and energy
Nutrition and water
Consumer goods
Automotive and transportation
Building and construction
Paints and coatings



Europe
North America
Asia
Rest of the world



OUR TARGETS IN COATING SOLUTIONS

2021 key figures

€2.7bn
Sales

19.1%
EBITDA Margin

5-6%
Capex intensity (1)

1.9%
R&D intensity (1)

The Coating Solutions segment includes the entire range of Arkema's solutions for the coatings market, which are notably used in decorative paints and for industrial applications, as well as key technologies for 3D printing and electronics.

With competitive, world-scale acrylics facilities, the Group has developed this segment since its stock market listing by making several acquisitions in coating resins and additives, in particular Coatex, Sartomer and Cray Valley. Integrating these downstream activities, as well as developing innovative technologies and more environmentally friendly, high value-added solutions, have helped improve the segment's resilience and performance.

"Our ambition: expand our sustainable offering and strengthen the added value of our solutions„

Main brands

NEXTDIMENSION®
LAMBSON™
ENCOR®

(1) *As a percentage of sales.*

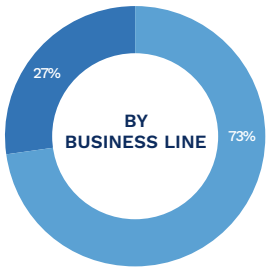
GROWTH DRIVERS

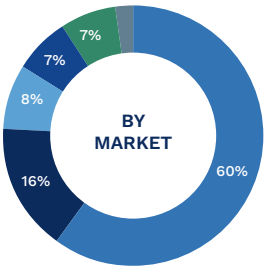
- **Increase the production capacity of our downstream activities** in high-growth regions, particularly Asia
- **Optimize our operational models** through reinforced integration of industrial platforms and downstream activities
- **Develop our sustainable offering** based on low-VOC formulations and bio-based solutions
- **Reinforce our technology** portfolio and downstream activities through bolt-on acquisitions

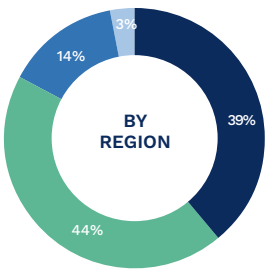
2024 AMBITION

- **Organic sales growth** over the period 2020-2024: around **3%** on average per year
- **Percentage** of Group sales **25-30%** in 2024
- **EBITDA margin** around **16%** in 2024

Breakdown of 2021 sales







OUR TARGETS IN INTERMEDIATES

2021 key figures

€1.4bn
Sales

22.9%
EBITDA Margin

Following the finalization of the divestment of the PMMA business to Trinseo in May 2021, the Intermediates segment now includes the volatile Fluorogases and Asia Acrylics activities, where Arkema holds leading positions, supported by cutting-edge technologies, competitive, world-scale facilities and strong partnerships.

In line with its ambition to become a pure Specialty Materials player by 2024, the Group plans to reduce the share of these more cyclical activities in its portfolio and will implement differentiated strategies for each of them, a significant part of which will involve considering divestments or partnerships that deconsolidate the activity.

Our projects and strategic reviews

PMMA

- **Divestment of the PMMA business** to Trinseo on 3 May 2021.
- The offer valued the business at **€1,137 million**, *i.e.*, over **9x** EBITDA.

FLUOROGASES

- **For non-emissive applications,** support the growth of our fluoropolymers while strengthening their upstream competitiveness, and accelerate the development of fluorospecialties, notably in electronics and batteries.
- **For emissive applications,** which represent approximately 75% of the business, explore several deconsolidation options through partnerships or mergers, either globally or on a regional basis, with third parties that could accelerate their development.

ASIA ACRYLICS

- **Rebalance upstream and downstream capacities** by reducing exposure to the monomers market through industrial partnerships and by strengthening downstream activities through organic growth and bolt-on acquisitions.

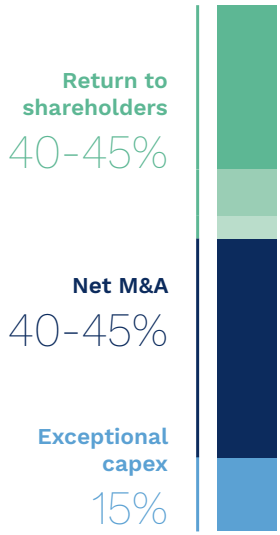
"Once these strategies are implemented, non-emissive Fluorogases applications and the Asia Acrylics business will join the Specialty Materials platform„

A BALANCED ALLOCATION OF **AVAILABLE CASH**

The Group's strategy, as described above, constitutes a central element of cash allocation with three priorities: exceptional capital expenditure, targeted bolt-on acquisitions in Specialty Materials, and increased shareholder returns.

~€3.5bn

SUBJECT TO APPROPRIATE MARKET CONDITIONS



Return to shareholders
40-45%

- Progressive **dividend policy**, targeting **40%** payout ratio by 2024
- Opportunistic share buyback programs
- Employee performance share plans

Net M&A
40-45%

- Mostly small and medium size **bolt-on acquisitions**
- Across our 3 Specialty Materials segments, in particular in **Adhesive Solutions**
- **EV/EBITDA multiple** after growth and synergies of <7x
- **Use of proceeds** from strategic review of intermediates

Exceptional capex
15%

- **Exceptional capex:** IRR ≥ 15% after taxes
- Includes capacity expansion of **PA11 in Asia** (€450m total investment) and **Nutrien** partnership (US$150m)

CASH TO ALLOCATE (1) 2020-2024

(1) Cash from operations less recurring CAPEX plus additional net debt at constant leverage (1.6x EBITDA including €700 million of hybrid bonds).

Maintaining the net debt (including hybrid bonds) to EBITDA ratio around the end-2019 level, the available cash over the period 2020-2024 should amount to approximately €3.5 billion, 15% of which will be dedicated to major organic growth projects, with the balance being distributed evenly between portfolio management operations and shareholder returns.

The targets outlined above are based on the Group's current best estimates, excluding a significant resumption of the Covid-19 health crisis.

STRICT FINANCIAL DISCIPLINE

This ambitious roadmap will remain underpinned by strict financial discipline.

→ RECURRING CAPITAL EXPENDITURE

~ 5.5%

of sales

→ TIGHTLY MANAGED WORKING CAPITAL

~ 14%

of sales

→ NET DEBT TO EBITDA RATIO

(including hybrid bonds)

< 2x

→ FINANCIAL RATING

Solid Investment grade

→ RETURN ON CAPITAL EMPLOYED

>10%

ACCELERATE
ORGANIC GROWTH

As part of this new phase of transformation, and in order to achieve its organic growth target of between 3% and 3.5% on average per year over the period 2020-2024, Arkema will leverage its recent production unit start-ups and continue its ambitious investment policy in high-growth countries. These projects, the most significant of which concerns the expansion of its specialty polyamides in Asia, will support growth in demand in several key end-markets, such as consumer goods, new energies and clean mobility.

An ambitious investment policy

To support its customers' geographic expansion, the Group aims for recurring capital expenditure to average **around 5.5% of sales** per year, with around 40% to 45% dedicated to growth projects and 55% to 60% to maintenance, safety and the environment.

In addition to this recurring capital expenditure, the Group will invest **around €525 million in exceptional capital expenditure** in the period 2020-2024.

2021

↓

€758m

in recurring and exceptional capital expenditure

EXCEPTIONAL CAPITAL EXPENDITURE

↓

ASIA

Expansion project in **bio-based specialty polyamides in Asia**, including in particular:

- a 50% increase in monomer and Rilsan® polyamide 11 global production capacity in Singapore, scheduled to start up mid-2022; and
- a polyamide 11 powders plant in Changshu, scheduled to come on stream in the first quarter of 2023.

This project will allow the Group to support the very high demand for lightweight,

bio-based materials in automotive, 3D printing and consumer goods markets.

This investment, which represents a total amount of around €450 million, and the financing of which includes a green bond dedicated to the Singapore plant, should generate an EBITDA of around €100 million at full capacity.

↓

NORTH AMERICA

US$150 million investment as part of the **partnership with Nutrien to produce hydrofluoric acid**, the main raw material for fluoropolymers and fluorogases, which will be carried out by Arkema at Nutrien's site in the United States.

This investment has many advantages in terms of both securing competitive access to hydrofluoric acid and environmental friendliness compared with more traditional processes.

Start-up of the unit is expected mid-2022.

RECURRING CAPITAL EXPENDITURE

5.3%
of Group sales in 2021

CHINA

50% increase in PVDF production capacity in Changshu, scheduled to come on stream at the end of 2022, to meet ever stronger demand in the lithium-ion battery sector and to serve the water filtration, construction coatings and semiconductor markets.

FRANCE

50% increase in PVDF production capacities at the Pierre-Bénite site, expected to come on stream in the first quarter of 2023. This project will enable to support the exponential growth in demand for lithium-ion battery cell materials.

UNITED STATES

15 kt/year capacity of 1233zd, a fluorospecialty solution with no or minimal emissive impact, for the high-efficiency insulation materials market and for emerging applications, particularly batteries. This unit is expected to start up at the Calvert City site in late 2023, for an estimated investment of US$60 million.

FRANCE

25% increase in its global Pebax® elastomer production capacity in Serquigny, expected to come on stream mid-2023, to support strong growth in particular in sports and consumer goods markets.

CHINA

Doubling UV curable resin production capacities at the Nansha plant, to support the fast-growing demand in Asia for cutting-edge solutions in electronics, driven by 5G technology, and in renewable energies. This new expansion is scheduled to come on stream in the second half of 2023.

2022 → ~ 5.5%
of Group sales in recurring capital expenditure

→ ~ €130 m
exceptional capital expenditure

INNOVATE FOR **SUSTAINABLE DEVELOPMENT**

Technological innovation is at the heart of Arkema's strategy and a key growth driver. It enables the Group to address major economic and societal challenges through solutions that contribute to the United Nations' Sustainable Development Goals.

Supporting our customers in addressing their challenges

Thanks to its 15 R&D centers across the world, Arkema develops new products, applications and production technologies to meet customers' particularly demanding needs in leading-edge sectors such as automotive, aerospace, consumer electronics and new energies.

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 has developed Kepstan® PEKK, a material for extreme environments that can withstand temperatures of up to 260°C, and Elium® resin, used notably to make lightweight wind turbine blades and enabling end-of-life recycling.

Contributing to operational excellence

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

Toward a portfolio of increasingly sustainable solutions

The Group is actively assessing its portfolio of solutions in light of sustainability criteria. At end-2021, 85% of sales had been assessed, of which

51%

significantly contribute to the United Nations' Sustainable Development Goals.

→ KEY FIGURES 2021

>1,600
researchers

€243m
in R&D expenditure

3.1%
of Advanced Materials sales allocated to the segment's R&D

Natural resources management

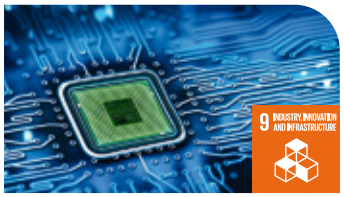
New energies

Lightweight materials and design

5 innovation platforms

ideally positioned to meet current and future challenges

Living comfort and home efficiency



Electronics solutions

In a world characterized by global megatrends such as urbanization and social change, climate change, resource scarcity and technological transformation, Arkema focuses its research efforts on ensuring its solutions adequately address market needs and specific customer expectations worldwide.

Based on this work, which is reviewed regularly, the Group has set up 5 innovation platforms which perfectly meet 5 United Nations' Sustainable Development Goals, including an innovation platform dedicated to natural resources management. This platform spans bio-based and recyclable solutions, the circular economy and water management.

“Our sustainable innovation dynamic should enable us to generate up to €1.5 billion additional sales by 2030 (1).”

(1) Compared with 2019.

15
R&D centers across three hubs in Europe, Asia and North America

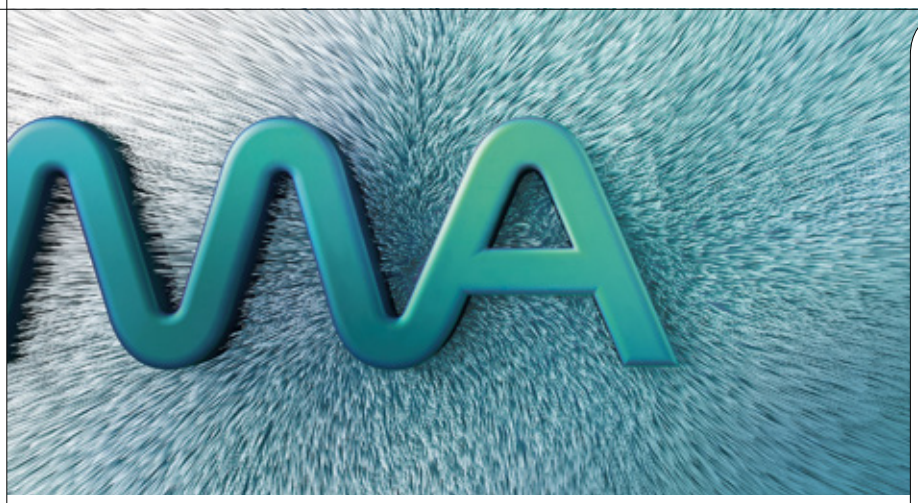
222
patent applications filed, 90% relating to sustainable development

Numerous partnerships
with universities and research laboratories, both public and private

~€1bn
sales from products less than 5 years old in Specialty Materials

BOLT-ON ACQUISITIONS TO STRENGTHEN **OUR SPECIALTY MATERIALS**

The Group aims to more than double the organic growth of its Specialty Materials between 2020 and 2024 through bolt-on acquisitions. Priority will be given to Adhesive Solutions with, on average, two to three small transactions per year supplemented by one to three medium-sized acquisitions over the period.



Acquisitions that create long-term value

In line with its ambition to carry out transactions that create value, the Group aims to make acquisitions offering significant synergies, thereby enabling to reduce the enterprise value to EBITDA multiple to around 7-8x, four or five years after the acquisition, taking into account organic growth and the implementation of synergies.

These synergies could correspond to:

- cost synergies made on purchases of raw materials, goods and services or logistics, or achieved by implementing operational excellence programs; and
- new geographic, technological or commercial developments driven by shared know-how and the Group's complementarities with the acquired companies.

Subject to appropriate market conditions, Arkema plans to allocate to its acquisition program, net of divestments, 40% to 45% of its available cash, which is estimated at approximately €3.5 billion over the period 2020-2024, while maintaining a net debt (including hybrid bonds) to EBITDA ratio of 1.6.

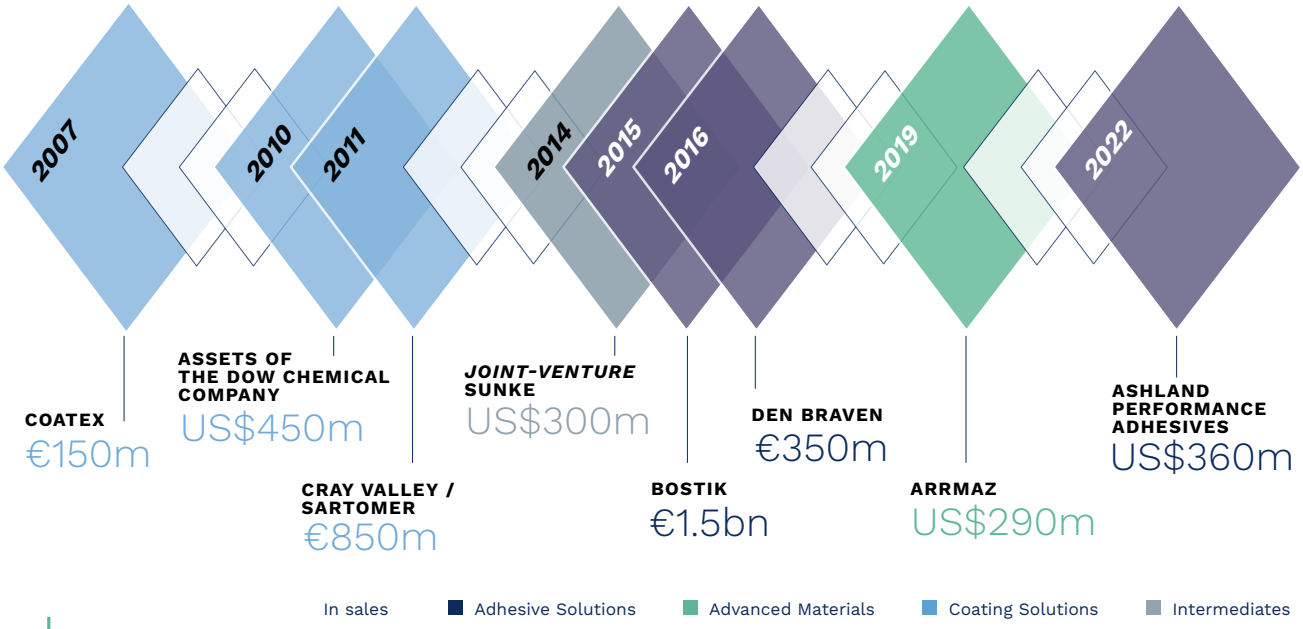
2021 HIGHLIGHTS

A major acquisition in Adhesive Solutions
with Ashland's Performance Adhesives business, a first-class leader in high performance adhesives in the United States. With 2021 sales of around US$360 million and EBITDA at a very high level of around US$95 million (including *pro forma* adjustments), Ashland has strong technological and geographical complementarities with Bostik. This acquisition, finalized on 28 February 2022, was made on the basis of an enterprise value of US$1,650 million.

and bolt-on acquisitions in Specialty Materials:

- Poliplas, a leader in hybrid-technology sealants and adhesives in the Brazilian construction market;
- Edge Adhesives Texas, a major player in innovative adhesive solutions used in residential buildings;
- Agiplast, a major player in the regeneration of high performance polymers; and
- Permoseal, one of the leaders in adhesive solutions for woodworking, packaging, construction and DIY in South Africa, which is expected to be finalized in second-quarter 2022.

Transformational acquisitions



Since 2006, Arkema has made active portfolio management a major transformation lever, in particular:

- the acquisition of Bostik in 2015, followed by many small- to medium-sized acquisitions aimed at developing its Adhesive Solutions segment including, most recently, Ashland's Performance Adhesives business, finalized on 28 February 2022; and
- the strengthening of its presence in the high value-added downstream activities of its Coating Solutions segment.

All these transactions represent around €4.8 billion in sales.

Divestments

In line with its objective of reducing the share of Intermediates in the Group's activities and refocusing on its strategic businesses, Arkema finalized:

- the divestment on 3 May 2021 of the PMMA business, with sales of more than €500 million, to Trinseo. This divestment, representing a major step in the Group's transformation, was made on the basis of an enterprise value of €1,137 million, *i.e.* over 9 times its EBITDA; and
- the divestment finalized in December 2021 of the epoxides business, with sales of around US$40 million, to US group Cargill. The transaction valued this business at US$38.8 million, *i.e.* around 10 times historical EBITDA.

Since 2006, the Group has made disposals worth around €2.8 billion in sales, with the main transactions being the divestment of the vinyl products business finalized in 2012, Functional Polyolefins in 2020 and PMMA in 2021.

CORPORATE SOCIAL RESPONSIBILITY **AT THE HEART OF OUR STRATEGY**

Arkema's social responsibility approach aims to create long-term value for all its stakeholders. This approach is based on five major themes, namely the sustainable solutions offering, circular economy, climate, safety and environment, as well as labor and relations with stakeholders.

Sustainable solutions offering

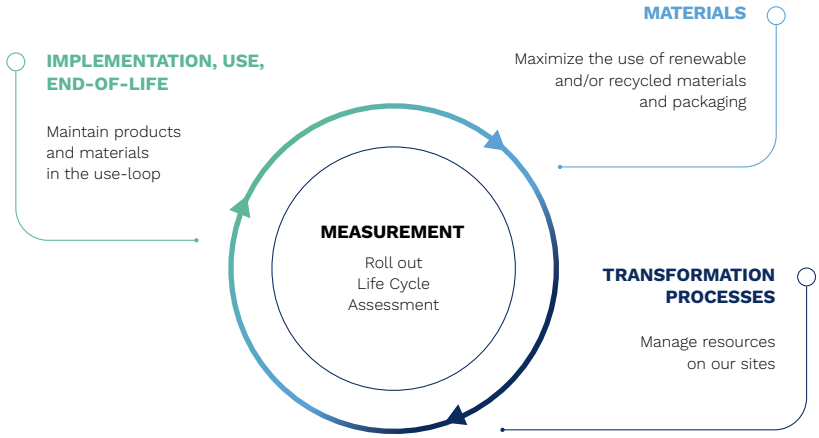
Toward a greater positive impact

To shift its product offering ever more assertively toward sustainable solutions, Arkema continues its approach to systematically assess its portfolio of solutions in light of sustainability criteria, with a target to reach 65% of its sales contributing significantly to UN Sustainable Development Goals by 2030. This assessment takes into account the entire value chain, from raw materials to the product's end of life and includes manufacturing processes.

Circular economy

For a responsible resource management

The Group has made the circular economy and responsible resource management a priority, applying to both the Group's solutions and its industrial operations, and covering the entire value chain based on four main drivers.



Climate

Contribute to limit global warming

Arkema has been mobilized in the fight against global warming for many years and, since 2019, has been committed to a climate plan in line with the Paris Agreement based on a Science-Based Target approach. The 2030 target is to reduce its greenhouse gas emissions by 38% compared with 2015, with a view to contributing to limit global warming to well below 2°C relative to pre-industrial levels by the end of the century. This commitment covers Scopes 1 and 2 and the substances listed in the Montreal Protocol.

Safety and environment

Acting as a responsible manufacturer

As part of its operations, the Group's ambition is to rank among the leading chemical companies in terms of safety performance and it is fully determined to reduce the environmental footprint of its activities.

In terms of safety, the Group has continued to clearly improve its performance in line with the trend of the past few years, driven largely by the strong commitment of all employees, and has set the demanding targets of achieving a TRIR of 0.8 and reducing process safety events with a PSER of 2.0 by 2030.

In addition, the Group is pursuing an active policy of reducing its emissions into air, water and soil, and has set the target of cutting volatile organic compound emissions intensity by 65% and chemical oxygen demand intensity by 60% by 2030.

Labor and stakeholder relations

A committed value chain

The Group's activities are part of a value chain and ecosystem comprising numerous partners and stakeholders, and it has made open dialogue with its interlocutors a cornerstone of its social policy. In particular, Arkema considers each of its 20,200 employees as talents. Developing their skills and maintaining their high level of engagement are of major importance for Arkema. Diversity, equal opportunity and inclusion form an integral part of the talent management policy. The 2030 diversity targets (30% women and 50% non-French nationals in senior management and executive positions), which Arkema raised in 2020, reflect the Group's geographic expansion and its commitment to equal opportunity, and acknowledge the contribution of diversity to the Company's performance.

Moreover, Arkema has integrated social challenges into its procurement process and strives to build long term, balanced and sustainable relationships that are based on trust with its suppliers and subcontractors.

The Group is a member of the Together for Sustainability (TfS) initiative, which aims to encourage social responsibility across the chemical industry supply chain, and has set a strategic target of achieving 80% of purchasing spend with suppliers covered by a TfS assessment.

RECOGNIZED ESG PERFORMANCE IN 2021

The Group's approach and performance in relation to environmental, social and governance (ESG) aspects are regularly assessed by external stakeholders including customers and SRI rating agencies. These agencies place Arkema among the leaders in the chemical sector, and recognize its very high levels of commitment and performance in these aspects.

S&P Global	Dow Jones Sustainability Indices	MSCI	CDP	V.E	ecovadis	SUSTAINALYTICS	ISS ESG
82	3rd *in DJSI World "Chemicals" category*	A	B	67	Top 1%	Rated	1st decile *global (sept. 2021)*

2021 HIGHLIGHTS

- → Inclusion of Arkema in the new CAC 40® ESG index on the Paris stock exchange, listing the 40 companies that have demonstrated ESG best practices.
- → Sustainable Leadership Award for Societal Contributions from the American Chemistry Council (ACC) for advanced bio-circular polyamide 11. This prestigious award rewards products, processes or initiatives that illustrate a commitment to innovation for a sustainable future.
- → Commitment by Arkema to preserving biodiversity with act4nature international.
- → First ARKEMA CARES 2021 global engagement survey, with 82% of employees stating their full engagement.
- → Top Employer 2022 certification in 4 countries (France, China, United States and Brazil), which account for two-thirds of Arkema's employees and recruitments worldwide.

COMMERCIAL AND OPERATIONAL EXCELLENCE INITIATIVES

To achieve its long-term ambition, the Group implements strong actions in the cross-functional areas of commercial and operational excellence. The digital transformation program is central to these initiatives, notably through numerous projects that allow the Group to make the most of the possibilities offered by new technologies.

Commercial excellence

Customers at the heart of Arkema's strategy and innovation policy

In order to improve customer focus and intimacy, meet their needs as effectively as possible and promote the diversity of the Group's solutions, Arkema's commercial excellence program notably focuses on:

- → a collaborative Customer Relationship Management tool:
  - rolled out across all of the Group's businesses in 2020 and used to share customer data, manage development opportunities and implement synergies for multi-business customers,
  - promoting new business development by recording and following up on any signs of interest shown by prospects or potential customers (leads) attracted by Arkema's visibility on websites and social media, with the aim of converting these leads into opportunities and then establishing a business relationship;
- → a reporting system, which provides sales and finance teams with more relevant business analysis and management, and better knowledge of our exposure to each market;
- → in relation with all the talent management initiatives, the continuation of the Sales Academy, a program of dedicated, ongoing training courses that develops sales teams' expertise in sales processes and customer relations, with notably in 2021 a global training campaign focused on pricing;
- → a strengthening of the Group-wide One-Arkema approach among customers and in multi-BU markets, drawing on a network of global key account managers and internal working groups to optimize the Group's commercial offering in its major markets; and
- → a growing customer focus recognized in our annual global satisfaction surveys, which drive us to strive for continuous progress and to strengthen our customer intimacy. In March 2021, this survey found that 82% of customers were satisfied or extremely satisfied – a high score within the industry.

Increasingly efficient digital tools

Strengthened interactions with our customers

- → Improvements to the Group's new websites, with the production of large volumes of product and market content;
- → Development of new web features, such as product comparison tools that give customers and prospects a better understanding of Arkema's solutions; and
- → First Coating Days seminar held in June 2021 over 3 days, presenting the Group's coatings offering and strategy to customers through interviews and a dozen webinars.

An improved services offering

- → Launch of a new customer portal allowing real-time order tracking, to be supplemented with new services and other features depending on customers' needs; and
- → Extension of the digitalized Carelflex® service to North America, following its success with the first customers in Europe.

Operational excellence

Developing a culture of operational efficiency to ensure the competitiveness and sustainability of the Group's sites

Our approach

Arkema has launched a continuous progress initiative across all its businesses and subsidiaries, which is notably based on:

- → constantly assessing areas of improvement and potential for progress in each of the Group's businesses, as well as sharing best practices;
- → defining precise and ambitious targets for each production site on safety, the environment, reliability, productivity and raw materials consumption, while carefully managing improvement plans; and
- → implementing the SMART initiative, an engaging, collaborative approach on the ground, that involves all employees in the process of identifying and continuously improving the performance of production units.

Our 5 commitments

1. Being among reference players in the chemical industry in terms of safety and environmental footprint

   Arkema continues to improve its performance in line with its 2030 targets.

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

   - Constant improvement of the manufacturing base and strengthening of competitiveness and reliability by making investments, by reducing variable costs through the optimization of raw materials consumption and energy efficiency thanks to continuous process improvement, and by implementing high performance digital tools; and
   - Optimization of fixed operating costs and industrial investments through a global procurement strategy for goods and services.

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

   The Group continues to optimize its supply chain, implementing in particular a new transportation management system (TMS), a customer portal and shipment track-and-trace tools.

4. Developing the technological innovation policy

   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. Promoting and reinforcing employee engagement

   In order to sustain its approach, Arkema develops an operational excellence culture among all employees and values their day-to-day actions that contribute to the Company's continuous progress.

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

Digital excellence

- → Ongoing implementation of digital tools, enabling to capture and simplify operational data of the Group's factories to monitor production, and also in research centers (electronic lab notebooks);
- → Rollout of the Trendminer® solution, designed to analyze our production data and optimize manufacturing processes; and
- → Development of IOT technologies, allowing real-time monitoring of logistics equipment (freight cars, containers, spherical tanks, etc.).

A collaborative workplace

- → Extension of the "Work Together, Work Clever" program Group-wide, helping all employees to become more proficient in using office automation tools and also to benefit from collaborative meeting technologies; and
- → Accelerated rollout of e-learning modules, now making it possible to follow all training courses remotely, and introduction of new modules on operating procedures developed in collaboration with field operators.

OUR **BUSINESS MODEL**

Design and develop, as a responsible manufacturer, innovative solutions adapted to our customers' main challenges to address global megatrends, and support them in their quest for sustainable performance.

OUR STRENGTHS (1)

Commercial strengths

- → **Leadership positions** in our main product lines
- → A worldwide presence in **55 countries**
- → A balanced portfolio of businesses
- → Strong partnerships with leading customers

Operational strengths

- → A global footprint with **141 sites**
- → **€6.5 billion** in tangible and intangible assets

R&D strengths

- → **5 innovation platforms** to address global megatrends
- → **More than 1,600 researchers in 3 regional** R&D **hubs** worldwide
- → Robust intellectual property with more than **10,000 patents**

Human capital

- → **20,200 employees** embracing the company's values and committed to its long-term plan

Financial strengths

- → Indebtedness well under control, with **net debt** (including hybrid bonds) of less than 2x EBITDA

OUR VALUE CREATION MODEL

Our values

solidarity
performance
simplicity
empowerment
inclusion

Our organization

14.5%
INTERMEDIATES

€9.5bn
OF SALES IN 2021

85.5%
SPECIALTY MATERIALS

- **Adhesive Solutions** 24%
- **Advanced Materials** 32.5%
- **Coating Solutions** 29%

Cross-functional CSR,
operational and commercial excellence initiatives
supported by digital transformation

(1) See pages 8 and 9.
(2) Share of sales which contribute significantly to Sustainable Development Goals.
(3) Total recordable injury rate per million hours worked with or without lost-time.
(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 CONTRIBUTION TO SUSTAINABLE DEVELOPMENT GOALS

OUR AMBITION

Our priorities

Offer

sustainable solutions driven by innovation and product stewardship

- → Boost **new energies** and **clean mobility**
- → Develop **lightweight materials** and **design**
- → Enhance **living comfort** and **home efficiency**
- → Manage **natural resources** and promote **circular economy**
- → Develop **electronic solutions**
- → Design solutions that reduce **health, safety and environmental risks**

Support

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

Act

as a responsible manufacturer deeply rooted in host communities

- → Ensure **employees' health** and **equipment safety**
- → Act for **climate** and reduce our **environmental footprint**
- → Contribute to the development of **territories**

Become a pure Specialty Materials player by 2024

with a resilient and simplified portfolio

Financial targets (2024)

- → Sales of **10 to €11bn**
- → Organic growth **>GDP**
- → High profitability of **~17% EBITDA margin**
- → **Strong** cash **generation**

Underpinned by strict financial discipline

- → Recurring capital expenditure of approximately **5.5% of sales**
- → Strictly managed working capital of **~14% of sales**
- → Net debt (including hybrid bonds) **<2x EBITDA**
- → ROCE **>10%**
- → **Solid investment grade** credit rating

Long-term non-financial targets

Sustainable solutions (2030)
- → Percentage of ImpACT+ sales [2]: **65%**

Safety (2030)
- → Total recordable injury rate (TRIR) [3]: **0.8**
- → Process safety event rate (PSER) [4]: **2.0**

Climate and environment [5] (2030)
- → Greenhouse gas emissions: **-38%**
- → Volatile organic compound emissions: **-65%**
- → Chemical oxygen demand: **-60%**
- → Net energy purchases: **-20%**

Diversity in senior management and executive positions (2030)
- → Percentage of women: **30%**
- → Percentage of non-French nationals: **50%**

Sustainable procurement (2025)
- → Percentage of purchasing spend with relevant suppliers covered by a Together for Sustainability assessment: **80%**

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 long-term value for all of its stakeholders.

SUPPLIERS AND CUSTOMERS

Offer innovative, sustainable solutions tailored to customers' specific needs

82% of satisfied or extremely satisfied customers

more than **1,700** suppliers assessed with regards to CSR (1)

71% of the Group's purchases with relevant suppliers (1)

222 patent applications filed

90% relating to sustainable development

Numerous partnerships announced with ERPRO 3D Factory in 3D printing, Morrow and Verkor in batteries

51% of sales assessed significantly contributing to the SDGs (2)

(1) Covered by a Together for Sustainability (TfS) assessment.
(2) On the basis of an assessment of 85% of the Group's third party sales in 2021.

REGIONS AND COMMUNITIES

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

€758m in recurring and exceptional capital expenditure

€288m in recurring cash taxes

Numerous partnerships focused on research with public laboratories and universities (École Polytechnique in France, Monash University in Malaysia)

Financing of projects to support education, through a dedicated fund, led by nonprofit organizations in **15 countries**

2021 Data..

Engage for the climate and the environment

PLANET

-34%	-15%	-50%	-55%
greenhouse gas emissions (1)	net energy purchases (2)	volatile organic compound emissions (2)	chemical oxygen demand (2)

(1) Greenhouse gas emissions in absolute terms relative to 2015 (Scopes 1, 2 and ODS).
(2) In EFPI terms compared with 2012.

Promote the individual and collective development of the Group's men and women

EMPLOYEES

€1.5bn	20,200	1.0	6.0%	24 hours
payroll expenses	employees	injury rate (TRIR)	of capital owned by employees	of training on average per employee per year
	26.2% women			

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

SHAREHOLDERS

14.4%	€756m	€3.0 (2)	€300m (3)
return on capital employed (1)	recurring cash flow	2021 dividend per share	share buyback program

(1) Excluding PMMA.
(2) Dividend proposed at the annual general meeting on 19 May 2022.
(3) Executed between 21 May and 24 November 2021, and followed by a 3.19% reduction in the Group's share capital, on 24 January 2022.

AN EXPERIENCED AND DIVERSIFIED BOARD OF DIRECTORS

Arkema's governance includes a Board of Directors with a Chairman and Chief Executive Officer and a senior independent director, as well as three specialized committees. The Chairman and CEO is furthermore supported by an Executive Committee comprised of a Chief Operating Officer, 5 operational and functional Executive Vice-Presidents and 3 operational Senior Vice-Presidents.

Composition of the Board of Directors at 31 December 2021

14 directors	1 senior independent director
45% women (1)	73% independence rate (1)

Arkema's Board of Directors comprises 14 directors, including 8 independent directors, 2 directors representing employees and 1 director representing shareholder employees, equating to an independence rate of 73% (1).

Except for the directors representing employees, directors are appointed by the ordinary general meeting for a 4 year term.

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

Jean-Marc Bertrand (63) ISGC
Shareholder employees rep. - IT project manager
Year current term expires: 2022

Thierry Le Hénaff (58)
Chairman and Chief Executive Officer, Arkema
Year current term expires: 2024

Nathalie Muracciole (57) NCCGC
Employee rep. - Corporate Talent Department
Year current term expires: 2024

Hélène Moreau-Leroy (57) NCCGC
Senior independent director
Chairman and Chief Executive Officer, Hutchinson
Year current term expires: 2023

Susan Rimmer (46)
Employee rep. - Global Product Stewardship Manager
Year current term expires: 2024

Marie-Ange Debon (56) AAC ✪
Chairman of the Executive Board, Keolis
Year current term expires: 2022

Laurent Mignon (58)
Chairman of the Executive Boar, BPCE
Year current term expires: 2023

Ilse Henne (49) AAC
Chief Transformation Officer, Thyssenkrupp Materials Services
Year current term expires: 2025

Fonds stratégique de Participations
Represented by
Isabelle Boccon-Gibod (53) ISGC AAC
Management consultant
Year current term expires: 2022

Ian Hudson (64) ISGC AAC
Chairman of the Board of Directors, Carbios
Year current term expires: 2023

Bpifrance Investissement
Represented by
Sébastien Moynot (49) ISGC
Member of the management committee of Bpifrance Investissement Large Cap.
Year current term expires: 2025

Philippe Sauquet * (64) NCCGC
Company director
Year current term expires: 2022

Thierry Pilenko (64) NCCGC ✪
Company director
Year current term expires: 2025

Victoire de Margerie (58) ISGC ✪
Chairman, Rondol Industrie
Year current term expires: 2023

AAC *Audit and Accounts Committee*
NCCGC *Nominating, Compensation and Corporate Governance Committee*
ISGC *Innovation and Sustainable Growth Committee*
✪ *President*

* *Co-opted by the Board of Directors' meeting on 9 November 2021 temporarily as a replacement for Alexandre de Juniac who resigned.*

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 chemical industry and customer-driven businesses in particular), finance, acquisitions and their integration, corporate social responsibility and digital;
- a majority of independent directors; and
- a high level of gender balance.

PROPOSED CHANGES TO THE COMPOSITION OF THE BOARD OF DIRECTORS

(submitted to the annual general meeting of 19 May 2022)

Ratification of the co-optation of Philippe Sauquet as an independent director;

- Reappointment of Philippe Sauquet as an independent director for a four-year term; and
- Appointment of Nicolas Patalano as a director representing shareholder [1] employees for a four-year term.

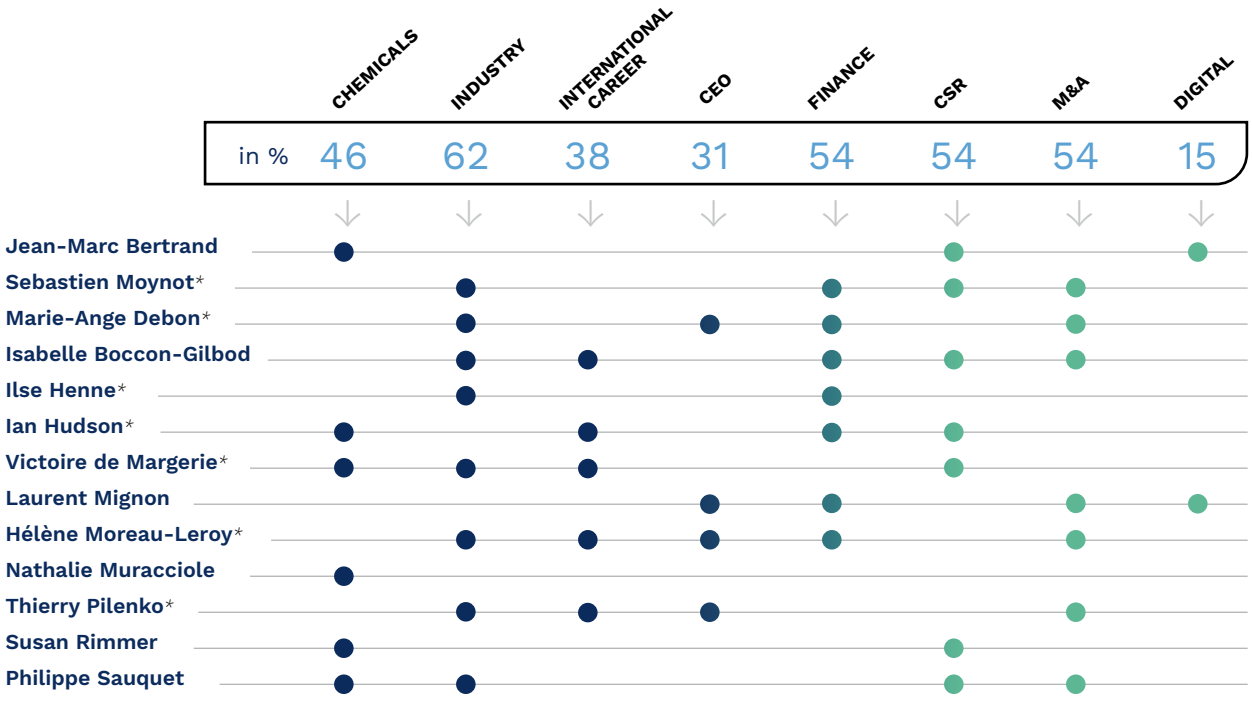
(1) Another candidate, Uwe Michael Jakobs, not approved by the Board of Directors, is submitted to the vote of the annual general meeting. As there can only be one seat for a director representing employees, only the candidate with the most votes and at least the majority, will be appointed.

OTHER CHANGES IN 2022

(submitted to the annual general meeting of 19 May 2022)

- Reappointment of Fonds Stratégique de Participations as a director for a four-year term, represented as before by Isabelle Boccon-Gibod; and
- Reappointment of Marie-Ange Debon as an independent director for a four-year term.

Directors' skills matrix (excluding the Chairman and CEO)



* *Independent directors.*

THE **BOARD'S WORK**

The Board of Directors

It determines the Group's strategic guidelines and oversees their implementation.

Its approval is required for:

→ **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, it promotes the Group's long-term value creation for all of its stakeholders, taking into consideration notably the social and environmental implications of its activities.

11 MEETINGS
including one meeting on Group strategy, with a 100% attendance rate

92%
ATTENDANCE RATE in 2021

To accomplish its missions, the Board is supported by the work of 3 SPECIALIZED COMMITTEES

AUDIT AND ACCOUNTS COMMITTEE			NOMINATING, COMPENSATION AND CORPORATE GOVERNANCE COMMITTEE			INNOVATION AND SUSTAINABLE GROWTH COMMITTEE *(since 20 May 2021)*		
The Audit and Accounts Committee oversees matters including the quality of internal control and the reliability of information provided to shareholders and financial markets.			The Nominating, Compensation and Corporate Governance Committee issues in particular recommendations on matters including the composition of the Board of Directors, the compensation policy for the Chairman and Chief Executive Officer, and good governance practices.			The Innovation and Sustainable Growth Committee is tasked with assessing the contribution of Arkema's innovation and strategy to environmental challenges and sustainable growth. Together with the Audit and Accounts Committee and the Nominating, Compensation and Corporate Governance Committee, this new committee will help perform a full review of the Group's ESG and non-financial challenges.		
6 MEETINGS	96% ATTENDANCE RATE	75% INDEPENDENCE RATE	3 MEETINGS	100% ATTENDANCE RATE	75% INDEPENDENCE RATE	1 MEETING	100% ATTENDANCE RATE	60% INDEPENDENCE RATE

Annual assessment of the Board of Directors' operating procedures

The Board of Directors carries out an annual self-assessment of its operating procedures using a questionnaire that it validates. An external assessment is carried out by an independent consulting firm in cooperation with the Chairman of the Nominating, Compensation and Corporate Governance Committee and the Secretary of the Board of Directors every 3 years.

For 2021, the Board of Directors' annual assessment was carried out by Spencer Stuart with the help of a self-assessment questionnaire. The results showed that the directors continue to be very satisfied with the Board's operating procedures, reporting stronger commitment in the context of the pandemic.

From a general viewpoint, it emerges from this assessment that Arkema's governance this year is again at a level in line with best practice. In effect, on average more than 90% of directors consider that the dynamics of the functioning of Arkema's Board of Directors and its performance are very satisfactory, despite the deep evolution of its composition in the past few years given the expiry of the terms of office of several directors in place since 2006. The directors unanimously manifest a real pleasure working together in a professional and pleasant environment.

THE **EXECUTIVE** COMMITTEE

The Chairman and Chief Executive Officer is also supported by an Executive Committee comprising a Chief Operating Officer, 5 operational and functional Executive Vice-Presidents, and 3 operational Senior Vice-Presidents.

Composition of the executive committee at 31 December 2021

NAME	POSITION	AREA OF RESPONSIBILITY
Thierry Le Hénaff	Chairman and Chief Executive Officer	
Marc Schuller	Chief Operating Officer	Advanced Materials, Coating Solutions and Intermediates segments, North America region, commercial excellence, raw materials and energy procurement
Reporting to Marc Schuller:		
Richard Jenkins	Operational Senior Vice-President	Coating Solutions segment
Marie-Pierre Chevallier	Operational Senior Vice-President	Performance Additives Business Line
Erwoan Pezron	Operational Senior Vice-President	High Performance Polymers Business Line
Vincent Legros	Chairman and Chief Executive Officer, Bostik	Adhesive Solutions segment
Luc Benoit-Cattin	Executive Vice-President, Industry and CSR	Industrial safety, environment and sustainable development, technique and construction, supply chain, quality and goods and services procurement, processes and operational excellence
Bernard Boyer	Executive Vice-President, Strategy	Planning, economic studies, acquisitions/divestitures, internal audit and internal control, insurance and risk management, and legal affairs
Marie-José Donsion	Chief Financial Officer	Accounting, financial control, treasury management, financing, taxation, investor relations, IT and digital transformation
Thierry Parmentier	Executive Vice-President, Human Resources and Communication	Human resources and communication

The R&D department falls within the remit of Armand Ajdari, Chief Technology Officer (CTO) of Arkema who joined the Group on 1 January 2022, and reports directly to the Chairman and Chief Executive Officer.

→ 20 %
of members are women

CORPORATE SOCIAL RESPONSIBILITY

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.

Arkema uses the Global reporting Initiative (GRI) standards as its CSR reporting framework. In accordance with the European Commission's 2019 guidelines, the Group also refers to the Task Force on Climate-Related Financial Disclosure (TCFD) framework for its climate reporting.

To facilitate the understanding of its CSR approach among all stakeholders, Arkema published a Social Commitment Charter, which was approved by the Executive Committee. It has 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 activity as a responsible manufacturer; and
- cultivate an open dialogue and close relations with stakeholders.

3 CSR COMMITMENTS

Deliver sustainable solutions driven by innovation

- Responsible product stewardship
- Solutions that address societal, climate and circular economy challenges
- Innovation at the heart of the activities

Manage our activity as a responsible manufacturer

- Safety of people and processes
- Health
- Climate
- Resources management
- Environmental footprint reduction

Cultivate an open dialogue and close relations with our stakeholders

- Ethics
- Human Rights
- Diversity and inclusion
- 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, 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, policies and codes are applied across the Group and all of its subsidiaries and are all available in the Social Responsibility section on the Company's website (www.arkema.com).

4.1.2 CSR governance

Arkema's CSR governance is integrated into the Group's corporate governance. Arkema's CSR ambition, the main challenges, 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.

Moreover, the Board of Directors, at its meeting of 24 February 2021, decided to create, from the close of the annual general meeting of 20 May 2021, an Innovation and Sustainable Growth Committee tasked with assessing the contribution of Arkema's innovation and strategy to environmental challenges and sustainable growth, thereby reinforcing the review mechanism of CSR issues by complementing the duties of the aforementioned Audit and Accounts Committee, as well as those of the Nominating, Compensation and Corporate Governance Committee relating to diversity. The committee's action and work are described in section 3.3.4.3 of this document.

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, and its adherence to the ten principles is clearly set out in its Communication On Progress. This commitment has been GC Advanced level since 2019. 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 and CSR Executive Vice-President, who is a member of the Executive Committee.

In addition, three steering committees, one for each of the three commitments set out in the Group's CSR policy, guide and support the Group's progress in the area of CSR. The three committees are chaired by the Industry and CSR Executive Vice-President. The Product Stewardship Steering Committee is made up of members of the Executive Committee in charge of the Business Lines and the R&D and Sustainable Development Vice-Presidents. The Industrial Ecology Steering Committee is made up of members of the Executive Committee in charge of the Business Lines and the Industrial, HSE, Process, Procurement and Sustainable Development Vice-Presidents. The CSR/Stakeholder Dialogue Steering Committee is made up of the Human Resources & Communication Executive Vice-President and a number of corporate Vice-Presidents who are actively involved in the CSR process. The three steering committees meet twice a year. Every year, the Sustainable Development Vice-President presents the Executive Committee with an overview.

A formal network of CSR correspondents was created in 2019. It comprises approximately 40 members, including representatives from each of the businesses that make up the Group's segments, corporate department and the main countries in which the Group operates. These correspondents work with the Sustainable Development department, which coordinates the network, to implement the CSR policy within their organization.

Integration of CSR into the Group's organic and external growth projects

CSR considerations are factored into the evaluation phases prior to acquisitions, in particular employee-related and labor law issues, environmental impacts of sites including the climate impact, sustainable purchasing and business ethics practices, and relations with local communities.

In the case of business disposals or reorganizations, special attention is paid to employee-related issues. Thus, prior to implementing such projects, the Executive Committee carefully examines the employee-related impacts and factors them into its decision-making process. Where necessary, the purchaser is required to make certain commitments.

As regards organic growth projects, industrial expenditure is now subject to a CSR assessment based on the Group's commitments and objectives. For projects in excess of €5 million, this assessment is an integral part of the approval process as of the feasibility phase.

For projects requiring the Board of Directors' prior approval, and more generally for any growth transaction or investment project requiring its opinion, the Board also ensures that all social issues and environmental impacts have been fully considered in the assessment process in accordance with the strategy described above.

4.1.3 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.

To identify the key impacts, risks and opportunities, the Group looks at stakeholder expectations, which are analyzed in three-yearly materiality assessments (see section 4.1.6), global megatrends (see the "Profile, ambition and strategy" section of this document), its duty of care plan (see section 4.1.5) and its consolidated non-financial information statement (see section 4.1.4) to identify risks. 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 Group's risk map. They are 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 CSR-related impacts, risks and opportunities are considered across the entire value chain and in relation with its business partners.

Since its creation, Arkema has been engaged in a continuous process of reducing the main risks associated with its activities, particularly those relating to safety and the environment. 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, particularly those relating to the climate and the circular economy (for further details, see section 1.1.2 of this document).

The key issues form the basis of structured programs at Group level, with progress tracked *via* indicators as presented in the table below. These programs are presented in detail in the various sections of this chapter. The key performance indicators for CSR, together with long-term targets for each one, are set out in section 4.1.7 of this chapter.

PRIORITY ISSUES, ACTION PLAN AND ASSOCIATED OBJECTIVES

Priority areas	Corresponding priority issues	Action plan and programs	Objectives
Sustainable solutions [1]	Sustainable solutions driven by innovation Collaborative innovation Responsible product stewardship	Develop the range of solutions: • continue and reinforce collaborative innovation and partnership initiatives in different formats; and • implement the sales portfolio sustainability assessment program (Archimedes) and increase the proportion of sales that contribute significantly to the Sustainable Development Goals (ImpACT+).	By 2024, 100% of our sales portfolio assessed in light of sustainability. By 2030, 65% of ImpACT+ sales.
(1) See details in section 4.2 "Sustainable solutions".			
Circular economy [2]	Circular economy, including water and waste management Collaborative innovation	Intensify the circular economy approach across the entire value chain based on the program drawn up in 2020 targeting four areas: • maximize the use of renewable and recycled materials; • step up the responsible management of materials, waste, water and energy at the Group's sites; • take action to keep the products and materials marketed by Arkema in the use loop, through eco-design and the development of recycling systems; and • strengthen tools for measuring circularity and extend life-cycle assessments.	By 2023, reduction in water withdrawal to 8.0 cu.m/€k of sales compared with 9.0 cu.m/€k in 2019. By 2024, 50% of sales covered by a life-cycle assessment.
(2) See details in section 4.3 "Circular economy".			

Priority areas	Corresponding priority issues	Action plan and programs	Objectives

Climate [3]	Greenhouse gas emissions reduction and energy management	Develop and roll out a climate plan in line with the Paris Agreement:
		• revise objectives to better meet the challenges of climate change:
		  ◦ target introduced in 2019: absolute reduction in greenhouse gas emissions based on a scientific approach.
		• implement the climate plan based on the following levers:
		  ◦ innovate and improve production processes,
		  ◦ optimize energy efficiency, and
		  ◦ step up purchases of low-carbon energy.
			By 2030, 38% reduction in the absolute value of greenhouse gas emissions* compared with 2015.
			** Scope 1 and Scope 2 as defined in the Kyoto Protocol + substances listed in the Montreal Protocol.*
			
			By 2030, 19% reduction compared with 2015 levels in absolute emissions related to fuel and energy (excluding Scopes 1 and 2), waste produced, and upstream and downstream transportation and distribution.
			
			Commitment that raw materials suppliers representing 82% of GHG emissions related to the Group's purchases set Science-Based Targets (SBTs) on their Scopes 1 and 2 by 2025.
			
			By 2030, 20% reduction in net energy purchases (EFPI relative to 2012).

(3) See details in section 4.4 "Climate".			

Industrial risks [4]	Prevention and management of industrial risks	Continue the actions taken while still aiming for the same level of excellence in process safety:
		• target to reduce the number of process safety events; and
		• main drivers implemented:
		  ◦ continue the regular analysis of industrial risks and the ongoing implementation of the measures necessary to manage them, and
		  ◦ strengthen process safety procedures.
			By 2030, reduction in the process safety event rate (PSER) to 2.0.

(4) See details in section 4.5 "Safety and environment".			
Well-being and health [5]	Well-being at work and work-life balance Occupational health and safety	Define a Group-wide, in-depth approach to work-life balance: • structure the global policy on workplace well-being; and • evaluate the initiatives undertaken *via* employee engagement surveys. Continue the actions taken while still aiming for the same level of excellence in personal safety: • target to reduce the total recordable injury rate (TRIR).	By 2030, reduction in the total recordable injury rate (TRIR) to 0.8.
(5) See details in section 4.5 "Safety and environment" for health, and section 4.6 "Labor relations and stakeholder relations".			

The Group's 3 CSR commitments *sustainable solutions;* *responsible manufacturer;* *open dialogue.*

Significant events of 2021

2021 was once again shaped by the Covid-19 health crisis but to varying degrees depending on geographic area. In line with 2020, protective measures were implemented and updated at each stage of the crisis in accordance with local regulations, to help protect employee health and prevent the spread of the virus at Group sites. Against a backdrop of total and partial lockdowns in various regions, Arkema demonstrated its capacity to manage and control the health impacts of the crisis while maintaining its industrial operations at the level required to serve its customers.

In this context, investors, customers and other economic stakeholders, legislators and civil society in general maintained and even reinforced their social expectations. In line with these expectations, Arkema continued to implement its transformation programs to address the priority issues listed above.

In 2021, the sixth IPCC report and the COP26 international conference strengthened expectations of a major and rapid reduction in greenhouse gas (GHG) emissions and of achieving carbon neutrality by 2050. In addition, the European Commission continued its consultations and publications as part of the Green Deal, in particular the Chemical Strategy for Sustainability, the Fit for 55 plan to reduce carbon emissions, the Taxonomy Regulation and the Corporate Social Responsibility Directive.

Contribution to the UN Sustainable Development Goals

The Sustainable Development Goals (SDGs) defined by the United Nations for 2030, which Arkema has adopted, set out the economic, social and environmental challenges facing our world today. 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].

TABLE OF THE GROUP'S CONTRIBUTION TO THE UNITED NATIONS SDGS AND THEIR DETAILED TARGETS

	Sustainable solutions	Responsible manufacturer	Open dialogue	Strategic objectives or programs
No poverty			1.5	
Zero hunger	2.1 2.3 2.4			
Good health and well-being	3.8 3.9	**3.5** **3.6** **3.9**	3.5 3.6 3.9	Reduction in personal injuries
Quality education		4.3 4.4 4.5	4.3 4.4 4.5 4.7	
Gender equality			**5.5**	Increase in gender diversity
Clean water and sanitation	6.1 6.2 6.3 6.4	**6.3** **6.4**		Reduction of effluent releases in water (COD)
Affordable and clean energy	**7.1** **7.2** **7.3**	**7.2** **7.3**		Renewable energy and electricity storage solutions Increase in energy efficiency
Decent work and economic growth	8.8	**8.8**	8.4 8.5 8.7 8.8	Reduction in process events
Industry, innovation and infrastructure	**9.1** **9.4** **9.5**	9.4		Electronics solutions
Reduced inequalities			10.4	
Sustainable cities and communities	**11.1** **11.2**			Home efficiency and insulation solutions
Responsible consumption and production	**12.2** **12.3** **12.4** **12.5**	12.4 12.5	12.6	Solutions contributing to more sustainable use of natural resources
Climate action	**13.1**	**13.1** **13.3**		Solutions contributing to climate action Reduction in greenhouse gas emissions
Life below water	14.1	14.1 14.2		
Life on land	15.1 15.5	**15.5**		Reduction in air emissions (VOC)
Peace, justice and strong institutions			16.5	
Partnerships for the goals	17.17	17.14	**17.14**	Supplier CSR assessment Increase in supplier commitment for the climate

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

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

The strategic contribution to the SDGs that relate to Arkema's sustainable solutions commitment is demonstrated by the Group's choice of the five 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.

In line 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 has since been rolled out widely. This process is described in section 4.2.3 of this document.

4.1.4 Consolidated non-financial information statement

In compliance with articles L. 225-102-1 and L. 22-10-36 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 4.1.1 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 Group's risk map. They are 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 accidents 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, the risk of poor social and environmental performances by suppliers or subcontractors, and the risk of scarcity of non-renewable resources.

The Group's governance of CSR issues is described in section 4.1.2 of this chapter.

The non-financial information statement for the year ended 31 December 2021, 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 4.7.8 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/global/en/social-responsibility/

CROSS-REFERENCE TABLE FOR THE NON-FINANCIAL INFORMATION STATEMENT

Articles L. 225-102-1, L. 22-10-36 and R. 225-105 of the French Commercial Code *(Code de commerce)*	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	2.1 (non-financial risks are tagged "CSR")
Social impact of the Company's activities	4.6.1
Environmental impact of the Company's activities	4.3.3 and 4.5.3
Impact of the Company's activities on Human Rights	4.1.5 and 4.6.3
Impact of the Company's activities on avoidance of corruption and tax evasion	4.6.2
Impact of the Company's activities and of the use of goods it produces and services it provides on climate change	4.1.5 and 4.4
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 4.6.4
Social commitments to the circular economy	4.3
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	4.6.1.7
Actions to counter discrimination and promote diversity	4.6.1.6
Measures to promote the recruitment of people with disabilities	4.6.1.6

Taxonomy Regulation reporting

About the Taxonomy Regulation

In line with the European Taxonomy Regulation 2020/852 (the Taxonomy Regulation) and its delegated acts on climate change mitigation and adaptation, and the content and presentation of environmental information, Arkema has implemented, pursuant to article 8 of such regulation, a process to generate the eligibility information required for this first reporting year.

Companies subject to the non-financial performance statement, transposition into French law of directive 2014/95 on the disclosure of non-financial information, are required to report their sensitivity to the European green taxonomy from 1 January 2022. For this first reporting year, from 1 January 2022 until 31 December 2022, non-financial undertakings shall only disclose the proportion of Taxonomy-eligible and non-eligible economic activities in their total turnover, capital and operational expenditure and the qualitative information relevant for this disclosure.

This initial reporting therefore covers only two of the six environmental objectives set by the European Union, namely climate change mitigation and adaptation.

Group activities eligible to Taxonomy objectives

Based on the activities described in the Taxonomy Regulation, Arkema's activities falling within the relevant scope were identified and analyzed jointly by representatives of the Research and Development, Sustainable Development and Finance departments, as well as representatives of the Business Lines.

For the three key performance indicators (KPIs) stated below, Group activities eligible to climate change mitigation and adaptation objectives are manufacture of plastics in primary form, manufacture of soda ash and manufacture of chlorine, as described in sections 3.12, 3.13 and 3.17 of Annexes I and II of the Delegated Regulation of 4 June 2021.

The manufacture of plastics in primary form accounts for the majority of the Group's eligible activities, and concerns the Group's three growth segments, chiefly involving the High Performance Polymers, Coating Resins and adhesives Industrial Assembly Business Lines falling within the scope of eligibility.

The KPIs for eligible activities in 2021 are therefore:

	2021 KPI
Percentage of Turnover	30%
Percentage of Capex	38%
Percentage of Opex	27%

These indicators were generated using existing reporting systems to carve out the required financial aggregates, based on the Group's literal understanding.

More generally, the ratios of Turnover and Capex to eligible activities form part of Arkema's policies on climate change mitigation and adaptation, discussed in greater depth in sections 4.4.3 and 4.4.4 respectively.

The denominators and numerators of these ratios were determined on the basis of the analytical structure used for presenting financial data for the Group's activities. In addition, financial information from the Group's information systems was analyzed and checked for consistency with Turnover, Opex and Capex in 2021. For Capex and Opex, where this structure did not allow direct generation of the required data, assumptions were made or allocation keys applied.

Calculations and explanations of indicators

The following sections set out the methods used and contextual data for the three indicators that meet the criteria for eligible activities specified in Annex I of Delegated Regulation 2021/2178:

Turnover Key Performance Indicator (KPI)

This KPI corresponds to the ratio between third-party turnover for taxonomy-eligible activities and overall Group turnover as reported in the consolidated financial statements at 31 December 2021.

Third-party turnover for the eligible activities is derived from the accounts consolidation system when it can be assimilated to whole units in the Group financial reporting structure. Otherwise, the amounts are derived from more detailed analyses using the Group's Business Intelligence information systems targeting eligible technologies.

Capex Key Performance Indicator (KPI)

This KPI corresponds to the ratio between Capex for activities identified as eligible to the Taxonomy and overall Group Capex.

The denominator therefore corresponds to the total of property, plant and equipment and intangible assets as published in the Alternative Performance Indicators in note 4 to the consolidated financial statements, right-of-use assets (ROU, IFRS 16) for the period, as given by the specific reporting tool used for application of IFRS 16, and property, plant and equipment and intangible assets resulting from business acquisitions, excluding goodwill, whose values are shown as additions to the consolidated balance sheet of the Group entities concerned.

The numerator corresponds to the items in the three above categories that the Group was able to associate with the eligible activities identified.

For eligible activities assimilated to whole units in the investment reporting structure, the data was obtained from the Group consolidation system. In other cases, data was calculated by assigning investment amounts to the production sites for eligible activities, basically in proportion to the fixed production costs for these activities at these sites.

Using the Group's reporting tool for right-of-use assets, the increase of these assets was identified for the year 2021. The values taken for the numerator are those directly allocated to the management units to which the eligible activities can be assimilated.

For this initial reporting, given the complexity of the analysis involved, there was no inclusion of individual Capex liable to correspond to purchases of products from activities themselves eligible to the Taxonomy.

In 2021, Capex charged to eligible activities was significantly impacted by the project to develop bio-sourced monomer and polymers production capacity in Asia. (For more details on this project, see the "Profile, ambition and strategy" section of this document.)

Opex Key Performance Indicator (KPI)

Because of the complexity of carving out Opex as specified in the texts of the Taxonomy Regulation and its delegated regulations, the analysis of eligibility for Opex focused on R&D-related expenses along with maintenance and repair costs and short-term lease costs. R&D expenses are identified in the consolidation system, while other expenses are taken from the information systems of certain entities by applying, where necessary, assumptions on the average percentage of such expenses with respect to total overheads for the activities concerned.

DETAILS ON TURNOVER CURRENTLY ELIGIBLE FOR THE TAXONOMY REGULATION

Taxonomy 2021 Turnover				Criteria for substantial contribution			
Economic activity	Code(s)	Overall Turnover in €m	Percentage of Turnover	Climate change mitigation	Climate change adaptation	Enabling activity category	Transitional activity category
A. TAXONOMY-ELIGIBLE ACTIVITIES							
Manufacture of plastics in primary form	C.20.16	2,875	30%	X	X		X
Manufacture of soda ash	C.20.13	15	< 1%	X	X		X
Manufacture of chlorine	C.20.13	3	< 1%	X	X		X
Turnover from taxonomy-eligible activities		**2,893**	**30%**				
B. TAXONOMY-NON-ELIGIBLE ACTIVITIES							
Turnover from currently taxonomy-non-eligible activities		6,626	70%				
TOTAL A + B		**9,519**	**100%**				

DETAILS ON CAPEX IN ACTIVITIES CURRENTLY ELIGIBLE FOR THE TAXONOMY REGULATION

Taxonomy Capex 2021				Criteria for substantial contribution			
Economic activity	Code(s)	Overall Capex in €m	Percentage of Capex	Climate change mitigation	Climate change adaptation	Enabling activity category	Transitional activity category
A. TAXONOMY-ELIGIBLE ACTIVITIES							
Manufacture of plastics in primary form	C.20.16	311	37%	X	X		X
Manufacture of soda ash	C.20.13	3	< 1%	X	X		X
Manufacture of chlorine	C.20.13	1	< 1%	X	X		X
Capex for taxonomy-eligible activities		**315**	**38%**				
B. TAXONOMY-NON-ELIGIBLE ACTIVITIES							
Capex for currently taxonomy-non-eligible activities		523	62%				
TOTAL A + B		**838**	**100%**				

DETAILS ON OPEX IN ACTIVITIES CURRENTLY ELIGIBLE FOR THE TAXONOMY REGULATION

Taxonomy Opex 2021				Criteria for substantial contribution			
Economic activity	Code(s)	Overall Opex in €m	Percentage of Opex	Climate change mitigation	Climate change adaptation	Enabling activity category	Transitional activity category
A. TAXONOMY-ELIGIBLE ACTIVITIES							
Manufacture of plastics in primary form	C.20.16	(122)	26%	X	X		X
Manufacture of soda ash	C.20.13	0	< 1%	X	X		X
Manufacture of chlorine	C.20.13	(5)	1%	X	X		X
Opex in taxonomy-eligible activities		**(127)**	**27%**				
B. TAXONOMY-NON-ELIGIBLE ACTIVITIES							
Opex in currently taxonomy-non-eligible activities		(335)	73%				
TOTAL A + B		**(462)**	**100%**				

The Group will be adjusting its methodology and analysis on Taxonomy eligibility in pace with changes in texts and activities.

Beyond the scope of direct Taxonomy-eligibility as such, a significant part of the Group's operations concerns the sale of products for downstream activities that are currently identified as eligible to the Taxonomy, such as manufacture of renewable energy technologies; manufacture of equipment for the production and use of hydrogen; manufacture of low carbon technologies for transport; manufacture of batteries; construction, extension and operation of water collection, treatment and supply systems; construction of new buildings and renovation of existing buildings.

4.1.5 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 (see section 6.1.2 of this document). 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 and the effectiveness of measures undertaken. The review is led by the Sustainable Development department, with input 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 at least once a year 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 procedures used to regularly assess the situation of the Group's activities and subsidiaries with regard to the risk map are described in more detail in section 2.2.4 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 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. In 2021, the Group used the available internal audit data to identify and analyze any potential Human Rights violations related to its activities. The results confirmed the absence of any serious violations. For further details, see section 4.6.3 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 4.5.1 and 4.5.2 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). Including accidents involving Group employees and subcontractor employees, the TRIR was 1.0 in 2021, unchanged from 2020, thus consolidating on the significant improvement compared with previous years. In fact, Arkema's performance in terms of its TRIR is one of the best in the chemicals industry. In 2021, the PSER was 3.1, a significant improvement on previous years. Given the performance achieved in 2021, the Group raised its TRIR target to 0.8 and its PSER target to 2.0 by 2030. For further details, see section 4.5.2 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 4.5.1 and 4.5.2 of this chapter, includes risk prevention measures, as well as measures for mitigating impacts in the event of an incident or accident. In addition, responsible product stewardship, including the transparency and availability of product information, is presented in sections 4.2.4 and 4.5.2 of this chapter; and
- 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 2021, 26 cases of occupational illness were reported Group-wide. The frequency rate of 0.7 per million hours worked is a marked improvement on previous years. Details on occupational illnesses are given in section 4.5.2.2.4 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 4.5.1 and 4.5.3 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 2021, the VOC EFPI was 0.50, well below the 2020 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 2021, the COD EFPI was 0.45, close to the 0.40 target set for 2030. For further details, see section 4.5.3 of this chapter. The results confirm the validity of the Group's programs and initiatives on reducing pollution risks.

Arkema is also attentive to climate change and responsible resource management, two major challenges facing society today.

The Group's climate policy and its management are described in section 4.4 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 in line with the Paris Agreement. The effectiveness of the measures undertaken is monitored *via* two strategic indicators for which targets have been set for 2030. The first relates to greenhouse gas emissions from operations at the Group's industrial sites (GHG indicator). In 2021, absolute GHG emissions compared with 2015 were 0.66, down significantly on the 2020 figure and consistent with the 0.62 target set for 2030. This reduction was achieved through specific actions under the Group's climate plan, and through its strategy of scaling down the Intermediates segment business. For further details, see section 4.4.3.1 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 2021, the Energy EFPI was 0.85, down sharply on the 2020 figure under the combined effect of an ambitious action plan and more favorable manufacturing conditions. This decrease is coherent with the 0.80 target set for 2030. For further details, see section 4.4.3.2 of this chapter.

To strengthen its commitment to promoting responsible resource management, Arkema set a new target in 2021 for water withdrawals as a percentage of Group sales. The aim is now to achieve a reduction of 11% compared with the baseline year 2019, *i.e.*, a target of 8.0 cu.m/€k by 2023. The indicator stood at 6.9 cu.m/€k in 2021, a sharp drop on the 2020 figure, owing to the combined effect of lower withdrawals and higher sales.

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 4.6.4 of this chapter.

The effectiveness of the measures undertaken is monitored in terms of the number of suppliers assessed and the scores obtained. At end-2021, over 1,700 suppliers had been assessed, and CSR scores had risen for 66% of suppliers whose assessments had been updated. To promote responsibility across its value chain and strengthen its commitment to responsible procurement, the Group defined a new strategic indicator in 2020, which shows the percentage of purchasing spend from relevant suppliers covered by a CSR assessment. The indicator stood at 71% in 2021, and the Group aims to reach 80% by 2025.

Some of the Group's products use plant-based raw materials. If 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 friendly and socially responsible sourcing. This initiative is described in section 4.6.4.6 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 4.5.2.4 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 4.5.3.2 of this chapter.

Report on the implementation of the duty of care plan

For risks related to 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 2030 in terms of total recordable injury rate (TRIR of 0.8) and process safety event rate (PSER of 2.0), and
  - 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 EFPI -60% and Energy EFPI -20% compared with 2012);

- no risks were identified of serious violations to Human Rights or fundamental freedoms, or in labor or business relations. However, Arkema is attentive to these issues and is rolling out prevention and monitoring initiatives.

Concerning risks relating to the activities of suppliers and subcontractors, the programs under way meet duty of care expectations, including:

- the roll-out of the Together for Sustainability (TfS) program, with a 2025 target of covering with a TfS assessment 80% of the Group's purchasing spend from relevant suppliers (see details in section 4.6.4.5 of this document); and
- the Pragati project for responsible castor farming (see section 4.6.4.6 of this document for details).

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 4.6.2.5 of this chapter.

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 of this document.

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.

Stakeholders	Context and purpose of dialogue	Key stakeholder expectations in the area of CSR	Form of dialogue
Customers	Business relationship and collaboration aimed at meeting the current and future needs of customers and end users	Innovative, sustainable, healthier and more environmentally friendly solutions tailored to specific needs Collaborative innovation and partnerships Circular economy and climate change Responsible procurement	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: • dedicated management of global key accounts as part of a commercial excellence program; • joint innovation programs with customers, particularly with regard to climate issues and resource management and including life-cycle assessment if required; • development of new digital solutions that increase value added for customers and partners; and • a global, online survey to assess overall satisfaction. For further details, see the section on Commercial excellence in the "Profile, ambition and strategy" section of this document.
Suppliers	Business relationship and collaboration aimed at meeting the current and future needs of the Group and its customers	Circular economy and climate change Collaborative innovation and partnerships	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, particularly with regard to climate issues and resource management. Arkema encourages its suppliers to commit to a corporate social responsibility program by conducting CSR performance assessments. To help achieve its SBT climate target, Arkema raises awareness and encourages its most GHG-intensive suppliers to take part in climate action and disclose their commitments. For further details, see sections 4.6.4 and 4.4.3 of this chapter.

Stakeholders	Context and purpose of dialogue	Key stakeholder expectations in the area of CSR	Form of dialogue
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	Collaborative innovation and partnerships Contribution to the social and economic dynamics of territories	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), particularly SDG 12, which relates to resource management, and SDG 13 on climate action. For further details, see sections 1.1.2 and 1.1.5 of this 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	Long-term value creation Preventive management of ESG (Environment, Social, Governance) risks Non-financial performance (ESG criteria) Climate plan management integrated into the strategy	• Results presentations; • meetings with and days dedicated to 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	Training and individual and collective development Diversity and equal opportunities Well-being at work and work-life balance	• 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 4.6.1.4 and 4.6.1.7 of this chapter.
Neighboring communities	Neighbors and communities that interact locally with Group sites	Prevention and management of industrial risks Transparency and dialogue Contribution to the social and economic dynamics of territories	The Common Ground® initiative described in section 4.6.6.2 of this chapter promotes local dialogue at each of the Group's sites.
Civil society and NGOs	Proactive and reactive dialogue	Climate change and circular economy Prevention and management of industrial risks Responsible product stewardship Business ethics and transparency	• 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 4.6.6 of this chapter.
Public authorities	Regular and occasional contact aimed at ensuring the responsible development of the Group's activities	Compliance with laws and regulations Prevention and management of industrial risks Responsible product stewardship Contribution to the social and economic dynamics of territories	• 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 4.6.5 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	Climate change and circular economy Prevention and management of industrial risks Responsible product stewardship	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 4.6.5 of this chapter.

Materiality assessment

In 2019, the Group conducted its second materiality assessment, a formal process of listening and consulting with stakeholders on CSR topics. This second assessment was extended to include the Group's three key regions – the Americas, Asia and Europe – and consultation of a broader range of stakeholders.

It is generally accepted practice to carry out a materiality assessment every three years. Arkema therefore used its 2019 assessment to draw up its strategy and will perform a new assessment in 2022.

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; and
- 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		Rising issues for estimation of importance	
1	Sustainable solutions driven by innovation	**15**	Developing of a CSR culture
2	Responsible product stewardship	**16**	Responsible procurement and supplier CSR commitment
3	Collaborative innovation	**17**	Responsible personal data management
4	Prevention and management of industrial risks	**18**	Integration of digital technology into company activities
5	Occupational health and safety	**19**	Integration of CSR criteria into the Group's mergers and acquisitions policy
6	Greenhouse gas emissions reduction and energy management	**20**	Consideration of circular economy challenges
7	Water and waste management	**21**	Taking into account climate change-related risks for the company
8	Responsible governance	**22**	Reliable and educational communication on the characteristics and the proper use of products
9	Business ethics	**23**	Carbon offsetting and positive contribution to biodiversity
10	Transparency	**24**	Fair remuneration and social protection
11	Stakeholder dialogue	**25**	Well-being at work and work-life balance
12	Labor relations and respect for Human Rights	**26**	Promoting the positive impact of products and solutions
13	Training and individual development	**27**	Taking into account new end-consumer expectations
14	Diversity and equal opportunities	**28**	Contribution of the Group to the social and economic dynamics of territories

2. A consultation phase, involving 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:

- the maturity matrix: the 14 historical issues as perceived to reflect Arkema's maturity; and
- the 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/global/en/social-responsibility/vision-and-strategy/priority-issues/

Priority issues

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 as well as 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 ISSUES

MAINTAIN EXCELLENCE (continuous)	SEIZE OPPORTUNITIES (short- or medium-term change)
Responsible product stewardship	Sustainable solutions driven by innovation
Occupational health and safety	Collaborative innovation
Prevention and management of industrial risks	Integration of digital technology into company activities
Business ethics	Consideration of circular economy challenges, including water and waste management
Diversity and equal opportunities	Greenhouse gas emissions reduction and energy management
	Training and individual development
	Well-being at work and work-life balance

The Group's 3 CSR commitments *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: "Design and develop, as a responsible manufacturer, innovative solutions adapted to our customers' main challenges in response to global megatrends and support them in their quest for sustainable performance".

The five priority areas defined are:

- development of a portfolio of sustainable solutions driven by innovation and responsible product stewardship;
- intensification of the circular economy;
- climate action;
- reduction of industrial risks; and
- health and well-being.

Action plans for the five priority areas were updated in 2020 and are described in the table presented in section 4.1.3 "Main impacts, risks, and opportunities" of this document. The associated indicators or targets are presented in detail in section 4.1.7 of this document.

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 4.6.6.2 of this document) and internationally through formal discussions with a panel of stakeholders.

In 2020 the Group brought together about ten representatives from each category of external European stakeholders and Arkema executives who represent the Business Lines, procurement and sustainable development. They chiefly discussed two key issues faced by the Group, the circular economy and climate change. Expectations were expressed concerning the need for collaboration across the entire value chain and pursuit of the Group's social contribution in its regions in three areas: labor, environmental and economic issues.

In 2022, Arkema will carry out a further materiality assessment to determine possible changes in stakeholder expectations and issues. The priority areas and action plan may be updated following this consultation.

4.1.7 CSR key performance indicators

The following table summarizes Arkema's key CSR performance indicators. These indicators, as well as the associated long-term targets, are reviewed annually by the Executive Committee, which is responsible for setting them and, where necessary, updating them. They reflect Arkema's determination to take an active role in the sustainability transition, in line with the Group's ambition described in the "Profile, ambition and strategy" section of this document, as well as its determination to address the major challenges and priority issues identified in the materiality assessment and presented in section 4.1.3 of this chapter.

In terms of safety, the TRIR and PSER targets were set for 2030 and revised to a more ambitious level, in light of the performance achieved in 2021.

Tracking and analyzing these KPIs enables the Group to validate, year after year, the performance of its CSR process and upgrade it as required. See the various sections of this chapter for further details.

	Target year	Target	2021	2020	2019
SUSTAINABLE SOLUTIONS					
Percentage of ImpACT+ sales [1]	2030	65%	51%	50%	46%
Percentage of sales from products made from renewable or recycled raw materials [2]			10%	10%	9%
RESPONSIBLE MANUFACTURER					
Percentage of AIMS audited sites	2025	100%	86%	82%	80%
Safety					
Total recordable injury rate (TRIR) [3]	2030	0.8	1.0	1.0	1.4
Process safety event rate (PSER) [4]	2030	2.0	3.1	4.0	3.7
Environmental footprint					
Greenhouse gas (GHG) emissions [5] *(in absolute terms compared with 2015)*	2030	0.62	0.66	0.77	0.87
Volatile organic compound (VOC) emissions *(in EFPI terms compared with 2012)*	2030	0.35	0.50	0.58	0.60
Chemical oxygen demand (COD) *(in EFPI terms compared with 2012)*	2030	0.40	0.45	0.45	0.50
Net energy purchases *(in EFPI terms compared with 2012)*	2030	0.80	0.85	0.90	0.91
OPEN DIALOGUE					
Employee development and diversity					
Percentage of women in senior management and executive positions	2030	30%	24%	23%	23%
Percentage of non-French nationals in senior management and executive positions	2030	50%	40%	41%	40%
Responsible procurement					
Percentage of purchasing spend from relevant suppliers covered by a TfS assessment [6]	2025	80%	71%	68%	68%

(1) The percentage of sales contributing significantly to the United Nations SDGs (ImpACT+) was calculated on the basis of an assessment of 85% of the Group's third-party sales in 2021, 72% in 2020 and 44% in 2019.

(2) The percentage of sales from products made from renewable or recycled raw materials covers products with a renewable or recycled raw material content of at least 25% in 2021 and 20% for previous years (the threshold increase did not impact the value of the indicator).

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

(4) 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).

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

(6) Relevant suppliers are those accounting for 80% or more of the Group's recurring purchasing spend.

Improvement process and recognition

For several years now, Arkema has been strongly engaged in a process to improve its CSR performance. The Group's approach is regularly assessed by external stakeholders, particularly extra-financial rating agencies and customers, providing the Group with areas for improvement that will enable it to rank among the best performing companies in the industry. As requested by Group customers, site audits may also be performed by independent auditing firms to supplement this assessment.

In 2021, Arkema was ranked among the top five in the chemicals sector by rating agency V.E. and was included in the newly created French CAC 40® ESG index.

Arkema also maintained its position in the Dow Jones Sustainability Index, improving its ranking to third place in the Chemicals category of DJSI World. This recognition, and the general improvement in extra-financial ratings, confirm the appropriateness of the Group's CSR approach.

Member of Dow Jones Sustainability Indices Powered by the S&P Global CSA

Inclusion in the DJSI World and DJSI Europe indices since 2020

MSCI

"A" rating since 2017

CDP DRIVING SUSTAINABLE ECONOMIES

In 2021, a "B" rating was obtained for Climate Change and a "B" rating for Water Security

V.E

Inclusion in the Europe 120 and Eurozone 120 indices since 2015
Inclusion in CAC 40® ESG in 2021

ecovadis

Arkema ranks among the top 1% of companies in the sector since 2014

ISS ESG

"C+" rating. Arkema is in the top worldwide decile

4.2 Sustainable solutions

DEVELOP INNOVATIVE SOLUTIONS ADAPTED TO GROUP 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, responsible 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 responsible 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 Steering Committee 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. The new committee comprises six members from the Executive Committee, which oversees business and industrial operations, and members from the Sustainable Development and Research and Development departments. Every year, the Sustainable Development Vice-President presents the Executive Committee with an overview. In addition, the Board of Directors decided to create an Innovation and Sustainable Growth Committee in 2021. The committee is tasked with assessing the contribution of Arkema's innovation and strategy to environmental challenges and sustainable growth. The overall governance of sustainable development is presented in section 4.1.2 of this chapter.

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

Circular economy

Arkema has made the circular economy a priority area with the overall goal of reducing the environmental impact of its activities throughout the life cycle. Arkema's approach to the circular economy is presented in section 4.3 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.

Indicative of the Group's momentum on sustainable development, its patent filings in this field saw a significant increase in 2021, both in absolute terms and proportionally to total filings.

	2021	2020	2019
Number of patent applications filed during the year relating to sustainable development	200	158	149
Percentage of patent applications filed during the year relating to sustainable development	90%	78%	67%

4.2.3 Management of the solutions portfolio

Archimedes program: assessment of the solutions portfolio

To shift its product range more assertively toward sustainable solutions, in 2021 Arkema continued the program it started in 2018 to systematically assess its portfolio of solutions in light of sustainability criteria.

The approach used is consistent with the Chemical Industry Methodology for Portfolio Sustainability Assessments (PSA) established by the World Business Council for Sustainable Development (WBCSD). It takes into account all of the social, environmental and economic impacts.

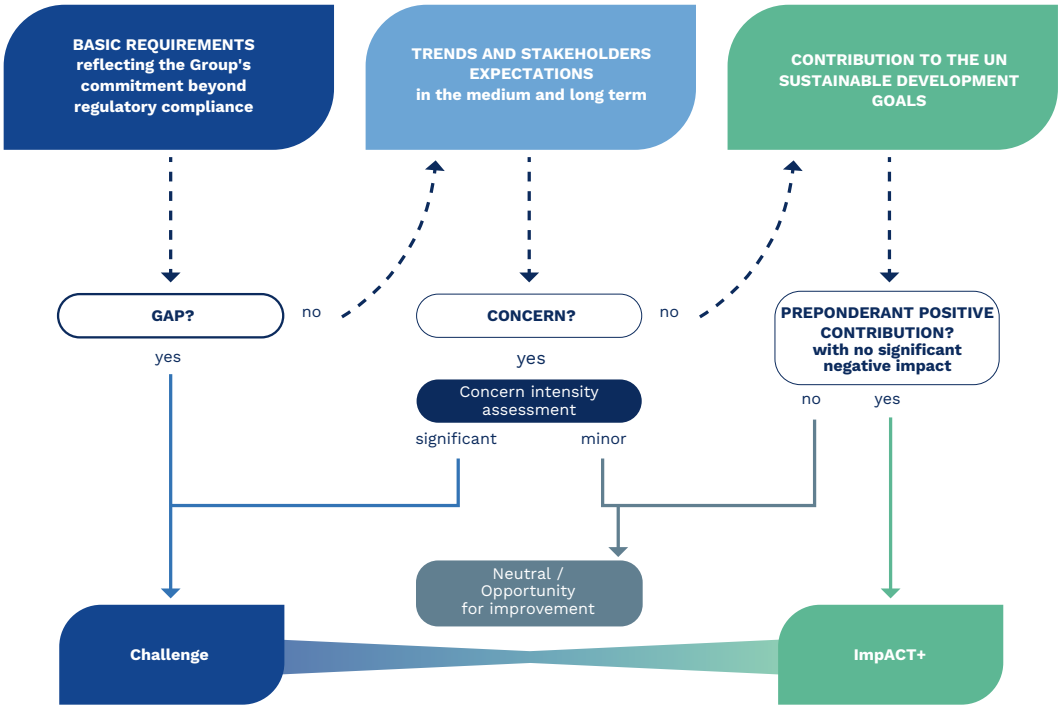
Products are considered in the context of their applications and of the regions in which they are sold.

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, going beyond regulatory compliance, (ii) the principles of ethics and respect for Human Rights, and (iii) long-term profitability factors;
- medium- and long-term trends in the regulatory framework and market expectations in terms of sustainable solutions, for which an impact criticality assessment is performed; 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.

The assessment considers all known, presumed or suspected hazardous substances present in finished products as well as in raw materials and processes. Particular attention is paid, in terms of both products and the raw materials used, to the presence of substances identified in the regulations as being substances of very high concern (SVHCs) after Arkema's analyses, or which nonetheless meet SVHC criteria.

ARCHIMEDES PROGRAM: ASSESSMENT FLOWCHART



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.

ImpACT+ solutions

Solutions in the ImpACT+ category include those 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.

Neutral and Challenge solutions

Other solutions can have a neutral impact or present a certain degree of risk in view of evaluation criteria. Based on the impact criticality assessment, they are classified as either "Neutral/Opportunity for improvement" or "Challenge".

Appropriate action and improvement plans have already been drawn up for more than 75% of "Challenge" solutions, including plans for substitution by safer alternatives.

At end-2021, the assessment covered 85% of the Group's third-party sales compared to 72% at end-2020. The method is being fine-tuned as it is rolled out and this approach will continue in 2022.

The percentage of sales generated by ImpACT+ solutions stood at 51% in 2021 with a target of 65% by 2030.

To achieve this strategic objective, the Group implements voluntary actions to support three key drivers, which are continuous improvement of solutions, sustainable innovation for products and applications, and active promotion of ImpACT+ solutions.

2030 *TARGET*

To strengthen its commitment in terms of sustainable offer, the Group has set a strategic target: 65% of ImpACT+ sales in 2030

	2021	2020	2019
Percentage of ImpACT+ sales [1]	51%	50%	46%

(1) The percentage of sales contributing significantly to the United Nations SDGs (ImpACT+) was calculated on the basis of an assessment of 85% of the Group's third-party sales in 2021, 72% in 2020 and 44% in 2019.

ImpACT+ solutions which, through their design and their use and end-of-life phases, contribute to the efficient use of resources and a reduction in the carbon footprint (Sustainable Development Goals No. 12 "Ensure sustainable consumption and production patterns" and No. 13 "Take urgent action to combat climate change and its impacts"), accounted for 43% of the Group's sales in 2021.

FOCUS

Bostik butyl sealing tapes: for safe and efficient buildings

Butyl sealing tapes provide a safe and easy-to-use solution to ensure the integrity of the building envelope throughout its life. They create a watertight, draught-proof seal around windows and doors, thus reducing the building's energy consumption. They replace metal or bitumen, thus eliminating the need for flame treatment, avoiding exposure of construction workers to heavy metals, and providing unique flexibility even at low temperatures.

FOCUS

Crayvallac® organic bio-based powders

Made from castor oil derivatives, Crayvallac® organic powders are a family of high performance rheology modifiers. One of their distinguishing features is their exceptional rheofluidifying behavior, which improves run-out resistance at higher film thicknesses, thus helping to reduce the number of coats to be applied. An excellent alternative to fumed silica-based technologies, Crayvallac® organic powders are also safer for the people who handle them.

4.2.4 Responsible product stewardship

4.2.4.1 Responsible 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 responsible 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:

- active contribution to advancing scientific knowledge to better take into account the hazards and risks relating to products and their use;
- product design aiming to reduce health, safety and environmental risks. Particular care is taken with products designed for consumers and professionals and with products likely to end up in recycling loops;
- risk management 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; and
- communication and clear information for product users, based on fair advertising and marketing practices.

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) described in section 4.5.1.2 of this chapter to manage HSE risks related to product modifications, particularly changes to product composition and manufacturing processes.

A training module on responsible product stewardship has also been introduced internally and added to the training program for various business and Supply Chain 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, Authorization 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.

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 Group's businesses 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 around €65 million for the registration of substances by the first three deadlines. An additional envelope of more than €40 million has been earmarked to cover the maintenance, improvement and development of the portfolio during 2019-2023.

When the registration stages 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, and that it addressed citizens' concerns about chemical safety. 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 190 companies from the chemical industry in signing up to the action plan. It fits perfectly with the Group's responsible 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 45% of the Group's filings maintenance activity in 2021.

With the launch of the European Union's Chemicals Strategy for Sustainability, Europe is opening a new regulatory chapter for the assessment and management of chemical risks. Arkema is already preparing by analyzing both the impact of the strategy on its business and the opportunities it could generate, which will be translated by the authorities into regulations and implementing measures in the years to come after consultation with stakeholders, including national and European industry associations.

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, 384 substances have been or will be evaluated under the plan. Thirty-three of the Group's substances have been listed in CoRAP and their state of advancement is as follows:

CoRAP	2012-2023	Evaluation completed	Additional information provided: awaiting conclusion	Additional data being constituted	Upcoming evaluation
Number of substances	33	19	2	4	8

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	10	9
SVHCs on the REACH candidate list	50	45

Outside Europe, the table above covers all the Group's businesses except for recent acquisitions by Bostik. Products containing these substances, whether subject to authorization or on the candidate list, accounted for 2.5% of sales in 2021, down from 2.9% in 2020. This decrease, despite the increase in the number of SVHCs in the candidate list, is the result of the Group's reformulation and substitution work. The Archimedes portfolio evaluation program outlined in section 4.2.2 is capable of identifying products in a "challenge" category, for priority action-plan rollout.

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 2021, the industry candidate list contained 219 substances, including (i) hydrazine produced at the plant in Lannemezan, France, (ii) 2-imidazolidinethione (ETU) produced by MLPC, (iii) nonylphenol ethoxylates (NPE) produced by the surfactants and additives business and (iv) two photoinitiators (2-methyl-1-(4-methylthiophenyl)-2-morpholinopropan-1-one and 2-benzyl-2-dimethylamino-4'-morpholinobutyrophenone) produced by Lambson.

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. 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.

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. It was finalized in September 2020 when the Committees for Risk Assessment (RAC) and for Socio-Economic Assessment (SEAC) issued their final opinions to the European Commission in anticipation of a regulatory proposal. 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 10 February 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. At the same time, the European Commission will finalize a proposed restriction on the use of microplastics in certain applications in 2022, which could mean that France will have to align, when the time comes, its own legal provisions with the new European regulatory framework.

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 registered the substances covered by the first deadline (31 December 2021). Arkema continues to prepare for the registration of substances according to schedule.

The Group is now preparing for the upcoming registration deadline in Turkey and has already completed the necessary pre-registrations. It also prepared for the United Kingdom's exit from the European Union and started compliance work on the basis of the regulatory information available, in particular with the grandfathering of registrations held by Arkema UK Ltd and substance notification at 27 October 2021 to benefit from transition periods for registration.

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 vast majority of plant-based raw materials 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 Group's businesses 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 responsible 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 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 took the measures necessary to meet the first deadline in January 2021 and continues its activities for the next deadline, set for 1 January 2024.

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 FRANCOPA, 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.

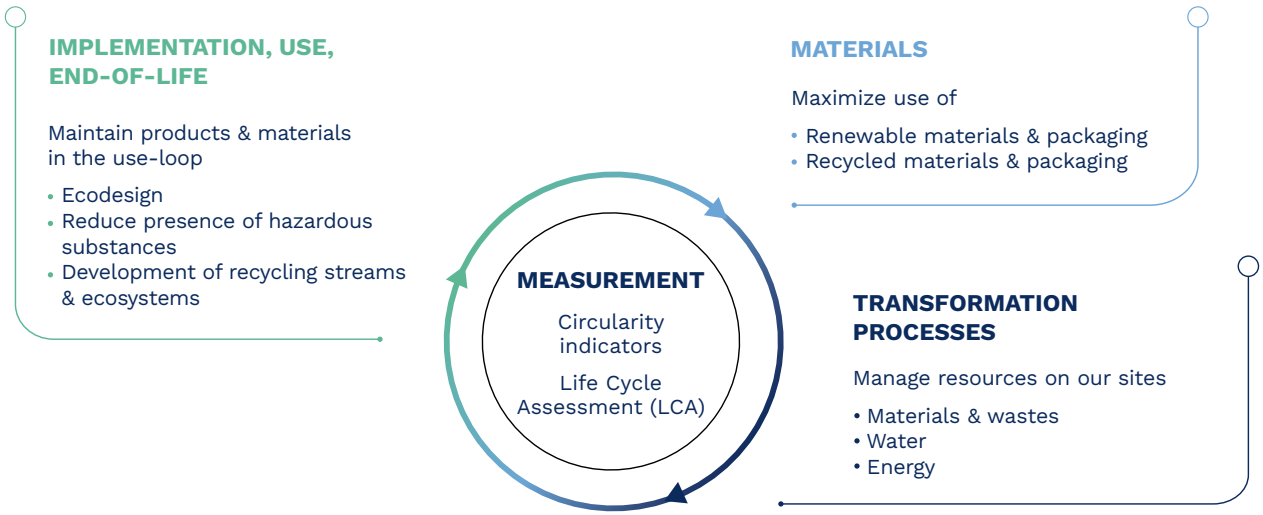
4.3 Circular economy

DESIGN PRODUCTS AND SERVICES THAT MINIMIZE WASTE AND POLLUTION AND OPTIMIZE THE USE OF RESOURCES, AND KEEP PRODUCTS AND MATERIALS IN USE

4.3.1 Circular economy approach

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 the circular economy a priority area, in line with the findings of its materiality assessment, presented in section 4.1.6 of this document. The circular economy challenge and the changes it requires apply to both the Group's solutions and its industrial operations, and Arkema is speeding up and strengthening its actions in this area.

Arkema's approach to the circular economy and responsible resource management covers the entire value chain and is based on four main drivers:



The circular economy program is managed by the Circular Economy Coordination Committee, which meets at least twice a year. It is made up of the Research & Development, Sustainable Development, Processes and Environment Vice-Presidents and the Renewables and Recycling Scientific Director. It oversees programs relating to the circular economy and the progress made in this area.

The main advances are shared with the Industrial Ecology Steering Committee for aspects related to transformation processes and with the Product Stewardship Steering Committee for all other aspects of the circular economy. These two steering committees, which include members of the Executive Committee, approve guidelines and decide on priorities and action plans.

4.3.2 Material selection

A pioneer in the use of raw materials made from biomass, as illustrated by the use of castor oil to produce Rilsan® specialty polyamides, Arkema makes every effort to maximize the use of circular materials in its products and packaging, including recycled or non-virgin materials and materials from renewable sources. The "Natural resources management" strategic innovation platform, described in section 1.1.2.1 of this document, fully supports this dynamic.

The new facility being built in Singapore that will be used to produce 100% bio-based amino 11 monomer and Rilsan® polyamide 11 will expand Arkema's offer of high performance materials made from renewable sources as of 2022. The Group issued its first green bond in 2020 to finance the construction of the new plant (see section 5.5 of this document).

The Group works extensively with its suppliers to measure the percentage of renewable and recycled materials in purchased products and packaging, to encourage the development of circular solutions, in particular *via* partnerships, and to secure the supply of strategic materials.

In addition, the Group's activities are encouraged to apply eco-design principles, and more particularly the use of circular materials and packaging, right from their solutions' initial phases of development.

This ongoing commitment was again demonstrated in 2021 by the fact that products at least 25% made from renewable or recycled raw materials accounted for around 10% of Group sales. Coming in at over €950 million, this sales figure is up by a sharp 12% on 2019 and 20% on 2020. Renewable raw materials include bio-sourced materials (*i.e.*, from biomass, plant or animal), and materials certified renewable by a Mass Balance approach. Recycled raw materials may also include materials certified using the Mass Balance approach.

FOCUS

SENSIO™: a range of bio-based, biodegradable surfactants for more sustainable detergency

SENSIO™ surfactants, which are up to 100% plant-based, GMO-free and non-competitive with the food chain, are derived from the sustainable castor oil industry, in which Arkema is a major player. Thanks to the Mass Balance approach, SENSIO™ surfactants are ecocertified and can be used in ecolabeled products, enabling Arkema's customers to create new-generation detergent formulas that are increasingly concentrated and effective, more sustainable, more responsible and more efficient.

4.3.3 The circular economy in transformation processes

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.

4.3.3.1 Energy use

Arkema has developed a climate policy, which is presented in section 4.4 of this chapter. This policy includes ambitious objectives and concrete actions to improve the Group's energy intensity. For further details, see section 4.4.3.2 of this chapter.

4.3.3.2 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, Arkema 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 vapor 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 in 2019, identified using the World Resources Institute's Aqueduct tool, represented less than 2% of the Group's consolidated water use and accounted for less than 2% of total production in terms of tonnage.

Drawing on these observations, the Optim'O project gives rise to numerous initiatives, particularly at the sites that account for most of the Group's water use and/or generate the most wastewater.

In 2020, the identification of the Group's water-stress-related risks was stepped up by adopting a more detailed, forward-looking methodology and by using WRI's Aqueduct and WWF's Water Risk Filter. The next phase, which involves analyzing the impact of water stress on the Group's activities, began in 2021 with the launch of a pilot study on a Business Line with operations worldwide.

FOCUS

Reducing water use

In Changshu (China), the systematic approach to optimizing water resources led to the roll-out of several water reuse projects, as a result of which the site's consumption fell by 22% between 2019 and 2021.

The table below presents consolidated water withdrawals in 2021, 2020 and 2019, calculated according to the methodology described in section 4.7 of this chapter.

Water use	2021	2020	2019*
Total water withdrawn *(in millions of cu.m)*	104	114	116

* *Following a correction of the 2019 metering methodology at the Pierre-Bénite site (France), the 2019 value communicated in the 2019 Universal Registration Document was reassessed by 2.8 million cu.m (corresponding to 0.32 cu.m/€k), consistent with the metering methodology of the other years.*

Water withdrawal decreased by 10 million cu.m in 2021. About half of this reduction came from divestment of the PMMA business, and the remainder from water savings achieved.

To step up action on protecting water resources, in 2021 the Group set a new goal for water withdrawal as a percentage of Group sales. The indicator is based on gross volumes less withdrawals and volumes sold to third parties. The reduction target is 11% with respect to 2019, *i.e.* 8.0 cu.m/€k by 2023. The indicator stood at 6.9 cu.m/€k in 2021, a sharp drop on the 2020 figure, owing to the combined effect of lower withdrawals and a higher sales figure.

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.

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 circular economy initiatives that are described in sections 4.3.2 and 4.3.4 of this chapter.

Lastly, the Group also uses circular, renewable and recycled raw materials in its production processes, as described in section 4.3.2 of this document.

4.3.3.4 Circular economy and industrial operations

The Group strives to limit waste and recovers by-products generated by its industrial processes. The Group's industrial-scope circular economy program has been strengthened since 2020 and involves:

- reducing consumption of raw materials;
- reducing the use of packaging (upstream and downstream);
- reducing waste production;
- carefully sorting and preparing waste to ensure the best possible treatment process;
- securing the sale of co-products and by-products and preventing their reclassification as waste;
- improving internal and external waste treatment processes; and
- processing third-party waste in cases where it is possible to improve disposal methods.

As part of this program, an awareness campaign has been launched for all industrial sites and a review of all waste flows has been initiated in order to improve circularity.

FOCUS

Solvent regeneration at Ribécourt (France)

Solvents must be renewed to maintain the performance of the processes in which they are used. A growing proportion of solvents is purified by the sites or by subcontractors for reuse. The Ribécourt plant is a perfect example of this approach, with a process that recycled 215 tonnes of solvents in 2021.

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.

More direct channels have also been set up, such as at the ArrMaz plant in Kunming (China), which returns intermediate bulk containers (IBCs) to its suppliers, and which itself set up a take-back system for empty drums and IBCs from several of its customers in 2021.

The Group also stresses the importance of using 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 Group's various businesses work to integrate into their product lines packaging made from the Post Consumer Recycled (PCR) stream, as the offer 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.

In 2020, manufacturers of plastic cartridges (an essential packaging component for the sealants and adhesives produced by the Group) entered into a technical testing phase designed to ensure that a significant portion of recycled plastic is integrated into their production processes in the near future.

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.

At the Hengshui site in China, similar by-products, along with crystallized sodium sulfate converted from a sulfuric acid waste flow, accounted for a total of 69,000 tonnes sold in 2021.

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, HSEQ, R&D and sustainable development – to step up these efforts and increase coordination with partners.

In 2021, 21% of waste produced worldwide by the Group was recycled on- or off-site to recover useful materials.

For several years, the Mont facility in France has 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 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 2021, 12,500 tonnes of desulfogypsum were recycled in this way, thereby avoiding their being sent to landfill.

At the Jarrie site (France), used secondary filters from the hydrogen peroxide production unit were previously sent straight to disposal systems. Thanks to a new waste recovery system, the palladium present in these filters is now recycled and reused in the production of one of the catalysts used by the site. This precious metal is on the European Union's list of critical raw materials.

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 recycling solutions are found whenever possible.

This commitment is reflected in a number of areas:

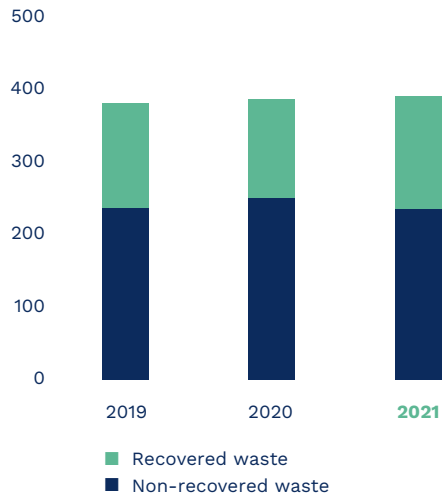
- reducing waste at source, by designing products and processes that generate as little waste as possible;
- recycling waste in the product value chain, in compliance with the REACH regulation; and
- recovering the energy potential of by-products and waste, wherever possible, by burning them as fuel.

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 recovered and non-recovered waste generated by the Group's operations in 2021, 2020 and 2019, calculated according to the methodology described in section 4.7 of this chapter.

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



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 tables show the amounts of hazardous and non-hazardous waste that were either recycled or burned as fuel in 2021, 2020 and 2019, calculated according to the methodology described in section 4.7 of this chapter.

Hazardous waste (in kt per year)	2021	2020	2019
Hazardous waste recycled into materials	27	20	26
Hazardous waste burned as fuel	63	60	57 (1)
Non-recovered hazardous waste	91	103 (2)	95 (1) (2)
• Of which landfilled	3.8	2.5	3.8
TOTAL HAZARDOUS WASTE	**181**	**183 (2)**	**178 (2)**

(1) The breakdown between recovered and non-recovered hazardous waste in 2019 was corrected following a historical classification error.
(2) Quantities of waste have been adjusted to eliminate water sent to treatment plants. This water returns to the aquatic environment after treatment.

Non-hazardous waste (in kt per year)	2021	2020	2019
Non-hazardous waste recycled into materials	58	48	54 (1)
Non-hazardous waste burned as fuel	8	9	8
Non-recovered non-hazardous waste	144	147 (2)	141 (2)
• Of which landfilled	25	26	26
TOTAL NON-HAZARDOUS WASTE	**210**	**204 (2)**	**203 (2)**

(1) The 2019 figure for non-hazardous waste recycled into materials has been corrected, after a co-product was erroneously included in its calculation.
(2) Quantities of waste have been adjusted to eliminate water sent to treatment plants. This water returns to the aquatic environment after treatment.

The overall waste volume rose by 4 kt in 2021. Given the high growth in activity, this increase is minor, owing to progress under the circular economy policy and divestment of the PMMA business during the year.

In 2021, 21% of waste produced by the Group worldwide was recycled at the production site or off-site to recover useful materials and 18% was burned as fuel.

4.3.4 Development, use and end-of-life management

Arkema works with its partners across the value chain to design and develop solutions that help keep products and materials in the use loop.

Eco-design

In cooperation with its customers and suppliers, Arkema works for each of its Business Lines and technology platforms to identify the most relevant circularity drivers, such as optimization of the quantity of materials used, extension of product lifespan, separability of materials and components, recycling and degradability.

Various training initiatives have been carried out with the teams involved in innovation within the Group's businesses to ensure that these issues are taken into account from the earliest phases of the design process.

Reducing the presence of hazardous materials in the Group's products

The presence of certain substances in our products can affect their recyclability. Arkema is committed to implementing a responsible product stewardship approach that takes this issue into account, thereby providing its customers with safer solutions. The Group's policy is described in section 4.2.4 of this chapter.

FOCUS

EnVia® resins range: for safer paints and coatings

EnVia® products contain no added alkyl phenol ethoxylate (APEO) surfactants, formaldehyde or formaldehyde donors and have a low volatile organic compound (VOC) content and low residual monomer levels. The EnVia® range enables Arkema's customers to formulate more health- and environmentally-friendly paints and varnishes, and facilitates access to ecolabels.

Extending the lifespan of Group customers' products

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

Kynar® PVDF, for example, is a long-lasting coating solution. 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.

Durastrength® acrylic impact modifiers extend the lifespan and enhance the performance of rigid and flexible PVC in applications such as siding, fences, decks, rails, pipes and injection-molded parts.

Recycling Group customers' products

Arkema is developing a number of solutions that make 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 parts made from Elium® 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 bottles can be reused, notably for beer manufacturers.

The Specialty Surfactants activity has developed a solution that increases the recycling rate of roadwork scrap. Using Cecabase RT® additives in asphalt mix increases the aggregate recycling rate by 10% to 15% compared with conventional techniques. These additives also reduce the asphalt mix's workable heating temperature.

The circular economy is based on interaction between the various participants in an ecosystem and therefore requires the development of partnerships and consortiums to set up recycling systems.

In 2019, for example, Arkema introduced Virtucycle®, a new recycling program in partnership with Agiplast, which specializes in the regeneration of high performance polymers. The program enables customers to partner with Arkema in post-industrial and post-consumer recycling projects for its high performance polymers. The Group acquired Agiplast in June 2021.

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.

4.3.5 Resource management measurement and life-cycle assessment

Measuring performance is an integral part of the plan for transitioning to a circular economy approach. Arkema has therefore introduced a number of indicators relating to products and industrial processes, as presented below.

To accelerate its approach, the Group has defined medium- or long-term targets for two of these indicators:

	Target year	Target	2021	2020	2019
Percentage of sales from products made from renewable or recycled raw materials [1]			10%	10%	9%
Water withdrawal by industrial sites *(cu.m/€k of sales)*	2023	8.0	6.9	9.7 [2]	9.0 [2]
Percentage of sales covered by a life-cycle assessment	2024	50%	27%	22% [3]	na

(1) The percentage of sales from products made from renewable or recycled raw materials includes sales of products with a renewable or recycled raw material content of at least 25% in 2021 and 20% for previous years (this change in threshold did not impact the value of the indicator).

(2) The values for water withdrawal in 2019 and 2020 were corrected following a change in the definition of the indicator, now based on gross volumes less regulated withdrawals and volumes sold to third parties.

(3) From 2021, the proportion of sales covered by a life-cycle assessment is measured as a percentage of revenue. The 2020 value has been corrected.

Product life-cycle assessments

To assess the environmental performance of its products, Arkema uses life-cycle assessments (LCAs) 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's Life Cycle Assessment Network, which is instilling this LCA culture across the organization, in particular through periodic employee training courses, and endurably 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.

A full life-cycle assessment was carried out on 27% of the sales generated in 2021. 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.

The Group intends to significantly increase the percentage of sales covered by LCAs in coming years to reach at least 50% by the end of 2024.

4.4 Climate

REDUCING THE CARBON FOOTPRINT OF THE GROUP'S ENTIRE VALUE CHAIN

4.4.1 Climate approach and commitment

The IPCC's sixth assessment report, published in 2021, clearly shows the impact of greenhouse gas emissions from human activities on climate change. The report specifically states that limiting climate change by 2100 is contingent on rapidly and substantially reducing greenhouse gas (GHG) emissions and achieving carbon neutrality by 2050.

Arkema confirms its commitment to countering climate change with an ambitious climate plan aligned with the Paris Agreement. This includes mitigation measures and an adaptation strategy.

The Group has set strategic long-term climate change mitigation targets for its entire value chain in line with an approach that uses Science-Based Targets (SBTs) and a trajectory that aims to limit the rise in global temperatures to well below 2°C above preindustrial levels by the end of the century.

2030 TARGET

38% reduction in greenhouse gas emissions* compared with 2015

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

2030 TARGET

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

The Group has also set out formal commitments for Scope 3 emissions:

- 19% reduction from 2015 levels by 2030 in categories 3 (fuel- and energy-related activities not included in Scope 1 or 2), 4 (upstream transportation and distribution), 5 (waste generated) and 9 (downstream transportation and distribution); and
- commitment from raw materials suppliers representing 82% of the Group's Scope 3, category 1 emissions (purchased goods and services) to set SBTs for their Scopes 1 and 2 emissions by 2025.

The methodology used to define this SBT is described in section 4.7 of this chapter. For a maximum contribution to the climate change challenge, this methodology covers GHG emissions under Kyoto Protocol Scopes 1 and 2, plus substances listed under the Montreal Protocol.

All Arkema Business Lines are required to contribute to reducing the overall carbon footprint.

The Group continuously innovates and improves its production processes, implements an ambitious energy efficiency optimization strategy, notably through its Arkenergy program, and pursues its efforts to purchase energy from low-carbon sources.

Arkema also encourages its suppliers of the most emissions-intensive raw materials to commit to SBTs to reduce their emissions by participating in the CDP supply chain initiative. The Group is determined to enhance its product range, notably by developing solutions that help reduce greenhouse gas emissions. The four innovation platforms, "Lightweight materials and design", "New energies", "Living comfort and home efficiency" and "Natural resources management", described in section 1.1.2 of this document, as well as changes to its fluorogases offer, contribute to this objective.

In addition to the mitigation measures outlined above, and detailed in section 4.4.3, the Group is developing a climate change adaptation strategy, presented in section 4.4.4 of this chapter.

The climate plan is managed by the Climate Steering Committee, which meets on a quarterly basis. This committee is coordinated by the Sustainable Development department and comprises the Group Process and Energy Procurement Vice-Presidents, industrial Business Line Vice-Presidents and regional HSE Vice-Presidents. It leads climate-related programs and monitors progress, not only with a view to achieving the quantitative targets that the Group has set, but more broadly in a way that marks out a path towards a carbon neutral economy by 2050.

Climate governance is supported at the highest level of the Group and is fully integrated into the CSR governance system described in 4.1.2 of this document. The Industrial Ecology Steering Committee meets twice per year to track progress on the Group's global action plan and to monitor the contribution made by each business to reducing greenhouse gas emissions. It is chaired by the Industry & CSR Executive Vice-President and comprises Executive Committee members in charge of the Group's businesses, the Sustainable Development, Safety and Environment Vice-Presidents, and Vice-Presidents of the actively involved functional units, such as processes and energy.

The climate plan, performance indicators and 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 Executive Committee is informed about GHG emissions on a quarterly basis.

In addition, climate issues are taken into account in industrial investment decisions, energy supply contracts and the evaluation of acquisition projects.

Arkema teamed up with around 100 other French companies at the Rencontre des Entrepreneurs de France (LaREF) meeting for French entrepreneurs held in August 2020, in support of a low-carbon industry and economy by signing the French Business Climate Pledge 2020 in line with its 2015, 2017 and 2019 commitments.

In 2021, as part of COP26, Arkema reaffirmed its commitment to climate action by taking up the pledges of the European Climate Plan.

4.4.2 Alignment with the TCFD recommendations

As part of its commitment to climate action, Arkema supports the recommendations issued by the Taskforce for Climate-related Financial Disclosures (TCFD). These recommendations are designed to provide a framework for business communication on climate change by organizing information into four key areas: governance, strategy, risk management, metrics and targets. More detailed information can be found in this document and in the CDP climate change questionnaire to which Arkema responds every year and which is aligned with the TCFD recommendations.

	Further details	
	Section of this document	**2021 CDP questions**
GOVERNANCE		
The presentation of CSR governance in section 4.1.2 of this chapter includes topics relating to climate change. In addition, a steering committee dedicated specifically to Arkema's climate plan was set up in 2019. Every year, performance shares are granted to the Chairman and Chief Executive Officer and to the Group's executives and employees. The climate-related objective of reducing greenhouse gases (GHGs) has been one of the key performance indicators since 2019. The achievement rate of this objective therefore has an impact on the allocation of performance shares.	4.1.2 4.4.1 4.6.1.5 3.5.1	C1.3 C1.3.a C1.1.a C1.1.b C1.2 C1.2.a
STRATEGY		
Main risks:		C2.3.a
• Physical risks	2.1.3	
Acute physical risks related to climate change (extreme weather events, such as floods, droughts and storms) that could (i) cause significant damage to certain sites or to the upstream chain and therefore impact the operations carried out at those sites and (ii) generate significant costs due to insurance deductibles and damage not covered by insurance policies.		
• Transition risks	2.1.2	
The introduction or strengthening of regulations relating to the pricing of GHG emissions (emissions trading systems such as the ETS, carbon taxes, taxes on energy purchases, etc.) could have a negative impact on the Group's activities by increasing operating costs and reducing profitability. **New regulations affecting the fluorogas market**, which could force the Group to sharply reduce, or even cease, the sale or production of certain products.		
Main opportunities:		C2.4.a
• Resource efficiency		
Energy: reduced energy use thanks in particular to the Arkenergy program, driving a reduction in production costs and environmental impacts. **Renewable and recycled raw materials:** development of specialty materials based on renewable raw materials, such as Rilsan® polyamide 11, and recycled raw materials to preserve non-renewable resources and meet high market expectations. **Recyclable solutions:** design of recyclable solutions such as Elium® resin, keeping the material in the use loop.	4.4.3.2 1.1.2.1 4.3	
• Markets		
Clean electric mobility: development of new solutions to improve the performance of batteries designed for energy storage in the fast-growing low GHG emission electric vehicle market. **Transportation:** development of lightweight materials for the aeronautics and automotive industries, reducing fuel consumption and therefore GHG emissions. **Construction:** development of solutions to improve building energy efficiency, reducing heating and air-conditioning needs and therefore GHG emissions. **3D technology:** development of a wide range of dedicated materials and solutions to support 3D printing customers and partners. Among the advantages of additive manufacturing, using less raw materials contributes to reducing GHG emissions.	1.1.2.3 1.1.2.2 1.1.2.6	
Climate-related scenarios: Preliminary work on climate-related scenarios was initiated in 2018. Extreme climate-related rainfall was assessed under the RCP 2.6 and RCP 8.5 scenarios. The analysis shows that climate-related flood risks are limited for Group sites in the short term.	4.4.4	C.3.1.a, C.3.2.a

	Further details	
	Section of this document	**2021 CDP questions**
RISK MANAGEMENT		
The procedures for identifying, assessing and managing financial and non-financial risks described in section 2.2 of this document cover the risks related to climate change. These risks are described under "Regulatory requirements and CSR expectations" and "Natural disasters and climate change", presented respectively in sections 2.1.2 and 2.1.3 of this document. To manage the acute physical risks related to climate change, Arkema is defining scenarios and determining alternative production locations within the Group for the majority of its sites in order to ensure continuity of service to its customers. For transition risks related to new regulations on GHGs and fluorogases, the Group is supported by regulations experts to anticipate regulatory changes and by its R&D teams to develop alternative solutions with lower GHG emissions.	2.1 2.1.2 2.1.3 2.2 4.4	C.2.2, C.2.2.a
METRICS AND TARGETS		
Greenhouse gas emissions targets (Scopes 1, 2 and 3):	4.4.3	C4.1, C4.1.a, C4.2, C4.2.b,
• for Scope 1 and Scope 2 greenhouse gas emissions as defined in the Kyoto Protocol and substances listed in the Montreal Protocol:	4.4.3.1	C6.1, C6.3,
◦ by 2030, 38% reduction in absolute emissions compared with 2015.		
• for Scope 3 greenhouse gas emissions as defined in the Kyoto Protocol:	4.4.3.3	C6.5
◦ by 2030, 19% reduction compared with 2015 levels in absolute emissions from fuel- and energy-related activities not included in Scopes 1 and 2 (category 3), waste generated (category 5), and upstream and downstream transportation and distribution (categories 4 and 9), and		
◦ commitment from raw materials suppliers representing 82% of the Group's Scope 3, category 1 emissions to set SBTs for their Scopes 1 and 2 emissions by 2025.		C12.1.a
The Group also has an intensive objective to reduce net energy purchases in terms of EFPI by 20% between 2012 and 2030.	4.4.3.2	
Also, an internal carbon price is used in the industrial investment analysis and approval process.	4.4.3.1	
The Group tracks the percentage of sales from products made from renewable or recycled raw materials [(1)], as well as the percentage of sales that contribute to Sustainable Development Goals 12 "Responsible consumption and production" and 13 "Climate action".	4.3.2 4.2.3	
In addition, Arkema uses life cycle assessments (LCAs) to measure the environmental performance of its products, including their climate impact, and aims for LCAs to cover 50% of its sales by 2024. The results of the LCAs inform eco-design initiatives inside and outside the Group.	4.2.4	

(1) The percentage of sales from products made from renewable or recycled raw materials includes sales of products with at least 25% renewable or recycled raw materials.

4.4.3 Climate change mitigation

Arkema is committed to reducing greenhouse gas emissions in order to limit global warming, and is working to contribute to a carbon neutral economy by 2050.

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.

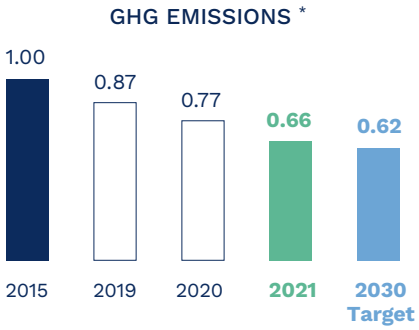
In addition to complying with the GHG Protocol, the Group also reports its direct greenhouse gas emissions from ozone depleting substances (ODS) in line with the Montreal Protocol.

Tracking of the Group's GHG emissions

The table below details greenhouse gas emissions [(1)] (in kt CO_2 eq.) from the Group's operations in 2021, 2020 and 2019, calculated according to the methodology described in section 4.7 of this chapter.

Scopes 1 + 2 + ODS	**2021**	**2020**	**2019**
GHG emissions *(in kt CO_2 eq.)*	3,117	3,628	4,087

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



** Scopes 1 + 2 + ODS, in absolute terms compared with 2015.*

In 2021, the Group's GHG emissions were down 14% compared with 2020. Absolute GHG emissions compared with 2015 were 0.66, down significantly on the 2020 figure and consistent with the 0.62 target set for 2030. Given the context of rising production volumes, this sharp drop is mainly due to proactive measures under the Group's climate plan and divestment of the PMMA business.

4.4.3.1 Scopes 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;
- fugitive emissions from cooling circuits using GHGs;
- burning of fuel oil and gas in production operations; and
- emissions from processes that generate CO_2, N_2O or CH_4 as a product, by-product, co-product, waste or gas discharges, such as thermal oxidation, which is used to convert VOCs into CO_2.

To reduce its impact on global warming, the Group has implemented an action plan to minimize direct GHG emissions, which includes:

- systematic leak detection programs and the installation of emissions scrubbers at fluorogas production facilities;
- energy efficiency improvements to processes under the Arkenergy program, reducing fossil fuel consumption of its boilers (see section 4.4.3.2 on energy); and
- optimization of processes and operating conditions of reactions to limit GHG emissions produced or emitted directly during the combustion of by-products, co-products or waste.

Capex and Opex on this climate change mitigation action plan on eligible activities are covered in the Taxonomy reporting, as outlined in section 4.1.4 of this chapter.

Absolute indicator for direct greenhouse gas emissions

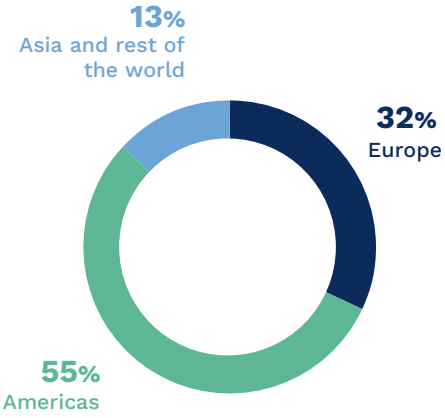
The table below details direct greenhouse gas emissions (in kt CO_2 eq.) from the Group's operations in 2021, 2020 and 2019, calculated according to the methodology described in section 4.7 of this chapter.

Scope 1 GHG emissions *(kt CO_2 eq.)*	2021	2020	2019
Total	1,822	2,268	2,698
Of which CO_2	1,436	1,495	1,490
Of which HFC	349	742	1,174
Others	37	31	34

The main factors behind the very significant decrease in emissions in 2021 were: improved reaction yields at the F32 unit in Calvert City (United States); continued improvement in vent treatment at fluorogas production facilities; and divestment of the PMMA business.

Other improvements and investments contributed to reducing direct Scope 1 emissions, such as on boilers in Honfleur and Genay (France), the cooling system in Coatza (Mexico), as well as a distillation column and a reboiler in Lannemezan (France).

SCOPE 1 DIRECT GHG EMISSIONS BY REGION



In 2021, direct emissions fell in each region.

Other direct emissions

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

Montreal Protocol	2021	2020	2019
Greenhouse gas emissions *(kt CO_2 eq.)*	234	257	247

Scope 2 indirect emissions

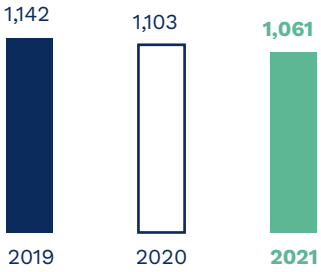
The Group analyzes the following indirect GHG emissions:

- Scope 2 CO_2 emissions from the suppliers of the electricity and steam purchased by the Group; and
- Scope 3 CO_2 emissions, categories 1, 2, 3, 4, 5, 6, 7, 8, 9 and 12. See section 4.4.3.3 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 4.4.3.2 on energy.

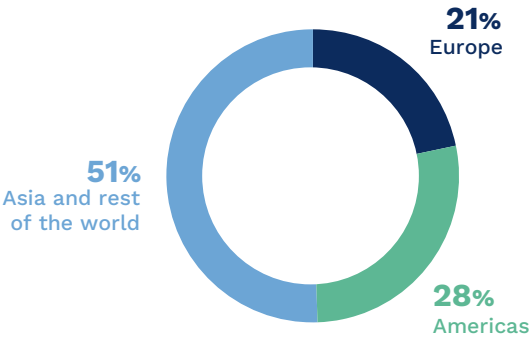
The chart below presents the Scope 2 emissions from the Group's operations in 2021, 2020 and 2019, as defined above and calculated according to the methodology described in section 4.7 of this chapter.

SCOPE 2 INDIRECT GHG EMISSIONS
(in kt CO_2 eq.)



Despite rising production, scope 2 CO_2 emissions decreased by more than 3% in 2021 *versus* 2020, owing to energy efficiency programs, more favorable production paces and divestment of the PMMA business.

SCOPE 2 INDIRECT GHG EMISSIONS BY REGION



Internal carbon price

To enhance its long-term approach, the Group set an internal price for Scope 1 and Scope 2 GHG emissions, expressed in terms of CO_2 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. Using the internal carbon price also serves to enhance employee awareness, drive behavioral changes, promote energy efficiency, and encourage teams to identify and seize low-carbon opportunities.

The Executive Committee reviews the use of the internal carbon price, checks its relevance and, if necessary, adjusts the value. The price is currently set at €50 per tonne of CO_2.

4.4.3.2 Energy

The Group deploys a wide range of actions to reduce Scopes 1 and 2 CO_2 emissions as part of both the Arkenergy program and its operational excellence strategy (for further details, see the "Profile, ambition and strategy" section of this document).

Energy use

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 Arkenergy program is being rolled out in every subsidiary through a global network of Energy Leaders in the businesses lines, facilities 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. To date, a total of 31 sites are ISO 50001-certified, which corresponds to approximately 55% of Arkema's total energy use. In 2021, the number of certified sites decreased due to the sale of the PMMA business;
- allocating a dedicated capital expenditure budget specifically for Arkenergy initiatives. In 2021, 52 capital projects were funded out of the budget, including 29 in Europe, 13 in the Americas and 10 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. In 2021, the projects in Houston (United States) and La Chambre (France) were rolled out and a new project was launched in Shanghai (China).

Arkema introduced a management system in Europe for all its steam traps in 2020, which it rolled out worldwide in 2021. Any failure of the trap system can cause significant energy losses. The aim of this program is to reduce the steam trap failure rate by 75% over three years through changes to their installation and regular inspections. The new digital solution enables the Group to visualize the condition of its steam traps, as well as the progress made on repairs and compliance work, and to consolidate the results at Group level.

Actions are also implemented at several plants to maintain insulation at its optimal level in order to avoid any loss of energy, along with solutions to recover alternative energy.

FOCUS

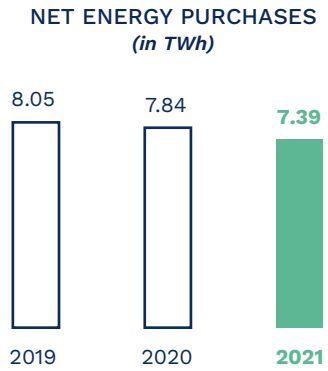
Optimized steam trap management worldwide

The program launched in 2020 in Europe was rolled out to Asia and the Americas in 2021, with the aim of covering the most energy-intensive sites, which account for 85% of the Group's total energy consumption.

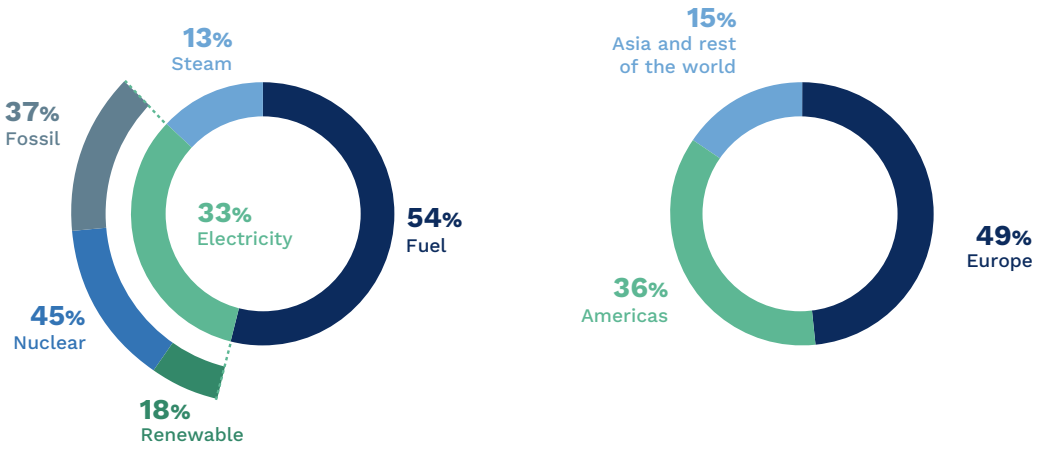
By the end of 2021, 90% of these sites had joined the program. Since its launch in 2020, nearly €2 million has been invested. This has reduced consumption by 48 GWh in 2021, which represents a 33% decrease in the average trap failure rate.

Absolute indicator for energy purchases

The chart hereafter presents consolidated net energy purchases in 2021, 2020 and 2019, in TWh, according to the methodology described in section 4.7 of this document.



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



In 2021:

98% of the TWh generated by fuel were natural gas-fired, unchanged from 2020;

22% of the net TWh purchased by the Group, regardless of source, were from low-carbon electricity, as was the case in 2020. The proportion of renewable electricity in the group's electricity purchases increased from 13% to 18%.

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

FOCUS

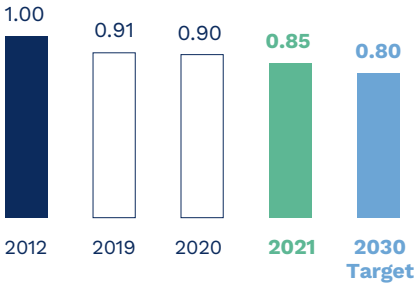
Arkema sites powered by renewable energy

Following the example of the Saint-Auban site (France), where a solar power plant producing 19 GWh per year went into operation in 2019, most of which is for self-consumption, in 2022 the Clear Lake site (United States) will receive about one-third of its electricity needs from a 260 MW solar power plant located in the Texas desert. These emblematic projects demonstrate the feasibility of green electricity production on brownfield sites where it does not compete with farmland.

Intensive indicator for net energy purchases

The chart below presents the net energy purchases EFPI for the Group's operations in 2021, 2020 and 2019, calculated according to the methodology described in section 4.7 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.

NET ENERGY PURCHASES EFPI



Energy performance improved significantly in 2021, owing to measures taken under the Arkenergy program and the return to more favorable production conditions.

4.4.3.3 Scope 3 greenhouse gas emissions

Following an initial inventory of its indirect Scope 3 emissions in 2016, the Group estimates 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 nine material categories, three non-material categories and three categories that are not relevant. The emissions estimated for the Group in 2021 are presented for ten of these categories in the table below. The calculation methods are described in the methodology presented in section 4.7.3.4 of this chapter. Additionally, the Group is working on estimating downstream categories 10 and 11, as well as on enhancing the reliability of category 12 data.

Category number	Category name	Emissions ($kt\ CO_2\ eq.$)	Comments
1	Purchased goods and services	7,515	Significant. As is often the case in the chemicals industry, this category is material for Arkema. Greenhouse gas emissions reported for this category increased in 2021, chiefly as a result of changes in the product mix and an estimate based on a broader scope.
2	Capital goods	440	Significant. Emissions in this category rose by 34%, consistent with the increase in development investments.
3	Fuel- and energy-related activities not included in Scope 1 or 2	677	Significant, stable.
4	Upstream transportation and distribution	278	Significant, stable.
5	Waste generated in operations	430	Significant, stable.
6	Business travel	5	Non-significant
7	Employee commuting	32	Non-significant
8	Upstream leased assets	5	Non-significant
9	Downstream transportation and distribution	292	Significant. In 2021, GHG emissions in this category were stable.
10	Processing of sold products	Data not available	Significant.
11	Use of sold products	Data not available	Significant. As is often the case in the chemicals industry, this category is the most material for Arkema. Estimation for this category is difficult, because of partial data on product use and the lack of a recognized methodology. 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). Year after year, these transitions result in an extremely significant reduction in the average global warming potential of the Fluorogases sold by the Group.
12	End-of-life treatment of sold products	2,568	Significant. The estimate for this category is globally stable. At this stage, it does not take into account the Fluorogases activities.
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	-	Not relevant.
TOTAL		**12,243**	

In 2021, indirect Scope 3 GHG emissions, which were estimated for 10 categories, represented 12,243 kt CO_2 eq. The increase arises mainly from changes in category 1.

In 2019, Arkema set Science-Based Targets (SBTs) aligned with a trajectory well below 2°C for its Scope 1 and 2 emissions and ozone-depleting substances. In 2020, it introduced SBTs for certain categories of Scope 3 emissions, thereby setting targets for its value chain in line with the Paris Agreement:

- a 19% reduction in Scope 3 emissions categories 3, 4, 5 and 9 between 2015 and 2030; and
- commitment from suppliers representing 82% of Scope 3, category 1 emissions to set SBTs for their Scopes 1 and 2 emissions by 2025.

To meet this target, in 2021 Arkema asked more than 100 suppliers, which are the main contributors to Scope 3 category 1 for raw materials, to complete the CDP questionnaire. For this first year, suppliers already committed to SBTs, or planning such commitment in the next two years, accounted for 31% of the Group's Scope 3, category 1 emissions for 2021.

In 2021, Arkema defined and launched the Low Emission Supply Chain program to reduce its Scope 3, category 9 carbon footprint. For further details, see section 4.6.4.6 of this chapter.

4.4.3.4 Low-carbon solutions

Continuous dialogue with customers and the 2019 materiality assessment show that climate change is a key concern for Group customers. For example, they want low-carbon products and solutions that help them reduce their GHG emissions and energy consumption.

Arkema's innovation strategy is a key component in its contribution to sustainable development. This strategy is detailed in section 1.1 of this document. Arkema is determined to enhance its product range, by developing solutions that help reduce greenhouse gas emissions. The four innovation platforms, "Lightweight materials and design", "New energies", "Living comfort and home efficiency" and "Natural resources management", described in section 1.1.2 of this document, as well as changes to its Fluorogases offer, contribute to this objective.

A few examples of solutions that contribute to reducing greenhouse gas emissions (Scope 3, categories 10, 11 and 12):

- Rilsan® polyamide 11 and Kepstan® PEKK, used as a metal substitute (solutions for "lightweight materials and design");
- Elium® recyclable resins (solutions for "natural resources management" and "lightweight materials and design");
- Kynar® PVDF, Foranext® electrolytes, Bostik Vitel® polyester (solutions for "new energies");
- Bostik adhesives and sealants (solutions for "living comfort and home efficiency");
- Forane® HFO fluorogases with a very low global warming potential.

In 2021, solutions which, through their design and their use and end-of-life phases, contribute to the efficient use of resources and a reduction in the carbon footprint (Sustainable Development Goals 12 "Responsible consumption and production" and 13 "Climate action") accounted for 43% of Group sales. For further details, see section 4.2.3 of this chapter.

FOCUS

Arkema supports the wind power industry in recycling

Recycling end-of-life wind turbines is a major industrial and environmental challenge for the wind power industry due to the considerable volumes involved. Bringing together seven partners from academia and industry, the Zero wastE Blade ReseArch (ZEBRA) project was launched in September 2020 to create the first 100% recyclable wind turbine.

With its Elium® thermoplastic liquid resin and its structural adhesives, Arkema proposes a breakthrough innovation in the composites market, opening up new perspectives in many sectors and especially in the production of wind turbine blades.

The Elium® resin-based composite parts are 100% recyclable, through a mechanical or chemical recycling process of scraps and end-of-life composite parts.

Arkema's position in this consortium demonstrates the Group's commitment and drive to integrate a circular economy model into its product design and to participate in developing new renewable energy technologies.

4.4.4 Climate change adaptation

For Arkema, adapting to climate change aims to reduce the vulnerability of its assets and operations to the current and expected effects of climate change, and to increase its resilience as described in section 2.2 of this document. Adaptation strategies supplement the mitigation measures presented in the previous section.

In order to prevent and limit the potential impact of natural disasters and climate change at the exposed sites, insofar as this is possible, the Group has defined scenarios that take into account the evolution and 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, however, 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.

Capex and Opex concerning action plans on adaptation to the consequences of climate change on eligible activities are included in the Taxonomy reporting outlined in paragraph 4.1.4 of this chapter.

Exposure to extreme rainfall

Extreme climate-related rainfall was assessed under the RCP 2.6 and RCP 8.5 scenarios for the period 2021-2050, using data referenced in scientific, peer-reviewed papers (Aqueduct Water Stress Projections from the World Resources Institute).

This assessment was conducted in line with TCFD recommendations and using a forward-looking scenario analysis to 2050, reflecting the long life of assets in the chemical industry. The study covered 134 Group sites in the following countries: Egypt, Morocco, China, Indonesia, India, Korea, Philippines, Vietnam, Belgium, Switzerland, Germany, Denmark, Spain, France, United Kingdom, Italy, Netherlands, Poland, Romania, Turkey, Canada, United States, Australia, New Zealand, Argentina, Brazil, Mexico, Malaysia, Saudi Arabia, Sweden.

The analysis in the RCP 8.5 scenario shows that climate-related flood risks are limited to two sites over the short term, and that 11 sites are subject to risks of extreme rainfall (> 700 mm/year).

Exposure of industrial sites to water stress

As part of the Optim'O project, launched in 2016 to optimize water management, Arkema conducted a study to identify water stress-related risks for its industrial sites. The results of this analysis are presented in section 4.3.3.2 of this chapter.

Based on this analysis, Arkema decided to step up this identification process. The next phase, which involves analyzing the impact of water stress on the Group's activities, began in 2021 with the launch of a pilot study on a Business Line with operations worldwide.

Exposure of the Group's value chain to the effects of climate change

Climate change could impact Arkema's supply chain if, for example, a major supplier or subcontractor could not supply one or more Group facilities, thereby impacting the Group's operating and financial performance and its ability to deliver to its clients.

However, suppliers with a strong CSR policy that are taking climate action, through adaptation and mitigation measures, will reduce their risks, increase their reliability and also be better partners for sustainable innovation. This is why Arkema has integrated these aspects into its purchasing process and endeavors to build sustainable and balanced, long-term, trust-based relationships with our suppliers and subcontractors. The Together for Sustainability (TfS) initiative plays a central role in the process of assessing risks and opportunities, including those related to the climate. For further details on the responsible procurement policy, see section 4.6.4 of this chapter.

Taking further steps, the Group initiated a program in 2021 to raise the awareness of its raw material suppliers by requesting their participation in the CDP questionnaire. This program urges them to engage in reducing their greenhouse gas emissions and to assess their exposure to climate change in order to define their own adaptation strategy. For further details, see section 4.4.3.3 of this chapter.

4.5 Safety and environment

BEING A TOP QUARTILE PERFORMER IN THE CHEMICAL INDUSTRY IN TERMS OF SAFETY AND REDUCING THE ENVIRONMENTAL FOOTPRINT OF THE GROUP'S OPERATIONS

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. The Group's ambition is to rank among the leading chemical producers in terms of safety performance and it is fully determined to reduce the environmental footprint of its activities.

4.5.1 Health, safety and environmental management

Safety, health and environmental protection 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 health, safety, environment and quality policy confirms the responsible manufacturer commitment expressed in the Group' Social Commitment Charter described in section 4.1.1 of this chapter.

The Group's health, safety and environment approach is structured around three areas: prevention of industrial risks (related to safety, the environment and pollution), an integrated 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 (HSEQ) Policy and in a global standard, the Health, Safety and Environment (HSE) manual. The policy and manual form the basis of HSE management systems in all Group entities, and also cover quality, security and energy.

The materiality analysis performed in 2019 confirmed that occupational health and safety and prevention of industrial risks were among the Group's priority issues and have been properly integrated as such into its CSR approach.

The Arkema Integrated Management System (AIMS) 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 and CSR Executive Vice-President, who is a member of Arkema's Executive Committee, 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. In addition, the HSEQ policy and key indicators are presented each year to the Board of Directors as part of the industry overview presented by the Industry and CSR Executive Vice-President. Lastly, a review of the environmental risks is presented annually to the Board's Audit and Accounts Committee.

Implementation of the Health, Safety, Environment and Quality (HSEQ) Policy is handled by the operating teams in each region and business.

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 4.5.1.2 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.*

Consideration for safety and environmental issues in acquisition and investment decisions

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. Taking these steps enables the Group to identify potentially critical environmental situations, estimate the cost of resolving them, and measure the efforts that may be required to bring these sites up to Group safety and environmental standards.

Similarly, safety and environmental issues are taken into account in the early stages of investment plans, and their compliance with Group objectives is verified.

4.5.1.1 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 4.5.2.2 and 4.5.2.3 of this chapter.

4.5.1.2 Management system and audits

The effective implementation of the Group's HSEQ/S/En policies – which cover health, safety, environment and quality, as well as security and energy – 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 HSEQ 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 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 HSEQ management initiatives. For the largest sites (49% of all Group sites), Full 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 and depending on their specific situation, Simplified or Light AIMS audits, as defined in section 4.7 of this chapter, are conducted at least every five years by Arkema staff.

The 2025 target is for 100% of facilities to have undergone a Full, Simplified or Light AIMS audit in line with the Group's audit schedule.

	2021	2020	2019
% of sites AIMS-audited	86	82	80

The steady increase in the percentage of AIMS-audited facilities since 2015 illustrates the continued deployment of this program, including at sites coming from acquisitions. Progress was less significant in 2020 and 2021, as some Simplified and Light audits were postponed due to the health crisis arising from the Covid-19 pandemic.

As part of an AIMS audit, field audits are carried out to ensure that site-led initiatives are implemented effectively and comply with requirements, notably the field initiatives described in section 4.5.1.3 of this document. These concern everyone working on the site, including Group and subcontractor employees, and apply to every aspect of the site's operations, including production, logistics, maintenance, offices, construction or turnaround sites, and production unit shutdowns.

During AIMS audits, facilities can also be 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. In 2021, the number of certified sites decreased due to the sale of the PMMA business.

Number of sites certified according to each standard	2021	2020	2019
ISO 45001 (health and safety)	85	87	86
ISO 14001 (environment)	84	82	81
ISO 50001 (energy)	31	34	33
ISO 9001 (quality)	146	154	156

Some 60% of Group facilities (industrial sites and R&D centers) have been certified to ISO 45001 standard in Europe, 46% in the Americas and 73% in Asia. This certification relating to health and safety represents 48% of Arkema employees.

ISO 14001 certification requires each production facility or R&D center 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.

	2021	2020	2019
% of ISO 14001-certified sites	58	54	53

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	2021	2020	2019
RCMS (United States only: health, safety, environment)	13	15	14

In addition, the Group performs 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.

The results of these audits are taken into account during AIMS audits.

In addition to audits, teams from the Group Safety and Environment department (DSEG) lead support initiatives at facilities whose performance needs improving or which have reported a specific issue. This support includes an analysis of the situation and continues with the development and monitoring of action plans. In addition, the DSEG has provided specific support to plants during their turnarounds and stepped up its participation in events organized by the Group's various businesses, plants (annual meetings with partner companies) and corporate departments (maintenance, R&D, etc.).

Another important tool in managing the deployment of the Group's HSEQ/S/En 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 HSEQ alert that enables other Group facilities that may encounter a similar incident to take corrective measures. The feedback process helps improve the Group's HSEQ expertise and ensure the effectiveness of the deployed measures.

To harmonize the identification, assessment and analysis of environmental risks beyond its ISO 14001-certified sites, the Group is rolling out a methodology for application worldwide. A dedicated IT system known as STARMAP was implemented in Europe, the United States and Asia in 2016, as explained in section 4.5.2.2.2. In 2021, 72% of the Group's industrial sites had installed the system, and around 71% of these sites had used it to update their environmental assessment. At end-2021, 65% of the Group's sites had carried out an environmental assessment, whether integrated into STARMAP or not.

4.5.1.3 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 HSEQ for new hires;
- the Safety in Action and Essentials programs;
- field initiatives, such as peer observations, flash audits, scheduled general inspections, safety tours, field safety audits, internal or process audits, general operating condition tours and construction site audits;
- dedicated training courses, such as "SafeStart®", "Managing Safely", "Transporting Hazardous Substances" and "Crisis Management"; and
- the Safety Culture program, which enables every employee to share the Group's safety challenges, policies and tools.

Several years ago, the Group also integrated the lessons learned from neuroscience to improve accident prevention. These programs and initiatives are detailed in this chapter.

In 2021, safety training (excluding e-learning) totaled 148,600 hours (*i.e.*, 11 hours per year per employee trained), and the number of employees who attended at least one safety training session totaled 12,974 (64% of the Group headcount) [(1)].

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

In addition, 14,390 people (71% of the Group headcount) took e-learning courses on safety in 2021 [1]. This number rose sharply in 2021, with roll-out of the new "Essentials" set out in section 4.5.2.2.1.

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.

Arkema organizes internal communication campaigns and other events to get employees involved in its new long-term objectives and to foster a culture of environmental awareness throughout the Group.

Details on employee training and the new-hire induction process may be found in sections 4.6.1.3.1 and 4.6.1.3.2 of this chapter. Environmental training totaled 14,913 hours in 2021 [1], or an average of 3 hours per employee. In the context of the pandemic, 4,524 employees attended at least one environment-related course during the year (excluding e-learning). This means that 22% of the Group's employees [1] attended environment-related training in 2021 (excluding e-learning).

In addition, 4,418 people (22% of the Group headcount) [1] took environment-related e-learning courses in 2021.

4.5.2 Health and safety information

4.5.2.1 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 two targets for 2030, which reflect the Group's willingness to continuously improve its performance in this area.

2030 TARGETS

Reduce the total recordable injury rate (TRIR) to 0.8.

Reduce the process safety event rate (PSER) to 2.0.

To contribute to achieving these goals, Arkema has also set a goal of extending the peer observation program to all of its facilities [2] by 2025.

By setting this strategic TRIR objective for 2030, Arkema is contributing to UN Sustainable Development Goals 3 "Good health and well-being" and 8 "Decent work and economic growth".

4.5.2.2 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 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 further details, see section 4.6.1.4 of this chapter).

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

(1) In entities at least 50%-owned and employing more than 60 people.
(2) For newly acquired companies' sites, the roll-out of this program takes place over a period of around three years.

FOCUS

Global rollout of the new Essentials

Ten years after their launch, Arkema decided to review its Essentials to account for progress made in safety, changes in accident typology, and developments in the industrial profile of its operations, which now focus more on downstream products. In 2021, all Arkema employees worldwide received training on complying with the rules associated with these 14 new Essentials, more than half of which remain unchanged. Each Group facility has launched a multi-year training program prioritizing Essentials according to the accident risks specific to the site ("one Essential per quarter").

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 2021, 61% of Group sites were operating peer observation practices on safety improvement. This was slightly down on the 2020 figure of 63%, owing first to divestment of the PMMA business, where peer observation practices were in operation at seven sites, and second to the fact that this approach was suspended at Bostik sites in 2020, for resumption in 2021-2023, because of the health crisis. The 2025 target is to reach 100% of Arkema sites.

As an adjunct to peer observation, Arkema has put in place special programs, such as Smart Zone for rectifying shortfalls *versus* best practices, and SafeStart®, which involves observing oneself and others to identify the critical states that lead to more than 80% of all accidents (rushing, frustration, fatigue and complacency).

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).

The program is being rolled out gradually across the Group, furthering an understanding of behavioral approaches, and facilitating the adoption of safety tools and equipment by highlighting their relevance.

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 2021, 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, or POC, such as the use of connected tools like vehicle-pedestrian detection to prevent collisions and 3D glasses for remote diagnostics. The Group is also gradually introducing other technologies, such as virtual reality for fall risk training, tablets for safety inspections and drones for maintenance inspections. Digital technology contributes to improving security management in three main areas: training using virtual reality, digitization of security processes and connected tools.

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. It had to be adapted to the restrictions due to the global pandemic, but has maintained its momentum.

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:

- at the global level, World Day for Safety. As pedestrian accidents account for one-third of the Group's accidents, in 2021 each site was asked to organize events, focus groups and concrete actions on traffic accident prevention. As part of this event, the Group organized a competition for the most innovative site; and
- employee engagement surveys are run periodically in Europe, China and the Americas. In 2019, 93% of respondents in China and 97% in the U.S. responded positively when asked whether they fully understood the safety expectations and requirements in their jobs. In the latest survey in 2018, 97% of respondents in Europe confirmed that they "keep safety in 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 4.6.6 "Community engagement" 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 active involvement of all employees.

2030 TARGET

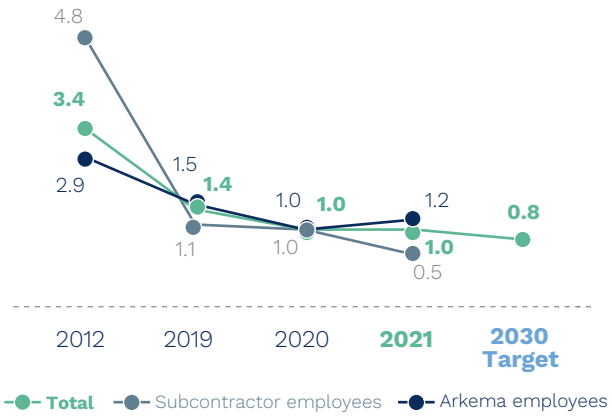
In light of the performance achieved in 2021, the Group has set a more ambitious target of achieving a total recordable injury rate per million hours worked (TRIR) of 0.8.

The improvement in the Group's results was consolidated in 2021, with a TRIR of 1.0 for the second consecutive year. This is the result of action plans over several years to raise awareness of the Group's safety requirements among contractor personnel and to develop a behavioral approach to safety.

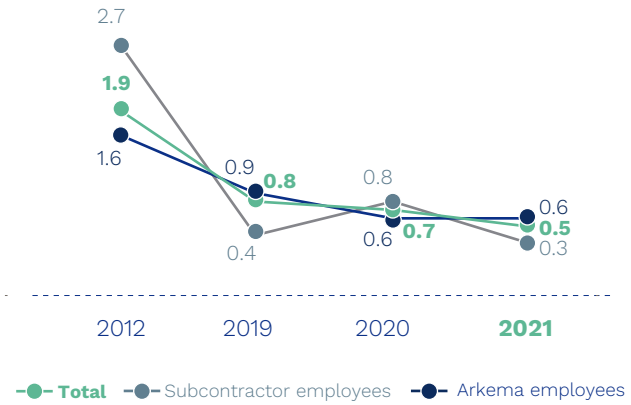
The Group also continued to make progress in its drive to reduce the number of lost-time injuries, thanks to the implementation of prevention initiatives. As a result, the lost-time incident rate (LTIR) declined to 0.5 in 2021 from 0.7 in 2020. An average of 43 days were lost per injury in 2021 across all Group and subcontractor employees. No fatal accident has been recorded since 2013 for all Group and subcontractor employees.

The following charts show consolidated injury rates for the 2019 to 2021 period, in number of injuries per million hours worked, calculated according to the methodology described in section 4.7.2 of this chapter. They also show data for 2012, the baseline year used to set the strategic safety target in the Group's CSR policy.

TOTAL RECORDABLE INJURY RATE (TRIR) (1) (2)



LOST-TIME INJURY RATE (LTIR) (3) (4)



In 2021, a total of 42 Group employees were victims of reported injuries recorded in the TRIR for the year, of which 20 resulted in lost time, out of a total worldwide workforce of 20,209 people. The rate also reflected the 6 incidents involving subcontractor employees reported during the year, of which 3 were lost-time injuries. The rate of potentially serious incidents remained unchanged in 2021 at 0.30, as did their number compared with 2020, at 13. 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.

4.5.2.2.2 Health at work

Arkema has 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, named STARMAP, to prevent these risks more effectively by capitalizing on globally managed data libraries and best practices. The application is being rolled out worldwide, supporting the gradual harmonization of existing methodologies. At 31 December 2021, 59% of the Group's sites had carried out a workplace risk assessment in accordance with the general basic principles defined by Arkema (*versus* 53% in 2020), and 26% had entered the assessment data into the STARMAP tool based on Arkema's methodology (*versus* 24% in 2020). The increase is actually much more significant, since workplace risk assessments were in operation at all the facilities to be divested by Arkema in 2021, including the PMMA sites in particular.

Additional measures have been implemented to protect employee health during the Covid-19 crisis. For further details, see section 4.5.2.4 on crisis management of this chapter.

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 covering 2021 to 2023 on the prevention of arduous working conditions and the further development of the ergonomics program was signed in late 2020 with the labor representatives, following on from the previous one signed in 2016. Numerous initiatives have been undertaken to improve ergonomics in various work situations, including load handling, packaging, unloading, equipment control, facility maintenance, as well as laboratory and office work. Before implementing improvement initiatives, the Group organizes awareness sessions to improve understanding of ergonomics. On top of that, a network of ergonomics correspondents was set up to develop internal expertise, and workstation ergonomics has been integrated into industrial projects as of the design phase and into their respective HSE reviews.

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 run a program called Ergonomics & Human Performance, under which a set of audits is carried out and guidance provided over several months in implementing the related action plans.

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

(1) The 2019 LTIR, announced in the 2019 URD as 0.7, was updated to include an injury that had not initially been taken into account.

(2) 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.

(3) 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.

(4) The 2019 LTIR, announced in the 2019 URD as 0.7, was updated to include an injury that had not initially been taken into account.

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. In the United States, employees receive training through the stress management program It's Time to Stress Less.

The Group has 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 in France with 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; and
- protect health in the workplace.

In light of the Covid-19 health crisis, a series of measures was also taken at the global level to protect staff. These measures included remote working for a vast majority of employees, the distribution of masks and hand sanitizer, and vaccination programs, including in the workplace.

In France, a psychological support unit was set up for employees as well as for expatriates and their families worldwide. In the United States, employees benefited from the implementation and financing of video doctor visits.

4.5.2.2.3 Medical care

In 2021, 95% of employees benefited from regular medical check-ups.

The occupational health services participated in Covid-19 prevention initiatives again in 2021, which mostly involved vaccination programs, in compliance with local regulations.

4.5.2.2.4 Occupational illnesses

Toxic or hazardous substances have been and continue to be used in the manufacture of Arkema'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, Arkema 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;

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 addition, each HSEQ review relating to a new industrial project lists the products used, identifies those that may present a health risk and implements the measures necessary to prevent or limit employee exposure (finding an alternative, limiting quantities, setting up protection systems, etc.).

In 2021, 26 occupational illnesses were reported, of which 10 were related to exposure to asbestos and 9 to exposure to chemicals. These figures, which include diseases not listed to date in the tables of occupational illnesses, increased significantly compared with previous years.

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

Occupational illness frequency rate (OIFR)	2021	2020	2019
Number of occupational illnesses reported per million hours worked	0.7	1.0	1.0

In France, the Group 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. At the global level, the Group is working on digitizing its risk assessment data using the dedicated STARMAP tool described in section 4.5.2.2.2, 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 6.3 to the 2021 consolidated financial statements in section 5.3.3 of this document.

4.5.2.3 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 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. To prevent water and soil pollution, facilities are installed on sealed floor surfaces or containment areas designed to collect any accidental spills. They are monitored and maintained to ensure their reliability and integrity.

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 located in the Group's three geographical regions (Europe – Middle East – Africa, Americas, and Asia-Pacific). 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 2021, Group capital expenditure allocated to safety, the environment and maintaining the production facilities to standard amounted to €281 million, *versus* €270 million in 2020.

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 2021, 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, 32 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 update 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.

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 process safety indicator, the PSER (number of process safety events per million hours worked) based on ICCA and CEFIC criteria.

2030 TARGET

In light of the performance achieved in 2021, the Group has set a more ambitious PSE target of 2.0.

The process safety event rate based on the international criteria defined by the ICCA came to 3.1 at the end of 2021, after remaining unchanged at around 4.0 over the last few years. This decrease is the result of concrete and targeted actions implemented following an analysis of process events by type and research into root causes. For example, technical measures involve reinforcing production line inspections (mechanical integrity program) and continuing the rollout of a risk based inspection approach. Actions to improve processes and protect people were also implemented, such as stricter processes to check equipment safety before work is carried out and circuit positions before they are put back into service.

An initiative to strengthen the Process Safety culture, promoted by the Executive Committee, was launched at Group level in 2021, with the definition of 10 Process Safety Must Haves.

Major process safety events (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.

FOCUS

The 10 Process Safety Must Haves

Driven by the lack of progress noted in process safety performance, in 2020 Arkema's Executive Committee approved a training program specifically for facility Managing Directors and operating teams to review fundamental process safety principles, which were summarized in the form of 10 Process Safety Must Haves.

These Must Haves are defined as the main essential rules for preventing industrial accidents and protecting the Group's business. They cover aspects such as process risk analysis, security barrier management, change management or emergency preparedness.

In 2021, Industrial Vice-Presidents and all managers of Seveso or equivalent sites received training on these Process Safety Must Haves, led by the Group's Safety and Process Safety leaders. This program continues to be developed and adapted to each site's organizational structure.

Transportation-related events

Transportation-related events are events that occur during the transportation or handling of hazardous and non-hazardous goods at loading/offloading areas 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.

A new global indicator was introduced in 2020: the ratio between the number of events and the number of shipments for the scope in question. The aim is to identify and analyze the transportation modes, regions and businesses with the highest event rates, so that a corrective action plan can be implemented.

In 2021, the overall rate was 0.09%, down slightly from 0.1% in 2020.

Major events are communicated to the Executive Committee on a quarterly basis. Progress on the action plans for major events is checked after four months and until completion.

The analysis of these events was used to target points for improvement, such as impermeability checks on tanks, loading plans for outgoing vehicles and the use of forklifts for loading packages. The Group's global directive on warehouse facilities was revised in 2020. Warehouses are classified into three levels in accordance with the level of hazard and the quantities of Arkema products stored.

4.5.2.4 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, security, cybersecurity 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 and 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.

Health crisis

2021 was once again shaped by the Covid-19 health crisis but to varying degrees depending on geographic area. Against a backdrop of total and partial lockdowns in various regions, Arkema demonstrated its capacity to manage and limit the health impacts of the crisis while maintaining its industrial operations at the required level. A specific organizational structure was set up worldwide and adapted by region and country in order to manage the crisis in compliance with local regulations. Protective measures have been implemented and updated at each stage of the crisis, to help protect employee health and prevent the spread of the virus at Group sites.

4.5.2.5 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:

- **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:** C-TPAT certification in the United States and AEO certification in France, Brazil, Benelux, Germany and other countries, leading to additional measures being taken to enhance transportation security;
- **intellectual property:** heightened security measures at research centers, for example by introducing standards designed specifically to protect information on cybersecurity measures; and
- **travel:** increased employee protection during business travel.

4.5.2.6 Cybersecurity

In the area of cybersecurity, the Group has adopted a policy for protecting data and corporate and industrial information systems worldwide, as described in section 2.1.3 of this document.

To implement the policy, Arkema has appointed a Group Chief Cybersecurity Officer, who reports to the Group's Chief Information Officer. The CIO comes directly under the responsibility of the Chief Financial Officer, who is a member of the Executive Committee. Cybersecurity guidelines are approved by the Board of Directors, which also monitors their effectiveness. Operationally, they are implemented by a global committee made up of Executive Committee members and Vice-Presidents of Business Lines and corporate departments, which meets twice a year. In 2021, Arkema appointed three Information Systems Security Managers, who are responsible for adapting Arkema's cybersecurity policy to the local context in Asia, the Americas and Europe. A network of cybersecurity officers is also being rolled out at Group sites to ensure that cybersecurity issues are taken into account at the local level.

Arkema's cybersecurity strategy is based on the international framework defined by the National Institute of Standards and Technology (NIST) to identify threats and Arkema's assets, protect those assets, detect and respond to security incidents, and develop business continuity capabilities and incident recovery plans. Guidance issued by internationally recognized cybersecurity standards (*e.g.* ISO 27001, SWIFT, OWASP) is also incorporated into its strategy. Arkema ensures compliance with cybersecurity laws and regulations in all countries where the Group operates. The cybersecurity policy is formally set out in various documents, including the Users' Guide, which describes the rules to follow for anyone with access to the Group's IT resources. Failure to comply with these rules, which aim to protect Arkema's information and operations, may result in sanctions.

To roll out this safety policy to all employees, the Group-wide iSafe awareness program, launched in 2018, is based on the communication of best cybersecurity practices. Actions are led to raise awareness through various channels, such as webinars, messages on the corporate intranet or the enterprise social networking tool Yammer, on-site posters, awareness videos, and regular phishing tests.

The Group's Cybersecurity Operation Center works continuously to detect and respond to security incidents. Security audits by specialized external firms, along with reviews to detect vulnerabilities in IT systems and infrastructures, are performed periodically. Their findings are developed into improvement plans, which are monitored by the cybersecurity team.

To ensure business continuity in the event of a major incident that would permanently disable Arkema's information systems, a business continuity plan and procedures for degraded mode operations were defined and approved. The plan is currently being rolled out at Arkema's production sites, starting with the Group's most critical facilities. Regular training and testing in cyber crisis management is provided to support this plan. All sites will be covered by the end of 2022.

In the summer of 2021, Arkema became a shareholder in Cyber Campus, a project launched by the French President. By 2022, the Cyber Campus will be the benchmark of French cybersecurity, bringing together national and international cybersecurity leaders. This demonstrates Arkema's strong involvement in the cybersecurity community and its commitment to developing the maturity of cybersecurity models throughout its ecosystem.

FOCUS

Arkema assesses the cybersecurity maturity of its suppliers

Arkema uses the services of Cybervadis to assess how suppliers protect their IT systems. This initiative aims to ensure that Group suppliers allocate adequate resources to protecting their operations and their customers' information against cyber threats, and, in doing so, contribute to Arkema's Cyber Resilience.

4.5.3 Other environmental information

4.5.3.1 Environmental management

Reducing its environmental footprint is part of Arkema's commitment to being a responsible manufacturer. To achieve it, the Group is upgrading its manufacturing practices, especially through dedicated investments and operating expenses, to reduce emissions and to optimize the use of energy, water and raw materials. While rigorously monitoring their emissions to water and to air, the Group's industrial sites implement relevant actions to control the potential impacts on the Group's stakeholders.

The main environmental risks associated with the Group's activities relate to air, water and soil pollution, climate change and the use of resources (presented in sections 4.4 and 4.3 respectively 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 organized around the topics of climate change (see section 4.4), resource management (see section 4.3) and impact on biodiversity (presented in the following sections).

The materiality assessment conducted in 2019 and set out in section 4.1.6 of this chapter confirmed the importance that stakeholders attribute to environmental topics.

In addition to the goals of reducing its greenhouse gas emissions and energy consumption, presented in section 4.4 of this document, the Group has defined two environmental objectives for 2030 that aim to reduce emissions to air (volatile organic compounds) and to water (chemical oxygen demand). These two strategic indicators and their trends are covered in more detail below.

Beyond the evolution of these two 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.

Investments and operating expenses allocated to the environment

In addition to the overall consideration given to reducing its environmental footprint when making industrial investments, each year Arkema makes specific investments to prevent, reduce or control incidents or accidents that could impact the environment. In 2021, these specific investments totaled €32 million.

Environmental protection also requires operating expenses, which include the cost of external waste and water treatment, as well as personnel costs for HSE functions. In 2021, these operating expenses totaled €114 million.

Regulatory and compliance monitoring

The Group ensures that its HSE network properly understands the applicable EU regulations, such as 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. A regulatory monitoring and compliance audit system is in place in each region. A regulatory compliance review is carried out annually by the HSE network and compiled at Group level.

In 2021, the Group was served two notices for environmental violations with fines totaling over USD 10,000. One of these was in the United States and one in China.

Governance

The Industrial Ecology Steering Committee meets at least twice a year to direct and support the Group's progress towards meeting its environmental and climate goals. It is chaired by the Industry & CSR Executive Vice-President and comprises Executive Committee members in charge of the Group's businesses, the Sustainable Development, Safety and Environment Vice-Presidents, and Vice-Presidents of the actively involved functional units, such as processes and energy.

Also, each quarter, the Group Safety and Environment Vice-President provides the Executive Committee with overviews of the Group's environmental performance and the progress made in the key indicators towards the long-term targets.

The following documents are available to keep governance bodies informed about the results of environmental footprint reduction programs:

- each business' entire environmental footprint, including its energy footprint, reviewed annually in individual meetings with the business Managing Director and industrial Vice-President(s) and the Group Safety & 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; and
- the Group's annual environmental and energy reports presenting results for the reporting and prior years, along with historical environmental footprint data for the past six years, issued to all the departments concerned. These reports track the initiatives that helped to improve the Group's environmental performance. A total of 163 initiatives were undertaken in 2021. They covered the full range of environment-related topics, including water withdrawals, the reduction in water effluent releases, GHG and VOC emissions to air, soil contamination and waste production.

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.

4.5.3.2 Other emissions and protecting biodiversity

Arkema has long been committed to reducing the environmental footprint of its production processes. The Group is working to protect biodiversity and help preserve fauna and flora by reducing its industrial facilities' effluent releases into the air, water and 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.

Initiatives being led by the Group, especially those taken to comply with regulations applicable in the countries where the Group operates, 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;
- a reduction in the amount of volatile organic compounds (VOCs) released into the air, thereby limiting the formation of ground-level ozone, a superoxidant harmful to flora and fauna;
- a reduction in SO_2 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 NOx emissions; and
- continued soil remediation projects at sites with long-standing industrial operations, in order to protect the species that depend on the land, preserve the quality of local groundwater and control the impact of legacy pollution.

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, production units are also being constantly improved with process upgrades and the installation of effluent treatment facilities.

FOCUS

Arkema steps up its action to protect biodiversity and joins Act4nature international

Launched in 2018 by the French association of *Entreprises pour l'Environnement* (EpE), Act4nature is an alliance of businesses, public institutions, scientific bodies and environmental NGOs committed to protecting, enhancing and restoring biodiversity.

In 2021, Arkema signed Act4nature international's ten common commitments and defined eight individual commitments on the basis of its most significant impacts on biodiversity throughout its value chain. These commitments are detailed in eight objectives covering its industrial sites, upstream and downstream of its activity, but also its stakeholders.

4.5.3.2.1 Emissions to air

The Group's objective is to minimize its environmental emissions, particularly greenhouse gases (GHG), as described in section 4.4, 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, with the most common technique being the installation of a thermal oxidizer 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-NOx burner technologies.

Absolute indicators for emissions to air

The indicators in the table below present air emissions from the Group's operations in 2021, 2020 and 2019, calculated according to the methodology described in section 4.7 of this chapter.

Emissions to air	2021	2020	2019
Total acidifying substances *(t SO_2 eq.)*	2,880	2,690*	2,740*
• SOx *(t)*	2,020	1,730*	1,710*
• NOx *(t)*	970	1,110	1,200
Carbon monoxide (CO) *(t)*	806	906	950
Volatile organic compounds (VOCs) *(t)*	3,330	3,426	3,810
Dust *(t)*	188	217	203

* *Following a correction to the SO_2 release assessment method at Kerteh (Malaysia), the 2019 and 2020 values reported in the 2020 Universal Registration Document have been adjusted for consistency with the 2021 count.*

NOx emissions, primarily associated with combustion facilities, continued to decline in 2021. This decrease is driven by equipment modernization, as at the Taixing (China) site, which decommissioned an incinerator with significant emission levels.

SO_2 emissions, mainly associated with manufacturing processes involving sulfur products, increased by 290 t, chiefly as a result of higher production and adjustments to counting methods. An action plan to reduce these emissions is underway.

Volatile organic compounds were down despite the increase in activity. This decrease is mainly due to sustained efforts on process efficiency and reliability improvements, as at the Villers Saint-Paul and Carling sites in France and the Calvert City site in the United States, and, to a lesser extent, to removing the PMMA business from the reporting scope.

FOCUS

VOC reduction at the Mont site (France)

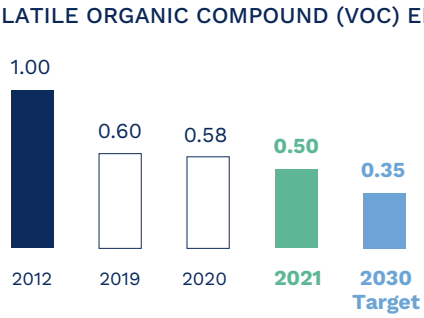
With connection of a vent to the site's thermal oxidizer, and more efficient operating stability, the Mont plant was able to reduce its VOC emissions in 2021 by 20% with respect to 2019.

Intensive indicator for emissions to air

The chart below presents the VOC emissions EFPI from the Group's operations in 2021, 2020 and 2019, calculated according to the methodology described in section 4.7 of this chapter. Emissions are calculated using the Group's biggest VOC emitters, which account for more than 80% of the consolidated total.

2030 TARGET

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



The substantial improvement in this indicator comes from progress on absolute emissions, in a general context of rising production. Action plans will continue to be rolled out to achieve the 2030 objective.

4.5.3.2.2 Emissions to water

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.

Initiated in 2016 to optimize the Group's water management, the Optim'O project also aims to reduce the amount of effluent discharged by the Group. It is helping to:

- optimize water use, the efficiency of the water treatment process, the initial design of installations and their daily operation, through the use of advanced technologies and the development of innovative solutions;
- ensure compliance with applicable legislation and regulatory developments, such as the Best Available Techniques reference document on Common Waste Water (CWW BREF) issued by the European Union; 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, updated annually since 2017 under the Optim'O project, 39 priority sites were identified as having the greatest impact on the Group's COD EFPI, and submitted for monitoring through a specific audit program. 12 sites were audited in 2021.

The Optim'O program benefits from a special budget that can be used to speed up the implementation of the action plan.

Absolute indicators for emissions to water

The environmental indicators in the table below present effluent released from the Group's operations in 2021, 2020 and 2019, calculated according to the methodology described in section 4.7 of this chapter.

Emissions to water	2021	2020	2019
Chemical oxygen demand (COD) *(t O_2)*	1,740	1,640	1,950
Suspended solids *(t)*	465	500	571

In 2021, COD discharges decreased significantly at the Beaumont and Clear-Lake (United States) sites, while performance at the Spinetta (Italy) and Chatham (United States) treatment units had a negative impact on overall performance. Corrective action has been taken at these units. Progress continued on reducing suspended solid releases at Pierre-Bénite (France).

FOCUS

Reduction in COD discharges

Through optimized unit operation and cooperation with the partner handling wastewater treatment, COD discharge at the Clear Lake plant (United States) fell by 47% from 2019 to 2021.

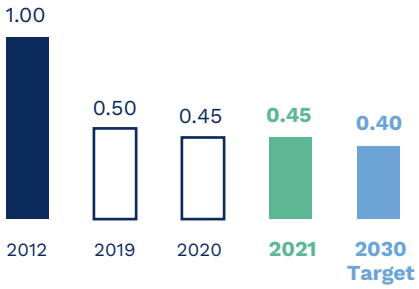
Intensive indicator for emissions to water

The following chart presents the COD effluent EFPI from the Group's operations in 2021, 2020 and 2019, calculated according to the methodology described in section 4.7 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



In 2021, the COD EFPI at 0.45 stabilizes the strong improvements of previous years at a level close to the 2030 target of 0.40. The Group is pushing ahead with actions toward reaching this target.

4.5.3.2.3 Other environmental measures

Other measures taken to reduce the impact on local residents

Another major focus of the Group's environmental policies is to ease the impacts 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 emissions;
- 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 impacts 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. The Cerdato site (France) has been running environmental protection initiatives since 2019, such as a partnership arrangement whereby the nature club at a local school makes bird and insect nesting boxes on Arkema's behalf. A local environmental association conducted an ornithological survey in 2019, then organized guided tours to observe the birds at the site.

4.5.3.2.4 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 2021 can be found in note 10.2.1 to the consolidated financial statements, in section 5.3.3 of this document.

4.6 Labor and stakeholder relations

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.

Governance

The CSR/Stakeholder Dialogue Steering Committee meets at least twice a year to guide and support the Group's progress, particularly in the areas of human resources, Human Rights and diversity, responsible procurement, philanthropy, stakeholder dialogue, sustainable finance and non-financial reporting. Its members include the Human Resources & Communication Executive Vice-President and corporate and operational Vice-Presidents, all of whom are actively involved in the CSR process. Every year, the Sustainable Development Vice-President presents the Executive Committee with an overview.

4.6.1 People

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

Like 2020, 2021 was impacted by the Covid-19 pandemic. The measures taken by the Group to protect employee health and safety while maintaining business continuity are described in section 4.5.2 of this chapter.

The context also greatly encouraged the use of new technologies across the Group, as described in section 4.6.1.2.

4.6.1.1 Talent management

Arkema considers each of its 20,209 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.

The objectives are based on two quantitative indicators that were updated in 2020 with more ambitious target values for 2030. They reflect the Group's commitment to equal opportunity and acknowledge the contribution of diversity to company performance.

2030 TARGETS

Percentage of women in senior management and executive positions: 30%.

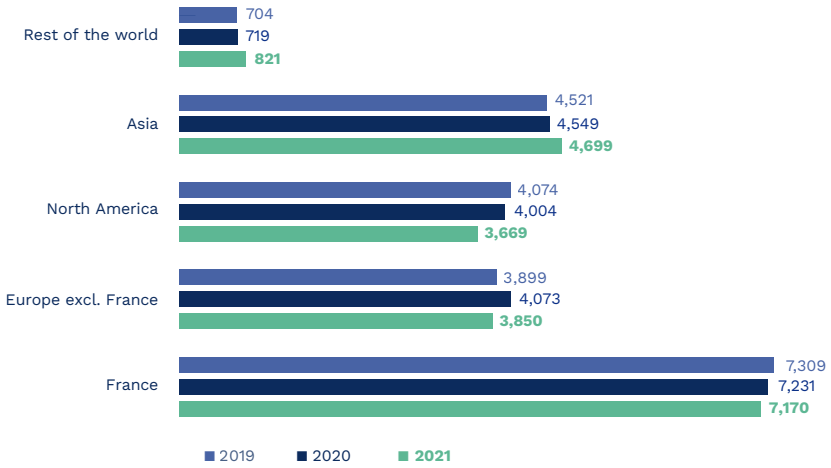
Percentage of non-French nationals in senior management and executive positions: 50%.

Talent management is based on the principles of workplace equality and non-discrimination. It is exercised in keeping with the Group's values of simplicity, performance, solidarity, empowerment and inclusion, while moving towards the UN's Sustainable Development Goals, as indicated in section 4.1.3 of this chapter.

To support the Group's development and its global strategy, the organization of the Human Resources (HR) function was adapted in 2020. It comprises both corporate and geographical HR departments. The heads of these departments 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 4.6.2 of this chapter.

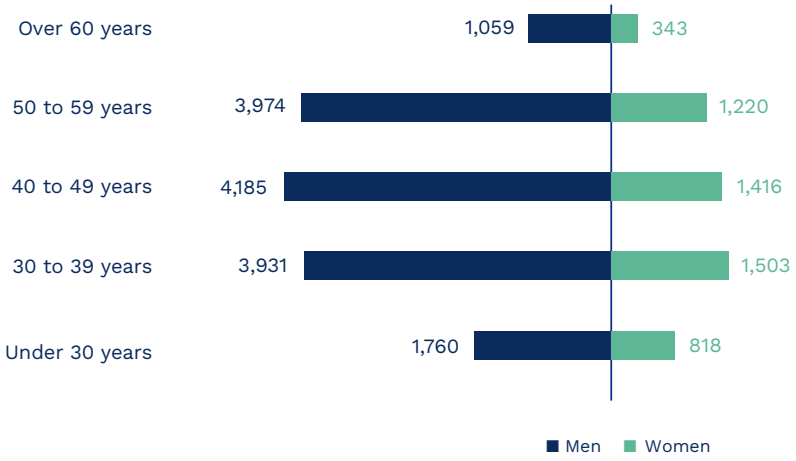
TOTAL HEADCOUNT BY REGION OVER THE PAST 3 YEARS



Total headcount stood at 20,209 at 31 December 2021, compared with 20,576 at 31 December 2020 and 20,507 at 31 December 2019.

The 1.8% decrease in headcount with respect to 2020 is mainly due to changes in the Group's scope of consolidation, in particular with the divestment of the PMMA business. In addition, personnel arrival and departure rates are up as a result of the dynamic labor market.

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 next ten years. The training and individual development programs implemented and described in section 4.6.1.3 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.

4.6.1.2 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 3.8% of the workforce at 31 December 2021. 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. In 2021, the proportion of employees who could benefit from this arrangement reached 9.5% of the total headcount in France.

At the Group level, in 2021, 20% of employees telework, either regularly or occasionally, regardless of the health context. This represents a high proportion given Arkema's business.

Faced with the Covid-19 health crisis, the Group's industrial sites continued to operate uninterrupted, while taking all the necessary measures to protect the health and safety of employees. Teleworking was encouraged wherever possible, primarily for services sector employees, and the policy on teleworking frequency evolved throughout the year in line with the recommendations issued by local health authorities. These organizational changes, made possible by the Group's robust and powerful information networks and by the flexibility and commitment of its employees, enabled the Group to continue operating.

The period also led to greater adoption and use of new tools enabling the organization of creative meetings and opportunities for virtual collaboration. Managers were made aware of the importance of maintaining ties and interacting regularly with their teams.

Lastly, a psychological support unit was set up for employees in France and for expatriates and their families worldwide.

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. Since 2017, 52 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.

The Human Resources Information System (HRIS) deployed since 2018 helps to standardize and share processes and data and facilitates access to organizational information.

FOCUS

Employees at the helm of their professional visibility within the Group

The MyCareer digital platform gives employees access in just a few clicks to all the services and information they need to actively participate in managing their career at Arkema, in particular by updating and personalizing their profiles, consulting their performance reviews, developing their networks and accessing vacancies throughout the Group.

In terms of training, new technologies have enabled the Group to offer a range of training modules and types (presentations, videos, games, etc.) that employees can choose from, according to their needs, learning methods and preferred pace. A preliminary self-assessment helps employees develop their training plan. The feedback collected via satisfaction questionnaires allows the relevant expert to adjust the module's content.

ArkemaNews, the Group's intranet, which is translated into eight 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.

Lastly, 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 2021, more than 450 groups were in place, bringing together more than 10,000 employees to discuss cross-cutting issues such as safety, tips on new digital tools, communication on major projects, and even sport.

Since 2018, the Work Together, Work Clever program, co-developed by the IT and Human Resources functions, has been helping employees get to grips with new digital practices and the resulting changes to ways of working. In 2021, nearly 5,000 employees in 15 countries took part in this program, and notably participated in the 350 webinars run by some 20 "user coaches" from regional IT functions. After an initial phase on using office automation and remote working systems, with widespread use of Teams, first for videoconferencing and then for collaborative work, the program has been further developed and now supports emerging practices in document sharing, collective intelligence and visual management.

FOCUS

Working clever by harnessing collective intelligence

To develop ways of working that harness collective intelligence, Arkema is deploying a number of digital solutions for visual management and collaboration during meetings or on projects. With the Klaxoon tool, for example, employees can interact simply and freely in real time, submitting as many ideas as they wish. This increases productivity and fosters creativity in remote meetings, enabling participants to share post-it notes and collaborative sketches, for example, during industrial project reviews or progress plan seminars.

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 manufacturing project managers are supported by a network of about 50 digital champions in the various businesses and 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 examples illustrate the measures Arkema has taken to enhance collaborative work methods and encourage its teams to embrace digital technology.

FOCUS

Connected smart glasses in industrial environments

Using a pair of specially developed augmented-reality glasses, users can view data remotely in real time on a high-resolution micro-screen. Clipped onto a safety helmet, this 100% hands-free device with voice command lets users navigate through menus, view documents, take photos or videos, fill in form fields, dictate reports, etc. Glasses of this kind, linked to Teams, can be used for sharing expertise in real time with local teams, for example.

4.6.1.3 Personal development and training

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

4.6.1.3.1 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 its values of simplicity, performance, solidarity, empowerment and inclusion, 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

	2021	2021	2020	2019
France	17%	345	322	366
Europe (excluding France)	14%	282	262	260
North America	33%	691	329	437
Asia	30%	629	326	431
Rest of the world	6%	123	71	99
GROUP TOTAL	**100%**	**2,070**	**1,310**	**1,593**

In 2021, Arkema hired 2,070 people under permanent contracts, compared with 1,310 in 2020 and 1,593 in 2019. The significant rise in recruitment despite the health crisis reflects the Group's vigor and proactive approach to achieving sustainable growth.

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. Gaining 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.

Arkema's teams participate in forums and organize visits to its industrial sites and research and development centers, particularly in France, China and the United States.

In 2021, as in 2020, these relationships were maintained, and some 30 forums were held, either remotely or gradually in person, in France, China and the United States.

FOCUS

Online Campus Talk, revisiting remote job dating

In spite of the health situation, Arkema has untiringly continued to engage with young graduates by diversifying its means of reaching them, with China standing as a good example. Very early on, the Human Resources project team used a flagship local video conferencing solution to run virtual recruitment forums such as Online Campus Talk. As well as making it easier to meet young graduates seeking an internship, a work-study program or a first job, the solution also breathes new life into recruitment practices, compensating for the lack of traditional forums considered a key confluence in student life. It effectively meets the need for interaction and continued recruitment in high-demand sectors, and sets the stage for the post-health crisis period.

Arkema made it into the HappyIndex® Trainees France ranking for the third year in a row in 2022. Based exclusively on feedback from interns and work-study trainees, the "Happy Trainees" label is awarded to organizations where students are motivated by their tasks and happy with their experience.

2. Attracting the best talent through employer branding

In 2021, Arkema ranked 102nd out of 750 on Forbes' list of the World's Best Employers.

Survey participants rated their employers on image, economic footprint, talent development, gender equality and social responsibility.

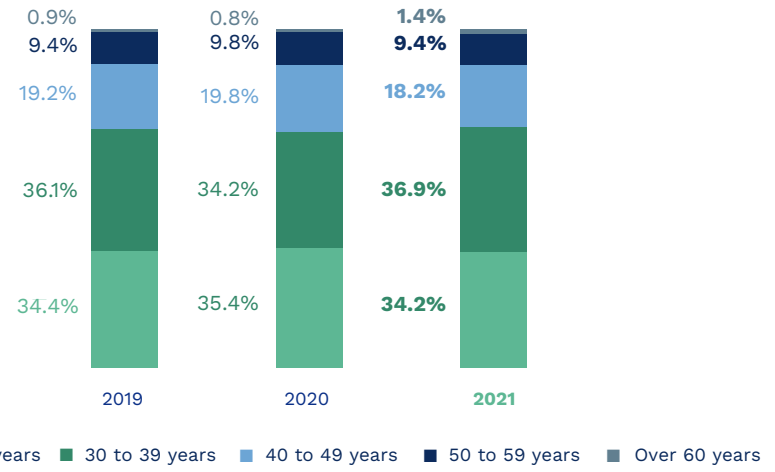
To support its growth, Arkema takes a proactive approach, in line with its diversity policy, to attract talent from a variety of backgrounds, and promote gender diversity. The Group uses various channels, including social media, to communicate externally about the Group, its products and its wide range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

Rolled out at the 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's international rating had risen from 3.8 to 4 out of 5 at the end of 2021.

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 2021

	Male	Female
Under 30 years	487	220
30 to 39 years	579	184
40 to 49 years	288	88
50 to 59 years	144	50
Over 60 years	25	5
GROUP TOTAL	**1,523**	**547**

3. Welcoming and integrating new employees

Arkema guides its new employees, which accounted for around 10.2% of the Group's headcount in 2021, through the integration process so that they can rapidly become operational.

The onboarding tool developed at Group level in 2020 has been rolled out in several languages. The two-hour, interactive webinar is held every quarter for the benefit of new arrivals. It includes an interactive presentation of the Group with a quiz, a virtual tour of Arkema's showroom (Workshop 4.20) and a discussion with a member of the Executive Committee.

Managers are highly involved in integrating new members of their team. Resources presenting the Group and its organization are made available to them and complete the integration process organized by the new employee's unit.

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 4.6.1.3.2 and 4.6.1.3.3 of this chapter on training and talent development round out the recruitment policy.

The breakdown of Group employees by age group in section 4.6.1.1 of this chapter shows that a significant number of Arkema employees will retire over the next few years.

CHANGE IN THE NUMBER OF DEPARTURES BY REASON

	2021	2020	2019
Resignations	1,089	693	945
Retirement	357	310	285
Dismissals	439	331	342
Other reasons (including divestment)	1,022	286	169

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. This is outlined in section 4.6.1.7 of this chapter.

In 2021, there were 165 dismissals on economic grounds arising from workshop closures and organizational adjustments.

Dismissals for personal reasons represented approximately 1% of the total workforce.

CHANGE IN EMPLOYEE TURNOVER

(as a %)	2021	2020	2019
Turnover	5.6%	3.5%	4.8%

Employee turnover, *i.e.* the percentage of resignations among employees on permanent contracts, stood at 5.6% in 2021, a figure that is higher than in the two previous years. This increase mainly concerns North America, in the context of a highly dynamic job market stimulated by economic recovery.

Moreover, note that resignations concern the managerial and non-managerial categories in proportions close to their respective weighting in the workforce as a whole.

4.6.1.3.2 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. Group-wide training hours in 2021 totaled 446,509, including close to 100,000 hours on an exceptional program addressing around a hundred operators at the Changshu site (China) under a government program. Excluding exceptional items, training hours group-wide showed little change with respect to 2020.

In 2021, safety, health, environment and quality (SHEQ) training and business training accounted for 48% and 39% of the training hours provided in the Group, respectively (excluding exceptional training). The hours of training on essential job skills accounted for 62% of all training, while the other hours of training focused on career development for employees.

CHANGE IN TRAINING HOURS (EXCLUDING E-LEARNING)

	2021	2020	2019
Percentage of employees having attended at least one training course during the year	80%	80.6%	86.1%
Average number of training hours per employee per year	24	18	25
Average number of training hours per manager	24	16	24
Average number of training hours per non-manager	24	20	25

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.

At corporate level and in France, the quality of training modules is assessed by means of questionnaires completed by participants at the end of each session.

In addition to these qualitative evaluations, some training courses include a test to gage the skills acquired.

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 specific practice develops skills and can facilitate employee access to promotions and internal mobility, allowing the Group to enhance its performance while retaining employees. This approach also meets the standards required by the Arkema integrated management system.

Some training programs may:

- be conducive to career advancement (changes in profession, grade or coefficient); and
- develop employee skills in line with transformation underway in a given profession (as with the Supply Chain Academy).

At corporate level, global programs are deployed under the Arkema University label. These include:

Business Academies

These academies offer employees personal and strategic development programs aligned with transformation in their professions, consistent with Group strategy, and create knowledge-sharing communities of experts. Sessions are co-developed and coordinated by internal and external instructors allowing for experience and best practices to be shared.

The following Business Academies are currently operational:

- Supply Chain Academy

  This academy was opened in 2018. After an initial phase addressing country supply chain managers and Business Line supply chain directors holding global or regional responsibility, it has been rolled out to reach supply chain managers at European facilities since 2021.

- Procurement Academy

  This academy, inaugurated in 2020, addresses all Group buyers in supply chain and purchasing departments (goods & services, raw materials, energy). Its aims are to support transformation in this profession, facilitate exchanges, build bridges between these departments, and develop a global community of buyers.

- IT Academy

  This academy was opened in 2021 to help professionals from this field keep up with technological and digital developments. It is also open to digital marketing teams and employees involved in digital projects.

The establishment of new academies addressing transformations in other professions is currently under consideration.

Management and Leadership Academies

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. This training is provided by HEC for Europe and Asia, and by Cornell University for America;
- 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; and
- the Top Executive Academy, created for around 100 executives, is based on 11 masterclass modules covering core subjects relevant to the Group's policies or programs (internal control, digital technology, finance, legal affairs, CSR, talent management) and the development of soft skills in creativity, international relations, negotiation, leadership (decision-making, confidence) and the executive mindset. Since 2021, this program has been rolled out in the form of virtual classes.

These programs contribute to promoting executives to positions with greater responsibility: in 2021, 87% of vacancies for senior management and executive positions were filled *via* internal promotions.

The Group's training offer is rounded out by local programs addressing specific needs.

FOCUS

iTeam Academy: skills development in service of digital transformation

Digital transformation has a profound impact on our ways of working. The Group's IT department teams are in the front line of this revolution, which is why developing the relevant talents is so important.

This is the purpose of iTeam Academy, which runs six introductory modules to share the fundamentals of six aspects of the digital transformation: agile concepts and methods, user experience, cybersecurity, data, architecture and new cloud technologies. The courses take the form of e-learning provided to the 350 employees of the IT department worldwide, along with others involved in Arkema's digital transformation.

Internally developed training programs

The Group encourages employees who are experts in their field to become an in-house authority and instructor. These initiatives promote the transfer of skills and highlight the value of instructors' expertise. Group business academies have been developed with this in mind, as have local programs in the United States, France and China.

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.

FOCUS

An educational web series on Arkema's materials

Arkema's Inside Materials web series, hosted by the Group's scientific mediator, provides original and educational insights into Arkema's specialty products, designed for a more sustainable approach to improving everyday life. This discovery-oriented program is also used for employee onboarding purposes.

It is a great way to encourage employees around the world to take on an ambassador role among their peers, the general public and potential customers.

FOCUS

Immersive reality training on pedestrian risk awareness

How can the impact of pedestrian risk awareness messages be increased? By using a high-fidelity immersive experience device.

The concept behind the device is to enhance skills acquisition by creating a real-life experience where best practices are adopted, because it is the human factor that determines the most effective opportunities for improvement. At three production sites in France, close to 300 people trialed virtual reality headsets for an immersive experience in four scenarios depicting risk situations, filmed on-site in first-person and in 3D.

Evaluations confirmed the effectiveness of this immersive tutorial. Six months after its introduction, 80% of the users reported remembering all the topics mentioned in the awareness module.

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 facility maintenance. The training offer currently consists of about 15 modules in French and English and sometimes in Chinese, German or Italian, depending on the topic. 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 enrollment easier.

E-learning is used to provide employees with a basic set of behaviors, benchmarks and practices to adopt worldwide in fundamental areas such as business conduct and safety.

CHANGE IN NUMBER OF EMPLOYEES WHO TOOK AN E-LEARNING COURSE

	2021	2020	2019
Number of employees who took an e-learning course	15,422	10,247	9,517
Percentage of employees having taken at least one e-learning course during the year	76%	55%	51%

The health context encouraged the use of e-learning. The sharp increase in the number of employees reached by e-learning training can be attributed primarily to roll-out of programs on safety and Code of Conduct and business ethics.

4.6.1.3.3 Talent development

Talent development is a key strategic mission for broadening the experience that employees acquire along their career paths, thereby cultivating new skills, this being an essential factor in the Group's development.

In this respect, talent development focuses on both:

- ensuring that the Group has the expertise it needs to meet its strategic challenges and secure development, both today and over the medium-term future; and
- helping employees build their careers, thereby enabling them to increase their skills and realize their career goals depending on the possibilities and opportunities available within the Group.

The talent development 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.

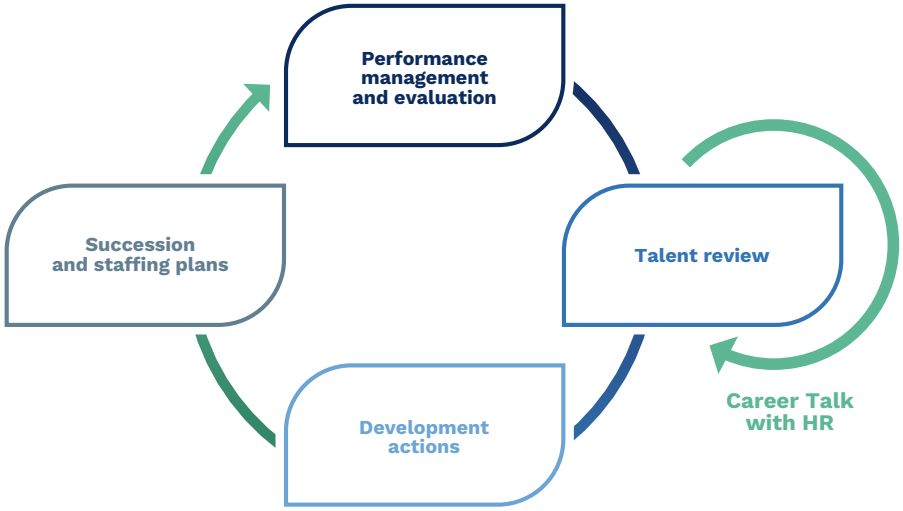
There are two key employee positioning prerequisites for talent management at Arkema:

- a cluster of professions within which jobs are identified by the main type of duties; and
- job evaluation (based on the Hay methodology), for structuring the Group's organization using a common frame of reference, and to support career development and a coherent salary policy. This approach also contributes to the harmonization of positions worldwide.

In 2021, the Group carried through a worldwide overhaul of employee management systems and processes to improve identification and promotion of internal talent throughout the company.

Talent Management Cycle

The Group's new Talent Management Cycle has four major stages:



Annual performance reviews

All Group employees are entitled to an annual performance review, to discuss the past year's performance with their managers and set objectives for the coming year. Employees are provided with feedback following a self-assessment. This system provides input for preparing personalized action and improvement plans involving specific guidance or training.

The Human Resources Information System (HRIS) tool rolled out worldwide at Arkema in 2018 is used to perform these reviews using an electronic format, meaning that information can more easily be shared between employees, management and human resources.

Employees working in matrix organizations receive a review from both their direct and functional supervisors. The HRIS application is used to structure this practice.

Career talk

Career talk meetings with talent managers provide employees with an opportunity to review their career paths, expectations and how they could advance their career in other Group professions. In France, the Motiva tool is used to help employees identify deeper motivations and clarify career plans.

Talent reviews

Annual talent reviews cover all professions and levels. A talent review begins at site level, then is consolidated and analyzed by profession, country, region, Business Line and corporate department, ultimately resulting in a summary shared with the Executive Committee.

This collaborative approach brings together a committee of HR managers and representatives. It involves observing performance to identify potential, map out career projections for each individual and determine action plans accordingly.

Succession and staffing plans

Succession and staffing plans, across all professions and company levels, ensure continuity in key positions and help to retain expertise throughout the Group.

The various career projections from Talent Reviews provide input for the succession plans in the form of candidate pools by profession, in line with short- and medium-term development outlooks.

Career committees

Drawing upon data from the various meetings forming the Talent Management Cycle, profession-specific career committees are formed to organize internal mobility consistent with the Company's changing needs in the short- and medium-term future.

The committees include HR managers and representatives, and they cover all employees in the scope concerned.

FOCUS

A globally aligned Technical Community to improve talent engagement and recognition

The three technical centers, in France, the United States and China, manage investment projects for Arkema's plants worldwide. The assignment of engineering project managers is now planned globally. Resources are managed as closely as possible to meet needs, using project characterization and a common skills framework. The aim here is to ensure the best match between the managerial capacities of each person and the demands of each project. As well as facilitating international mobility for project managers, this organization also enables them to progress individually, harnessing their respective areas of expertise within the Group.

International experience

International talent is developed through:

- the global dimension of many projects and responsibilities, offering employees day-to-day experience in a multicultural environment; and
- expatriation, which aims to enrich employees' skills and experience with a perspective of individual development. It enables the Group to strengthen local skills in the context of strategic projects, while ensuring the capitalization of know-how.

The number of Group employees working as expatriates, for an average of three to five years each, is around 80, reflecting the Group's priority focus on promoting or hiring locally whenever possible, including for executive or high responsibility positions, as outlined in section 4.6.1.6 of this chapter.

4.6.1.4 Employee engagement and well-being

Arkema maintains its proactive approach to employee engagement and workplace well-being, key factors contributing to the Group's performance. 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 sustaining open dialogue with employees to continuously improve the quality and safety of the work environment and the work/life balance, along with workplace atmosphere and organization.

In 2020, Arkema initiated a worldwide process to develop a global policy on quality of life at work (QLW) based on four key areas:

- Health and work: mental health, health and fitness, work/life balance;
- Working conditions and environment: teleworking, working environment, ergonomics and working conditions;
- Living in the digital age: acculturation, things to look out for, breaks and digital project deployment; and
- Working relations: management in line with the Group's values, attentiveness to employees.

The project involves HR teams across all countries, and Sustainable Development representatives. A global QLW committee has been set up, and the initiatives planned and introduced will be assessed by means of employee engagement surveys.

FOCUS

Setting the standard for a great place to work

The *Bien-être en ligne* (Well-being online) scheme earned Arkema a Better Living in the Workplace award in France in 2021. During the first lockdown in 2020, a daily online program, involving employees from France and abroad, was set up, with meetings, serious games and workshops hosted by philosophers, osteopaths, soft skills experts, sports coaches to name a few.

Employee engagement and satisfaction

Arkema periodically carries out internal surveys in particular to assess employee satisfaction and engagement and to identify appropriate action plans.

In 2021, Arkema launched Arkema Cares 2021, its first worldwide internal engagement survey, with more than 85% of employees in 49 countries responding. The survey covered 11 topics: working conditions, global vision, occupational safety, working relations, advancement prospects within the Group, well-being at work, governance and decision-making, management, work organization, values and ethics, and work/life balance.

The response rate was 52.6%, representing a very satisfactory level of coverage.

Findings showed an 82% employee engagement level and an NPS [(1)] of 24. The very high score achieved by Arkema reflects employees' attachment to the Company.

The results were analyzed for each of the Group's entities, shared with employees, and reported by geographic area.

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 4.6.1.2 of this chapter, 20% of the Group's employees teleworked in 2021, which is a high proportion in view of its industrial activity. As in 2020, many Arkema employees teleworked in 2021 because of the health situation.

Another advantage, offered to young parents to safeguard their work/life balance, is paternity leave granted at 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 mobile technology, such as:

- information on good teleworking practices, including remote management, ergonomics, and a reminder of the right to disconnect;
- awareness-raising initiatives for all employees, under the Work Clever banner, with webinars, expert insights, practical advice; and
- awareness training for managers.

(1) The NPS (Net Promoter Score) is an index measuring satisfaction with a brand, product or service.

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Emotional well-being evaluation, and support on better understanding and improving health

The Wellness Matters program developed by Arkema's Human Resources team in the United States gives employees and their family members the option of receiving support to have a clearer idea of their health so that they can better manage life's challenges. As well as providing support on reducing psychological or financial stress, it tackles the specific aspect of emotional well-being, during a health crisis that is stressful for all. Employees can request a confidential screening to assess their emotional well-being. Support is available on the ResourcesForLiving website, where employees can request online consultations. Mental health apps such as MyStrength and TalkSpace are also available on smartphones. The program also offers deductions on health insurance contributions.

Actions taken to prevent psychosocial risks and to improve working conditions

Going beyond the legal requirements, the Group has implemented stress prevention policies in its key countries, including France, China and the United States.

These policies provide for the assessment of stress levels among employees or for particular positions, as well as training and awareness initiatives to reduce workplace stress.

Lastly, an ergonomics program was initiated in France in 2015 to improve different aspects of working conditions in both manufacturing and services.

In recent years, major changes have been made to the work environments of employees at the head office of Arkema China Investment in Shanghai and those at the Bostik head office in Colombes, near Paris. These projects were carried out with input from the employees concerned, to ensure a comfortable work environment adapted to their needs. Pleasant workspaces significantly contribute to employee well-being.

The Social Club launched 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.

Absenteeism

Absenteeism, which includes sickness, accident and maternity leave, as well as strikes and unpaid leave, stood at 4.5% for 2021, down compared with 2020 (5.1%). This is still higher than the 2019 figure of 4.2%.

Absenteeism for medical reasons was also down, from 3.3% in 2020 to 2.8% in 2021, marking a return to the pre-pandemic level of 2.8% in 2019.

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. In 2021, 95% of Group employees accordingly had supplementary life cover, 94% supplementary disability cover, and 78% health insurance cover.

4.6.1.5 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.

41% 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. The main factor behind the increased percentage is that variable portions reach a wide population. 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 themselves on their geographic market against other industrial groups or within the chemical industry, and to 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 2021 and previous years are presented in note 6.2 to the consolidated financial statements, in section 5.3.3 of this document.

Equal pay between men and women

With an average proportion of women on its payroll of 26.2% at 31 December 2021, 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 2021, the figure was 83 for both companies.

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.

At 31 December 2021, 6% 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 this 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 2021, performance shares were granted to some 1,500 beneficiaries, representing 7.4% of the total headcount. 32% of these beneficiaries are women.

For more information, please refer to section 3.5, section 6.2.6 and note 6.4 to the consolidated financial statements at 31 December 2021 in section 5.3.3 of this document.

4.6.1.6 Diversity, inclusion, 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 brought in by the Group 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. (i) gives training to people involved in the recruitment and hiring process, (ii) provides them with job descriptions and applicant profiles, and (iii) 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; and
- an annual review of compensation to ensure equal pay.

The strategic objectives set by the Group for 2030, 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.

In 2021, the Diversity Steering Committee was replaced by a Group Diversity and Inclusion Committee, whose composition was reviewed to include more international profiles. This committee includes Business Line Vice-Presidents, corporate Vice-Presidents and the Sustainable Development Vice-President along with HR and Communication representatives, and regional and Group diversity-inclusion representatives. The topics covered by this committee have been extended to include gender equality, promotion of cultural diversity, equal opportunity and inclusion.

Running alongside this committee is a junior diversity and inclusion committee, comprising 11 international multidisciplinary representatives in the early stages of their careers or on lower managerial levels. This junior committee addresses the same issues as its counterpart. By putting the contributions from these two complementary committees to use, the Group seeks to have a fuller grasp on the matters at hand.

The work of the two committees in 2021 resulted in the development of the Arkema Diversity and Inclusion Charter and a number of action plan proposals.

Measures to promote female employees' access to positions of responsibility

Although historically not an issue that has been given much importance in industry as a whole, the proportion of women in the Group's total headcount has steadily increased to 26.2% at 31 December 2021. Women accounted for 26.4% of new hires across all levels in the organization.

2030 TARGET

To strengthen its commitment in terms of diversity, the Group set an ambitious target in 2020: 30% of senior management and executive positions to be held by women.

The Group has also set an intermediate target of positions in this category being 26% held by women by 2024.

In 2021, women accounted for 24% of all senior managers and executives across the Group, a one-point increase on 2020. The change is primarily the result of the support program introduced in 2016 to promote equal opportunity and gender diversity.

High-responsibility positions (senior managers and executives) account for around 10% of all managerial positions across the Group. Senior managers account for about 2% of all management positions.

The Group confirms that Arkema France (the only company concerned) is working to comply with French legislation on targets of 30% by 2026 and 40% by 2029 for women in senior management positions, as defined in the company's collective agreement.

More generally, the Group encourages women to move up to senior positions. At 31 December 2021, the Group management committee had twenty-five members, including the ten Executive Committee members, along with Vice-Presidents of Business Lines, support functions, regions and countries. The Group management committee includes six women, 24% of the total.

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 2030, 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.

Within the scope comprised of France, the United States and China, women hold 39% of lower management positions and about 35% of middle management positions.

The action plan to reach the targets involves:

- annual monitoring of the proportion of women in senior management and executive positions is now included in the collective objectives used for calculating variable compensation;
- a mentoring program run by senior executives to help women move into positions of responsibility. Since its creation in 2016, the program has benefited 75 women in France and is now being expanded internationally. Nearly 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.

Initiatives to foster international diversity

Developing the percentage of employees of non-French nationality in management positions is a key component of the Group's geographic growth strategy.

2030 TARGET

To strengthen its commitment in terms of diversity, the Group set an ambitious target in 2020: 50% of senior management and executive positions to be held by non-French nationals.

In 2021, 40% of senior managers were non-French nationals, compared to 41% in 2020. This decrease is mainly due to a change in the scope of consolidation, with the divestment of the PMMA business.

In every country where Arkema operates, local skills and capabilities are developed in every aspect of the business, including top management. This was the case in 2021 with the appointment of the heads of the China, Japan and Korea entities, and the Chief Financial Officers of the Korea and Brazil entities.

The action plan involves:

- expatriation programs (for further details, see section 4.6.1.3.3 of this section);
- the international mentoring program designed to help participants advance in their careers was run for a second time in 2021, supporting 19 "mentee" participants in nine countries (Brazil, Argentina, China, Germany, India, Japan, Singapore, the United Kingdom, the United States). The program gives talented young employees the opportunity to benefit from the support of a mentor and to increase their visibility within the Group; and
- training for managers on "working in an intercultural environment" and "managing in diversity" (since its creation in 2019, 300 managers in France, Italy and Germany have taken part in this program).

In addition, some 3,000 employees in North America completed an e-learning program on diversity, equality and inclusion that provides the key definitions of these concepts and raises awareness on the topics of identity, bias, and micro-aggressions, along with suggestions on courses of action. It is included in the on-boarding schedule for new employees.

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A network promoting diversity and inclusion

Ensuring a fair and inclusive environment for all employees is a key focus of Arkema's policy.

A diversity and inclusion network has been set up in the United States to promote diversity, provide different insights on the subject, and form bonds between participants. Participant employee profiles, information articles and content on diversity, equality and inclusion topics are shared online.

This approach is unique in that it is the product of Arkema's US Leadership Development program, in which participants together discuss the issues faced by the Company and work to implement solutions.

Initiatives to promote the employment of people with disabilities

The Group contributes to the integration and continued employability of people with disabilities through dedicated training programs and workstation modifications. 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.

A new, three-year agreement was signed by Arkema France in 2020 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.

At the end of 2021, disabled employees accounted for 4.8% of the Group's workforce in France.

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.

Initiatives 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 2021, 22 of the 345 people hired under permanent contracts in France were over 50 years old, representing 6.4% of the total.

4.6.1.7 Active social dialogue with employee representatives

The Group respects the fundamental freedoms of its employees, such as the freedom of association and expression, as defined in its Business Conduct and Ethics Code.

On 1 July 2020, a Group Labor Relations Vice-President was appointed to coordinate all labor relations policies worldwide.

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. These principles are stated in Arkema's Human Rights Policy, outlined in section 4.6.3 of this chapter.

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.

In France, awareness-raising initiatives on trade union presence and rights are run every two years jointly by management and representative trade unions, designed for all employees. Depending on their positions, managers' training programs include sessions on labor relations and union rights. Lastly, in France, the Group provides trade unions with dedicated intranet sites where they can inform employees about their activities.

Arkema pledges to enforce a non-discrimination policy with regard to employee representatives, and to respect and protect their rights. In France, Arkema's collective agreements include provisions guaranteeing that the careers of employee representatives be monitored, to ensure equal treatment with respect to non-mandated employees. Elsewhere, a training program is offered to newly elected employee representatives.

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 25-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;
- 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 2021, five plenary meetings were held *via* videoconference, including an information and consultation procedure on the proposed divestment of the Group's PMMA business. Insights into the Group's future development were shared, with a statement from the Chairman and Chief Executive Officer, and the practice of teleworking within the Group in Europe and prospects in the fluorinated products sector were also discussed.

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 2021, as shown in the following table.

PERCENTAGE OF EMPLOYEES REPRESENTED BY ELECTED BODIES AND/OR UNIONS, BY REGION

	2021*
GROUP TOTAL	**90%**
France	100%
Europe (excluding France)	95%
North America	71%
Asia	84%
Rest of the world	100%

* *Data corresponding to sites employing more than 60 people, which accounts for 93% of the Group's total workforce.*

Employee relations with regard to the Group's development

The Group pays a great deal of attention to the social impact of the changes it experiences. Prior to any reorganization within the Group, the Executive Committee carefully examines the social consequences of projects and factors them into its decision-making process.

Reorganization projects also give rise to in-depth discussions with employee representative bodies as part of information and consultation procedures, both at corporate level and locally. The reorganization of MLPC in France, with the resulting job cuts, prompted negotiations with sector-specific trade unions in 2021 with a view to avoiding any redundancies. The resulting voluntary departure measures included early retirement schemes, internal redeployment and support for external mobility.

With external growth and divestment transactions, specific commitments may also be made to take account of their social implications. As part of the divestment of the Group's PMMA business, the purchaser undertook, at Arkema's request, to maintain the jobs of the employees transferred and ensure their status and compensation at Arkema were carried over on an equivalent basis. With the acquisition of Ashland's Performance Adhesives business, the Group also undertook to ensure that the employees' status and remuneration at Ashland were carried over, if not surpassed, thereby ensuring optimal transfer conditions.

A Group Human Resources Vice-President for acquisitions/divestments and labor law was appointed on 1 July 2020 to oversee the social aspects of divestments and acquisitions worldwide. He reports to the Group Human Resources and Communication Executive Vice-President, a member of Arkema's Executive Committee.

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.

Digital systems were used to ensure continued labor relations dialogue and the work of the bodies during the health crisis. Therefore, in 2021, 68 agreements were signed worldwide, including 13 in France. These agreements cover issues such as health and safety at work, quality of life at work, social protection, pensions, working hours and conditions, gender equality, disability, compensation, forward-looking management of jobs and skills, and training.

4.6.2 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.

4.6.2.1 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.

The Code of Conduct 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. These documents and their translations are available on the Group's website:

www.arkema.com/global/en/arkema-group/ethics-and-compliance/.

Since 2021, Group employees have committed, as part of their annual performance review, to respect Arkema's business compliance and ethics program, which includes the Code of Conduct and the Anti-Corruption Policy (see section 4.6.2.2 of this chapter). The compliance statement was signed either *via* the annual performance review electronic form or by email.

4.6.2.2 Measures for reducing the risks of anticompetitive practices, corruption and fraud

The Group's business compliance and ethics program primarily covers antitrust, export control and anti-corruption laws, defines and describes related guidelines, procedures and risk management processes.

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; and
- e-learning modules on the Code of Conduct, anti-corruption and antitrust legislation, with the latter primarily aimed at employees who are most exposed to these risks. As of 31 December 2021, 13,238 employees had completed the e-learning course on corruption.

4.6.2.3 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 2021.

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, mentioned in section 2.1.2 of this document, is updated regularly.

Disciplinary actions are provided for in the Code of Conduct and the Anti-Corruption Policy in the event of a breach of policy therein. The details are described in the internal rules of each entity. Of the alerts submitted in 2021, allegations were founded in seven cases and resulted in disciplinary action. Regarding business integrity, one employee was dismissed for conflict of interest and three for attempted fraud, and a contract with one intermediary was terminated for attempted fraud. And in the area of respect for employees, two employees were dismissed for harassment.

4.6.2.4 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 was set up in 2021 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.

4.6.2.5 Whistleblowing system

The Group's whistleblowing procedure has been translated into 12 languages and is available on the Group's website: https://www.arkema.com/global/en/arkema-group/ethics-and-compliance/whistleblowing-procedure/. The procedure was submitted to the Central Works Council of Arkema France in June 2018, and 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 Code of Conduct, 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.

Eight alerts were received through this system in 2021, and most of these concerned suspected conflicts of interest. Only one of the suspicions was found to be warranted, resulting in dismissal of the person concerned.

4.6.2.6 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. As of 31 December 2021, none of the Group's subsidiaries was located in tax havens included on the European Union "black list" dated 1 January 2022.

Arkema applies transfer pricing policies endorsed by the OECD to its inter-company flows, and believes its policies to be reasonable for the risks and functions of the entities that constitute the Group, and compliant with the arm's length principle. 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. Tax risk reporting is integrated into the risk management process and is presented annually to the Group Audit Committee.

4.6.3 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 and identify Human Rights violations against its employees, partners and other stakeholders, and to remedy any violations that do occur.

The Group opposes all forms of forced labor, child labor, human trafficking, discrimination and harassment, and asserts its commitment to upholding the fundamental rights of a decent minimum wage, health and safety for its own employees and those of outside companies working at its sites, equal opportunity, equal pay, respect for private life, freedom of association, the right to strike and the right to collective bargaining.

The Group's vigilance in the area of Human Rights extends throughout its own operations, across its value chain, with particular regard to suppliers and subcontractors, and throughout audit engagements carried out for the evaluation of potential acquisitions.

Arkema's commitments are formalized through its Human Rights Policy, which highlights four areas that are monitored particularly closely:

- health, safety and security: programs, initiatives and results are presented in section 4.5.2 of this chapter;
- health and safety of customers and end users: programs and initiatives on responsible product stewardship are presented in section 4.2.4 of this chapter;
- suppliers and subcontractors: programs, initiatives and results are presented in section 4.6.4 of this chapter; and
- promotion of diversity and equal opportunity: programs and achievements are described in section 4.6.1.6 of this chapter.

Arkema's Executive Committee is responsible for drawing up the Group's Human Rights Policy and disseminating it across all entities, while the regional entities are tasked with implementation, in compliance with applicable laws and regulations. The CSR/Stakeholder Dialogue 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 Vice-Presidents 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 risk identification process is based on a review of internal feedback, general risks presented in the International Labour Organization's (ILO) Declaration on Fundamental Principles and Rights at Work and the International Bill of Human Rights, risks specific to the chemicals industry, such as risks concerning the health and safety of employees, local communities, customers and end users, the management of major industrial incidents, the transportation of hazardous goods and the commitment of suppliers and subcontractors, which covers the sourcing of conflict minerals. Identified risks are assessed 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.

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 commitment is reflected in its compliance with international standards and the applicable laws in the countries in which the Group operates, identification and regular assessment of the risks that may be generated by the Group's activities, the implementation of corrective action when necessary, a policy of continuous improvement of the Company's practices through ongoing 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.

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.

Human Rights compliance is an integral part of the commitments expected of suppliers and subcontractors, 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 4.6.4 of this chapter.

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.

In 2021, the Group used the available internal audit data to identify and analyze any potential Human Rights violations related to its activities. The results confirmed the absence of any serious violations and did not show any regional differences. Even so, to prevent such violations, improvement measures, chiefly concerning safety and personal data protection, were taken at recently acquired businesses to ensure alignment with Arkema best practices.

Actions relating to the whistleblowing system are described in further detail in section 4.6.2.5.

4.6.4 Responsible procurement

Arkema is primarily involved in the transformation of raw materials and works with a large number of subcontractors and service providers. Poor performances by these subcontractors and service providers 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.

Purchasing functions are managed globally at Group level. A Responsible Purchasing Steering Committee meets at least three times a year, bringing together representatives from the Procurement departments (Goods and Services/Logistics/Raw Materials and Energy) and the Sustainable Development department. The key items discussed during its meetings are reported to the CSR/Stakeholder Dialogue 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, Arkema deployed the resources described in the following sections.

Subcontracting

The Group subcontracts for two main purposes: for investment programs and industrial services, and, to a very limited extent, for the production of certain finished products. Subcontracting therefore accounts for part of the €281 million in capital expenditure dedicated in 2021 to safety, the environment and the maintenance of industrial units.

4.6.4.1 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 4.6.2.1 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.

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. All new suppliers and subcontractors are informed of the code's provisions and are expected to comply with these provisions in addition to general purchasing conditions.

4.6.4.2 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 2021, sessions were held to present the responsible procurement approach to buyers from all departments and regions. These sessions were followed up with reminders, updates and discussions about implementing the Together for Sustainability supplier assessment initiative. Accordingly, around 80% of buyers attended training or brush-up sessions in 2021.

In 2021, Arkema also set up the Procurement Academy, an ongoing training program to harmonize rollout of procurement best practices throughout the Group. This program includes training in CSR requirements and Arkema's commitments, and all Group buyers will receive training on this matter over a period of three years. By 2021, 41% of buyers had completed the training.

4.6.4.3 Selection of suppliers and subcontractors

The procurement departments carry out preliminary assessments before entering into any business relationships with suppliers or subcontractors, as part of the selection process. These assessments are based on robust criteria that notably include corporate social responsibility issues. Two sources of information are used for these assessments:

- questionnaires that cover performance and aspects of compliance, enabling Arkema to assess the supplier or subcontractor's ability to meet Group requirements, particularly in terms of ethics, safety and the environment, corporate social responsibility and product quality. These questionnaires come with certificates and other supporting documents provided by the supplier or subcontractor; and
- external databases that provide information and assessments of companies' financial solidity, performance and compliance. For corporate social responsibility, the Group uses the Ecovadis ratings platform. As for cybersecurity, the Group began using Cybervadis assessments in 2021.

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.

For purchases of goods, services and trade products, Arkema includes social, environmental and ethical criteria in its supplier evaluation and selection process, in line with the Group's CSR policy.

Raw materials suppliers are questioned by the Group about their management system, their compliance with the principles of the chemicals industry's Responsible Care® program, their certification to ISO-type standards and their ability to manage the transportation of raw materials to Group sites in line with the safety requirements. In 2021, the questionnaires were extended to query suppliers on the carbon footprint and the proportion of renewable or recycled content in their products.

Conflict minerals policy

Since the 2010s, key concerns have emerged about minerals from politically unstable areas. Some illegal minerals operations are used to fund violent activities that maintain or encourage conflict in these areas.

Regulations passed in the United States (2010 United States legislation, Dodd-Frank Wall Street Reform and Consumer Protection Act, section 1502) and the European Union (regulation (EU) 2017/821 of the European Parliament and of the Council of 17 May 2017) urge organizations to source materials responsibly, by applying reasonable care to due diligence and compliance measures for the specified minerals (tin, tantalum, tungsten and gold) coming from conflict-affected and high-risk areas, such as the Democratic Republic of Congo (DRC) and adjoining countries.

The Group does not directly purchase "conflict minerals", as identified in these regulations. Arkema is nevertheless committed to responsible sourcing.

If the products it buys contain conflict minerals, as defined by the regulations, Arkema requests its suppliers to provide information about the origin of these minerals. In its concern to uphold responsible sourcing practices, the Group makes every effort not to purchase raw materials that Arkema has reason to believe could originate from the DRC or neighboring countries, unless they are certified "conflict-free". Arkema also supports its customers in complying with regulations, by answering their inquiries as to whether the products purchased contain conflict minerals.

In 2013, Arkema implemented a conflict minerals program utilizing tools and recommendations developed by the Responsible Minerals Initiative (RMI) and set up a framework with its partners along the supply chain. This program is deployed throughout the Group and aims in particular to facilitate the commitment and reporting of suppliers, to automate the generation of Conflict Minerals reporting Templates (CMRTs), to answer quickly to customers' requests and to coordinate activities between the different functions of the company.

In this way, the conflict minerals management program enables Arkema to meet its regulatory obligations and handle customer requests, while reducing critical risks on its supply chain.

4.6.4.4 Assessment of suppliers and subcontractors

In the context of relationships with suppliers and subcontractors, and in order to drive continuous improvement in safety performance, environmental impact, business ethics, quality and innovation, the Group's three Procurement departments have introduced continuous assessment processes *via* two complementary systems:

- the first is a periodic assessment based, in particular, on the supplier or subcontractor's observed performance in terms of its commitments, the number, type and management of any complaints, and the CSR assessment conducted *via* the Together for Sustainability initiative described below; and
- the second system is based on targeted audits. The audit schedule is defined annually by each Procurement department, giving priority to suppliers and subcontractors whose performance requires improvement. Under the Supplier Code of Conduct, suppliers and subcontractors agree to meet all of the Group's CSR expectations and to cooperate with its audits of their compliance with the code.

In line with Arkema's HSE policy, the Goods and Services Procurement department regularly assesses the employee safety performance of the leading contractors working on Group sites. The results of these assessments are systematically discussed during contract reviews. As explained in section 4.5.2.2.1 of this chapter, the safety of contractor employees is considered just as important as that of Arkema personnel, and their incidents are included in the Group's safety performance.

Supply chain service providers are regularly audited with 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. Inventory requirements on warehouse operators ensure real-time availability of an itemized list of the Group's products in stock, along with their exact location.

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.

FOCUS

Arkema's Responsible Procurement program: operational excellence to reduce the Group's environmental footprint

Under the Optim'O project on improved water management at Arkema's production units, a worldwide consultation was conducted to select a small number of suppliers capable of providing water treatment services for boilers and cooling circuits.

In addition to technical, economic, organizational and location criteria, the CSR performance of the candidates was analyzed *via* their Ecovadis evaluations, along with performance on the safety of people. The four global suppliers selected obtained an Ecovadis CSR performance rating of "certified".

Through its Responsible Procurement program, Arkema identifies the best partners from a technical, commercial and CSR standpoint, the latter being an essential element in the GASP qualification process, especially important in the water management sector.

4.6.4.5 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. The issues discussed during its meetings are reported to the CSR/Stakeholder Dialogue Steering Committee and the Risk Review Committee.

At the end of 2021, more than 1,700 of the Group's suppliers and subcontractors had been assessed according to CSR criteria over the last three years. 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.

During the year, CSR scores rose for 66% of suppliers whose assessments were updated.

2025 TARGET

To continue its efforts in the area of responsible procurement, the Group has set the following strategic target: 80% of purchasing spend from relevant suppliers covered by a TfS assessment.

In 2021, the percentage of purchasing spend from relevant suppliers covered by a TfS assessment stood at 71%, up from 68% in 2020. Relevant suppliers are suppliers accounting for 80% of the Group's recurring purchasing spend, as defined in the methodology note in section 4.7.

At-risk suppliers

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 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.

4.6.4.6 Collaborative programs for a responsible value chain

A responsible approach to castor oil harvesting

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 5,800 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 69 villages. Phase 2 of the project aims to train more than 7,000 farmers by the end of 2022. 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.

Suppliers working with Arkema to reduce their carbon footprint

To combat climate change, commitment is required across the whole of the value chain.

Suppliers from whom purchases account for the highest emissions in Scope 3 category 1 (purchased goods and services) are encouraged to set SBTs consistent with the Paris Agreement. In view of this, in 2021 Arkema asked more than 100 suppliers to complete the CDP Climate Change questionnaire and commit to an SBT climate trajectory. More than half responded. Based on the responses received, the proportion of suppliers that have already expressed this commitment or that plan to do so within two years represents 31% of the Group's Scope 3 category 1 emissions. Arkema will continue this effort, targeting 82% by 2025.

In 2021, Arkema also outlined and launched the Low Emission Supply Chain program, aimed at reducing the carbon footprint caused by its transportation activities (Scope 3 category 9 GHG emissions). This program sets quantifiable targets in line with the Group's Scope 3 commitments (19% reduction *vs.* 2015 for Scope 3 categories 3, 4, 5 and 9 by 2030. See section 4.4.3.3 of this document). It empowers Business Lines by providing them with measurement tools and a range of reduction drivers. It involves logistics service providers, who are invited to collaborate on joint initiatives to reduce CO_2 emissions, such as optimizing means of transport and loading practices, and using alternative fuels and engines.

FOCUS

Grey is smart

Ahead of forthcoming regulatory changes, Arkema launched an initiative on the gradual incorporation of PCR (Post Consumer Recycled) plastics into certain packaging, such as pails in the construction adhesives market. This packaging has a specific color (gray), which distinguishes it from packaging made of new material and facilitates proactive communication on this sustainability initiative.

4.6.5 Institutional relations initiatives

As a responsible chemicals producer, the Group is in contact 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 reports on its business annually to meet its disclosure requirements as a registered 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 numerous chemical and material 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 close to 50 other specialized industry associations worldwide whose objectives are closely related to its businesses.

Employees in charge of institutional relations, or contributing to this function in Business Lines and functional departments, are tasked with monitoring local, national and international public initiatives liable to impact the Group, and with defending or promoting Group interests accordingly. The priority issues addressed concern: responsible product stewardship; the circular economy; the energy and climate change transition; and business competitiveness, both globally (*i.e.*, at Group level, on issues such as taxation, particularly on output, payroll taxes, employment law, regulation in general, etc.) and locally (*i.e.*, at plant level, on issues such as health, safety and environmental legislation, and support for expansion projects and reorganizations). On the energy and climate change transition, the Group's roadmap and positions are in line with the Paris Agreement objectives. In reducing its carbon footprint and adapting its solutions, the Group strives to contribute to the national and European 2050 carbon neutrality target.

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. Three Arkema Inc. employees have been registered as lobbyists to Congress.

In 2021, out of a total of €5.1 million, the Group paid €3.7 million in membership fees worldwide to general or specialized industry associations, the two highest amounts being to France Chimie (29% of total fees) and CEFIC (7% of total fees). Approximately 20% of the fees paid to industry associations support lobbying efforts. Responsible product stewardship and climate change accounted for 24% and 14% of total expenditure respectively, including the proportions of industry association membership fees, consultancy costs and internal expenses.

The Group expressly confirms that it does not finance any political party or organization in the countries where it operates with the aim of influencing their position or obtaining special treatment that could be interpreted as acts of corruption.

4.6.6 Community engagement

In the 54 countries where it operates, the Group positions itself as a company 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.

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 come 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.

4.6.6.1 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.

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, circular-economy-derived materials, new energies and 3D printing. In 2021, Arkema launched the Start-up Connect program, which invites advanced materials start-up around the world to approach Arkema with a view to establishing a dedicated research collaboration and benefiting from the Group's technological support and experience, in the form of technical or financial assistance for their innovations.

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 aims to forge partnerships with players in the additive manufacturing ecosystem, particularly in the United States:

- a collaboration agreement entered into in 2019 with Idaho-based Continuous Composites was followed up in 2020 with the acquisition of an interest in the SME in order to speed up the development of its continuous fiber 3D printing technology; and
- in 2021, Arkema made an equity investment in Erpro 3D Factory, a French company specializing in mass production through additive manufacturing, founded in 2017 and with which Arkema entered into a partnership as early as 2018.

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 and several universities in France, the United States, Canada, Belgium, Japan, South Korea and Malaysia. Further information on these partnerships is provided 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 in Malaysia, which is located just outside Kuala Lumpur. The aim of this collaborative research center is to enhance understanding of biocatalysis, a discipline that could lead to more sustainable processes than those achieved with traditional chemistry or the identification of new avenues for producing sulfur products.

Promotion

In France, Arkema took part in the Big Tour 2021, an initiative led by Bpifrance aimed at promoting French innovation expertise to the general public, while also raising awareness about climate change and career opportunities. On this 24-stop summer tour, Arkema spotlighted four flagship innovations: energy solutions, Pebax® material and sport, water treatment and Kynar® PVDF, and Bostik sealants.

4.6.6.2 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, workforce inclusion, diversity and environmental protection, as well as health. 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.

4.6.6.2.1 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.

Designed to improve the social acceptability of chemical plants and develop understanding about the Group's business, it is based on the following key principles:

- 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; and
- 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.

In addition to these discussions about the Group's activities, Arkema also contributes to the social and economic dynamics of local communities through philanthropy initiatives.

Operational implementation of the Common Ground® initiative is overseen by the Group's site managers, who are supported by human resources or communication managers. Employee participation, on a voluntary basis, is also a key component.

4.6.6.2.2 Initiatives relating to priority issues

In line with its history, businesses and core values, and more particularly the values of solidarity and inclusion, the Group takes action both globally and locally to address social challenges that it sees as a priority.

Education and workforce integration

Determined to support education right from the start of the Common Ground® initiative, Arkema created a fund for education on its 10th anniversary, in line with its CSR commitments. 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, 56 educational projects carried out by non-profit organizations have been selected for sponsorship in 15 countries. The employees sponsoring these projects come from ten of the Group's host countries.

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

Since 1996, the Arkema Inc. Foundation in the United States has been working to improve the quality of life in local communities around the Group's sites, promote science and support science education at all levels. The foundation's flagship Science Teacher Program aims to make teachers experts in science education and to get elementary school students interested in science. Teachers take part in an intensive session taught by Arkema engineers and scientists, and use innovative science experiment kits to learn compelling new ways to illustrate scientific concepts. Since its inception, the Science Teacher Program has benefited hundreds of school teachers and thousands of students. In 2021, around 20 teachers completed this module.

In France, the Group has been a sponsor of the CGénial Foundation's program to promote science among middle and high school students since 2016 and provides its support to spotlight science and technical-related disciplines and careers. The aim is to build bridges between business and academia by taking part in the Foundation's flagship programs. In 2021, despite the Covid-19 pandemic, more than 950 middle and high school students have benefited from the experience of Arkema's volunteer speakers through presentations in classrooms or online.

In the same vein, Arkema took part in the French Fab Tour in 2021, spearheaded by Bpifrance and the *Union des Industries et Métiers de la Métallurgie* (UIMM), which gives schoolchildren and students an insight into the industry and its professions. During the 13 stages of this tour, the Group demonstrated its know-how in four of its areas of expertise: sports, resource management, energy and sustainable housing.

For five years now, volunteer employees in China have been running regular sessions with students from middle and high schools in the vicinity of Group plants as part of the educational project Arkema ChemArt Green Innovation Class. The initiative's aim is to advance the teaching of science subjects, promote chemical industry professions and educate the younger generation on environmental issues. In 2021, the focus was the conservation of biodiversity. Circular economy initiatives included support for a new Green IT Classroom, and the donation of dozens of recycled computers.

In addition to educational initiatives, the Group also provides its support to cultural projects.

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. This initiative aims to provide disadvantaged children aged 6 to 12 with greater access to music and opera and is aligned with Arkema's focus on education as well as youth inclusion and with the values of solidarity and empowerment championed by the Group. In 2021, despite the health crisis, some 1,000 students in the priority education zone of Colombes enjoyed a participatory opera experience, with a DVD version of a performance shown in a closed screening with audio description and French sign language available.

Diversity and social inclusion

In keeping with its internal policy of promoting gender diversity and equal opportunity, 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, now known as *D1 Arkema*. 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. 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.

Since 2019, the Group has also become a partner of Sport dans la Ville, a French non-profit that runs the "L dans la Ville" program, which is designed to help girls from disadvantaged neighborhoods find their place in society, in particular through sports and cultural activities. The program offers specific opportunities (sports, cultural activities, visits to companies, training workshops, etc.) to more than 1,000 girls to give them the same chance at success as boys. Initiatives are rolled out locally by the Group's various sites in France.

Environment and biodiversity

The Group is committed to protecting the environment and preserving biodiversity, above and beyond its regulatory obligations, and carries out a diverse array of initiatives worldwide. Participating in community awareness campaigns on waste management and recycling, planting trees, installing beehives or birdhouses, and rehabilitating wastelands both on and off Group sites are just some examples of the actions taken to protect the environment.

The Cerdato site (France) has been running environmental protection initiatives since 2019, such as a partnership arrangement whereby the nature club at a local school makes bird and insect nesting boxes on Arkema's behalf. A local environmental association conducted an ornithological survey in 2019, and this is being extended with sessions to discover the birds present on the site.

Health

In China, with the support of its subsidiary ArrMaz, Arkema launched the Clean Water Project in 2020. The aim of the project is to provide drinking water to children at primary schools located in priority regions in Yunnan Province. Thanks to more than €50,000 in funding from the Group, Chinese NGO One Foundation was able to distribute five water filtration units in 2020 and five more in 2021. In a region where tap water is unsafe and bottled water is not a financially viable option, these filtration units improve the living standards of both the children and their teachers.

Arkema also stepped up its commitment to health during the year by supporting non-profit Ruban Rose during breast cancer awareness month, alongside its partner the French Football Federation. The 12 *D1 Arkema* clubs organized various events during October 2021 to raise public awareness of this health issue. The Group pledged to donate €150 for every goal scored during D1 matches throughout the month, resulting in a total donation of €10,000.

Employee giving: participatory sponsorship

In 2018, Arkema introduced a "salary rounding" system in France. This participatory sponsorship system proposed by solidarity economy company MicroDon allows employees to donate the cents from their monthly salary, with Arkema donating the same amount as its employees. Over the past four years, more than €115,000 has been raised for the six non-profit organizations selected, which take action in areas that are aligned with the Group's CSR policy.

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 50-foot multihull and a Mini 6.50 monohull. Further high performance solutions developed by Arkema were used in the construction of the Arkema 4 next-generation Ocean Fifty trimaran, completed in 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 Specialty Materials. In 2021, some fifteen young people from the non-profit Médoc Enfance Handicap were given the chance to get up close and personal with the boats taking part in the *Transat Jacques Vabre* race, at the Le Havre harbor. The crews competing in the race were given 100 "kits to go" comprising Bostik and Arkema products.

4.6.6.3 Economic contribution

The Group commits funds and resources in support of local involvement initiatives. Examples include:

- corporate philanthropy initiatives, such as the Arkema Education Fund, the Arkema Inc. Foundation, and support for the *Sport dans la ville* organization;
- Arkema product donations;
- academic partnerships; and
- collaborative programs such as the Pragati initiative outlined in section 4.6.4.6.

Because of information availability schedules, the economic data is for 2020. Total contributions of €5.25 million broke down as 85% in financial contributions, 4% in employee time donations, 9% in product donations and 2% in time spent by employees on program management.

4.7 Reporting methodology

4.7.1 Reporting organization

The CSR reporting organization is designed to enable the Group to manage and measure the effectiveness of its social responsibility policy.

Reporting scope and period

The reporting scopes for employee, environmental and climate 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 and climate, 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 articles L. 225-102-1 and L. 22-10-36 of the French Commercial Code, as amended and created by French Law no. 2020-1142 of 16 September 2020, 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 articles L. 225-102-1 and L. 22-10-36, 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 4.7.8 of this chapter.

The reporting process follows the GRI Guidelines. The GRI content index can be found in section 4.7.5 of this chapter.

4.7.2 Methodological note on sustainable solutions indicators

4.7.2.1 Details on sustainable solutions indicators

Sustainable development patents

Number of original patent applications filed in the reporting year by the Group in response to sustainable development issues and contributing to at least one UN Sustainable Development Goal.

R&D expenditure

R&D expenditure is expressed as a percentage of consolidated revenue for the year.

ImpACT+ solutions

Percentage of third-party sales of ImpACT+ solutions. Solutions in the ImpACT+ category include those 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.

Percentage of sales from products made from renewable or recycled raw materials

Sales from renewable or recycled raw materials correspond to sales of products that use renewable or recycled raw materials in the proportion of more than 25%. Until 2020, this threshold was 20%. This change of threshold did not impact the value of the indicator.

Renewable content is calculated by determining the proportion of raw materials of renewable origin (biomass, plant or animal) using the biogenic carbon ratio, the renewable material mass ratio, or the certified Mass Balance method. Recycled content is calculated by determining the proportion of raw materials of recycled origin, using the mass ratio or the certified Mass Balance method. Recycled materials are materials that are transformed into new products instead of being disposed of as waste. Scrap materials reused within the same production process are excluded.

Results are becoming increasingly precise with growing understanding on the renewable and recycled content of raw materials, and with improvements in calculation methodologies.

Percentage of sales covered by a life-cycle assessment (LCA)

Percentage of sales of solutions for which a full life-cycle assessment is available. Life-cycle assessments are conducted by Arkema experts or through professional associations.

They are reviewed approximately every five years, or earlier if needed or in the event of significant change. They cover one or more environmental impact categories, with at least cradle-to-gate scope, and may be validated by independent third parties.

4.7.3 Methodological note on environment, climate and safety indicators

4.7.3.1 Environment and climate 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 (Circular economy in transformation processes) and sections 4.4 (Climate) and 4.5 (Safety and environment) 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 environment and climate reporting covers all active 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 2021, excepting certain sites acquired recently. In 2021, the scope covered industrial operations accounting for 98% of the Group's sales. 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 since 2019. In addition, since 2019, when the new SBT climate target was set, the Group has included all of its sites (industrial sites operated by the Group or by its majority-owned subsidiaries, head offices and research and development centers) in calculating its carbon footprint (Scope 1 + ODS, Scope 2, Scope 3).

The scope of consolidation for energy reporting covers all of the sites operated by the Group or by majority-owned subsidiaries, including plants and research and development centers with an operating permit as at 31 December 2021, excepting certain sites acquired recently.

Operations sold or discontinued in 2021 were removed from the scope of reporting for the year but remain in prior-year data.

Newly acquired sites are integrated at the end of the first full year. The activities of CMC, Poliplas, Edge Adhesives Texas and Agiplast are therefore not included in the environmental and climate reporting for 2021, and neither are some small sites acquired in previous years. These activities accounted for less than 2% of Group sales in 2021.

Operations that started up in 2021 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 2020 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 2021 are not included in the scope of EFPI reporting for 2021, but are still included for previous years.

Operations started up in 2020 will be included in the EFPI reporting in 2022 compared with their 2021 performance.

Operations acquired in 2021 will be included in the 2023 scope of EFPI reporting for all of their 2023 activities, compared with their 2022 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.

4.7.3.2 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. The accident figures for newly acquired sites are integrated into the TRIR and LTIR indicators within three years. Some of the sites acquired in 2019, 2020 and 2021 are not included in accident safety reporting. The reporting for 2021 covers 97% of the Group's workforce as of 31 December 2021. New sites are included in the calculation of the peer observation indicator within three years of their acquisition or start-up date.

4.7.3.3 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 "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 greenhouse gas (GHG) emissions

Targets adopted by companies to reduce 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 preindustrial 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.

4.7.3.4 Details on environment, climate 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 (SOx), ammonia (NH_3) and nitrogen oxide (NOx) emissions converted into tonnes of sulfur dioxide (SO_2) 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. Wastewater transported to treatment plants, which returns to an aquatic environment after treatment, is excluded.

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 CO_2 eq.).

In this report, 2021 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 natural 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 CO_2 emissions were calculated using electricity and steam consumption and emission factors in tonnes of CO_2 equivalent per input unit (MWh or 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 e-grid database for 2019 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.

Indirect Scope 3 CO_2 emissions were estimated 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 estimated for ten categories (see section 4.4.3.3 of this document). A detailed explanation of the calculation methodology is available to stakeholders upon request.

- Category 1 – Purchased goods and services: emissions are estimated based on purchases of raw materials, industrial gas and packaging. An initial estimate is made on the basis of volumes for which information is processable, *i.e.* more than 85% of the amount of such purchases. Emissions corresponding to the remaining 15% are then estimated by extrapolation. For processable volume figures, an emission factor specific to each chemical product is applied (in CO_2 equivalent per tonne) where available. Otherwise, an emission factor of 1.8 t CO_2 eq./t is assumed (that for organic chemicals in the EcoInvent database, version 3.5). The specific emission factors applied come from life-cycle assessments conducted by the Group or by professional organizations such as Plastics Europe, or from the EcoInvent database (version 3.5), or from the Base Carbone®.

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 CO_2 eq./€k).

- 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 CO_2 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 factors 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)], except for electricity in France, for which values are as given by the EDF utility for 2020.
- 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 1,000 km by truck and a factor of average emissions for road transport (in kg of CO_2 per t.km). For the main raw material, actual transportation modes are considered. 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 EcoInvent base (version 3.5) 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 Group employees' travel and hotel accommodation. Emission values are provided by the travel agencies the Group works with.
- Category 7 – Employee commuting: emissions were estimated using the least favorable scenario, assuming that all 20,209 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 CO_2 emissions per kilometer by vehicle type and fuel type given in DEFRA database (2019 version).

(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 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.
- Category 9 – Downstream transportation and distribution: the emissions were estimated using Group company logistics data, which account for more than 99% of consolidated shipments. The Group defines a shipment as the transportation of products to customers, as well as any post-production logistics. Since 2019, the calculation has been 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 greenhouse gas 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 97% of transported volumes. For the remainder, average distance and emission factors were applied. The reporting period runs from 1 October to 30 September of the following year.
- Category 12 – End-of-life treatment of sold products: the products sold by the Group have been classified into 15 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. For Bostik products, a special scenario for end-of-life treatment was applied to account for the nature of these products and their applications. Emission calculations take into account the end of life of packaging used for products sold.

Commitment from raw materials suppliers accounting for 82% of Scope 3, category 1 emissions to set SBTs for their Scope 1 and 2 emissions by 2025

On the basis of Scope 3 Category 1 emission calculations (see definition above), Arkema asks its most emissions-intensive suppliers to complete the CDP Climate Change questionnaire and take up a climate commitment to an SBT trajectory. Supplier response is analyzed to calculate the proportion of suppliers already taking up such a commitment or planning to do so within two years.

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. The average number of days lost per injury mentioned in section 4.5.2.2.1 is estimated in mid-January N+1 for the reporting on year N. This figure may be re-evaluated in N+1 depending on the actual average number of days lost. For 2021, these accident-rate figures exclude activities at certain acquisitions made in 2019, 2020 and 2021, as detailed in section 4.7.3.2 of this chapter.

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 these 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 (PSE) rate, 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. Three protocols are used, depending on the facility's size and specific needs: Full AIMS, which is combined with ISO certifications, for the largest sites or sites that present major risks, Simplified AIMS for smaller sites with low risks, and Light AIMS, for very small sites with low risks and facilities that have been recently acquired.

4.7.4 Methodological note on employee, social and responsible procurement indicators

4.7.4.1 Social and employee reporting tools and scope

Employee data are taken from several different reporting processes.

The employee data presented in section 4.6.1 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, ArrMaz, Bostik, Coatex 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 93% of the Group's total headcount.

Any changes or corrections to prior-year data are noted in section 4.6.1 of this chapter.

4.7.4.2 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 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 registration document does not include any information about combating food waste, ensuring food security or promoting the responsible, equitable and sustainable production of food.

4.7.4.3 Details on employee 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.

To remain consistent with financial reporting, Australia and New Zealand are included under Asia, rather than "Rest of the world". Employee data for 2019 were restated for comparisons over the three-year period.

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.

Recruitment

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.

Average employee compensation for men and women covers France, China and the United States, which together account for 66% of the Group's workforce. Comparisons are against the base salary.

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-subsidiary 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. In the absence of data on nationality, 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.

4.7.4.4 Details on responsible procurement indicators

Percentage of purchasing spend from relevant suppliers covered by a Together for Sustainability (TfS) assessment

Relevant suppliers are suppliers representing 80% of the Group's recurring purchasing spend.

Purchases are considered recurring if made from the same supplier over the last three reporting years. TfS supplier evaluations are considered valid if performed within the last three years.

4.7.5 Indicators [1]

		2021	2020	2019
SUSTAINABLE SOLUTIONS				
Innovation				
Number of patent applications filed during the year relating to sustainable development		200	158	149
Percentage of patent applications filed during the year relating to sustainable development	%	90	78	67
R&D expenditure as a percentage of consolidated revenues	%	2.6	3.1	2.8
Management of the solutions portfolio				
Percentage of ImpACT+ sales [2]	%	51	50	46
Responsible product stewardship				
Number of substances with REACH registration		425	425	425
Circular economy				
Percentage of sales from products made from renewable or recycled raw materials [3]	%	10	10	9
Percentage of sales covered by a life-cycle assessment [4]	%	27	22 [4]	nc [4]
SAFETY, CLIMATE AND ENVIRONMENT				
Safety, environment and maintenance expenditure	€m	281	270	279
Management system				
Percentage of sites audited according to Arkema Integrated Management System (AIMS) standards	%	86	82	80
Percentage of ISO 45001-certified sites	%	59	57	57
Percentage of employees covered by ISO 45001 certification	%	48	48	47
Percentage of ISO 45001-certified sites in Europe	%	60	56	59
Percentage of ISO 45001-certified sites in the Americas	%	46	52	47
Percentage of ISO 45001-certified sites in Asia	%	73	65	65
Percentage of ISO 14001-certified sites	%	58	54	53
Percentage of ISO 14001-certified sites in Europe	%	71	64	65
Percentage of ISO 14001-certified sites in Asia	%	79	76	76
Percentage of ISO 14001-certified sites in the Americas	%	20	18	18
Safety				
Total recordable injury rate (TRIR)	per million hours worked	1.0	1.0	1.4
Lost-time injury rate (LTIR)	per million hours worked	0.5	0.7	0.8 [5]
Percentage of sites practicing peer observation	%	61	63	62
Process safety event rate (PSER)	per million hours worked	3.1	4.0	3.7

		2021	2020	2019
Climate				
Greenhouse gas (GHG) emissions [6]				
Direct greenhouse gas emissions corresponding to the Kyoto Protocol	kt CO_2 eq.	1,822	2,268	2,698
• of which CO_2	kt CO_2	1,436	1,495	1,490
• of which HFC	kt CO_2 eq.	349	742	1,174
• of which others	kt CO_2 eq.	37	31	34
Direct greenhouse gas emissions corresponding to the Kyoto Protocol, by region				
• Europe	%	32	32	30
• Americas	%	55	56	56
• Asia and rest of world	%	13	12	15
Direct greenhouse gas emissions corresponding to the Montreal Protocol	kt CO_2 eq.	234	257	247
Scope 2 indirect greenhouse gas emissions	kt CO_2 eq.	1,061	1,103	1,142
• of which Europe	kt CO_2 eq.	221	245	290
• of which Americas	kt CO_2 eq.	297	352	401
• of which Asia and rest of world	kt CO_2 eq.	543	507	451
Climate indicator: Scope 1 and Scope 2 GHG emissions as defined in the Kyoto Protocol + substances listed in the Montreal Protocol	kt CO_2 eq.	3,117	3,628	4,087
Scope 3 indirect greenhouse gas emissions [7]	Mt CO_2 eq.	12.24	11.19	12.56
Energy				
Net energy purchases	TWh	7.39	7.84	8.05
• of which Europe	TWh	3.58	3.97	4.26
• of which Americas	TWh	2.67	2.69	2.57
• of which Asia and rest of world	TWh	1.14	1.17	1.22
Energy EFPI		0.85	0.90	0.91
Net energy purchases by type				
• fuel	TWh	3.98	4.29	3.98
• electricity	TWh	2.46	2.57	2.71
• steam	TWh	0.94	0.98	1.36
Natural gas in net purchases of fuels	%	98	98	98
Low-carbon electricity in net energy purchases	%	22	22	22
Number of Arkenergy investments		52	66	51
• of which Europe		29	42	28
• of which Americas		13	6	12
• of which Asia and rest of world		10	18	11
Number of ISO 50001-certified sites		31	34	33
Adapting to the consequences of climate change				
Number of sites exposed to climatic risks		26	28	25
Other environmental information				
Emissions to air				
Acidifying substances	t SO_2 eq.	2,880	2,690 [8]	2,740 [8]
Carbon monoxide	t	806	906	950
Volatile organic compounds (VOCs)	t	3,330	3,426	3,810
Volatile organic compound (VOC) EFPI		0.50	0.58	0.60
Dust	t	188	217	203
Emissions to water				
Chemical oxygen demand (COD)	t O_2	1,740	1,640	1,950
Chemical oxygen demand (COD) EFPI		0.45	0.45	0.50
Suspended solids	t	465	500	571

		2021	2020	2019
Resources management				
Waste				
Total hazardous waste	kt	181	183 [9]	178 [9]
Hazardous waste recycled into materials	%	15	11	14
Hazardous waste burned as fuel	%	35	32	32 [10]
Non-recovered hazardous waste	kt	91	103 [9]	95 [9] [10]
• of which landfilled	kt	3.8	2.5	3.8
Total non-hazardous waste	kt	210	204 [9]	203 [9] [11]
Non-hazardous waste recycled into materials	kt	58	48	54 [11]
Non-hazardous waste burned as fuel	kt	8	9	8
Non-recovered non-hazardous waste	kt	144	147 [9]	141 [9]
• of which landfilled	kt	25	26	26
Water withdrawals				
Total water withdrawn	millions of cu.m	104	114	116 [12]
Water withdrawals as a percentage of Group sales	cu.m/€k	6.9	9.7 [13]	9.0 [13]
LABOR AND STAKEHOLDER RELATIONS				
People				
Headcount				
Total headcount at 31 December		20,209	20,576	20,507
• of which permanent employees		19,305	19,692	19,783
• of which fixed-term employees		904	884	724
Total headcount at 31 December by geographical area				
• France		7,170	7,231	7,309
• Europe (excluding France)		3,850	4,073	3,899
• North America		3,669	4,004	4,074
• Asia		4,699	4,549	4,521
• Rest of the world		821	719	704
Managers in the total headcount	%	28.6	28.1	27.9
Diversity				
Women in the total headcount	%	26.2	25.6	25.3
Women in the total headcount by region				
• France	%	28.3	27.5	27.2
• Europe (excluding France)	%	26.4	25.3	25.7
• North America	%	24.5	23.2	22.7
• Asia	%	25.1	25.5	25.2
• Rest of the world	%	21.6	21.4	20.6
Percentage of women managers (all levels)	%	31.1	30.1	29.9
Percentage of women in executive positions (Hay grade 17 or higher)	%	18	16.4	16.7
Percentage of women in senior management and executive positions (Hay grade 15 or higher)	%	24	23	23
Non-French nationals in senior management and executive positions (Hay grade 15 or higher)	%	40	41	40
Percentage of women who hold performance shares	%	32	30	28
Percentage of women in lower management (France, United States, China)	%	39	37	
Percentage of women in middle management (France, United States, China)	%	35	33	
Percentage of women in business-related positions (France, United States, China)	%	26	25	
Percentage of women in technical positions (STEM: Science, Technology, Engineering and Mathematics)	%	19%	19%	
Equal pay between men and women (women's average base salary/men's average base salary):				
Lower management	%	96	95	
Middle management	%	91	92	
Senior management and executive positions (excluding Executive Committee)	%	97	95	

		2021	2020	2019
Recruitment				
Recruitments during the year		2,070	1,310	1,593
• France		345	322	366
• Europe (excluding France)		282	262	260
• North America		691	329	437
• Asia		629	326	431
• Rest of the world		123	71	99
Manager recruitments		521	338	494
Non-manager recruitments		1,549	972	1,099
Women recruitments	%	26.4	28.9	28.2
New hires aged 50 and over	%	10.8	10.5	10.3
New hires aged under 30	%	34.2	35.4	34.4
Departures				
Departures during the year		2,907	1,620	1,741
• of which resignations		1,089	693	945
• of which dismissals		439	331	342
• of which retirement		357	310	285
• of which following a divestment/merger		887	109	27
• of which other reasons		135	114	142
Work organization				
Full-time employees	%	96.2	96.2	96.3
Part-time employees	%	3.8	3.8	3.8
Employees who telework	%	20.0	16.5	13.8
Absenteeism				
Overall absenteeism rate	%	4.5	5.1	4.2
Absenteeism rate on medical grounds	%	2.8	3.3	2.8
Training				
Number of training hours	thousands	447	346	463
Average number of training hours per employee		24	18	25
Average number of training hours per manager		24	16	24
Average number of training hours per non-manager		24	20	25
Number of employees who received training, excluding e-learning		15,032	15,105	15,997
Number of employees who took an e-learning course		15,422	10,247	9,517
Number of safety training hours	thousands	149	163	182
Number of safety training hours per employee trained		11	14	13
Number of employees who received safety training (excluding e-learning)		12,974	11,879	14,142
Number of employees who took safety-related e-learning courses		14,390	7,852	6,684
Number of environment-related training hours		14,913	7,571	10,210
Number of environment-related training hours per employee trained		3	2	2
Number of employees who received environment-related training (excluding e-learning)		4,524	3,217	4,686
Number of employees who took environment-related e-learning courses		4,418	5,593	4,863
Breakdown of training hours by topic:				
• Technical expertise	thousands	235	133	203
• HSEQ	thousands	167	181	196
• IT/digital technology	thousands	17	15	19
• Management	thousands	28	17	45
Percentage of apprenticeships (Arkema France)	%	4.7	4.2	4.4
Proportion of Group employees benefiting from annual performance reviews	%	100	100	99

		2021	2020	2019
Health and welfare				
Percentage of employees benefiting from regular medical check-ups	%	95	95	94
Occupational illness frequency rate (OIFR)	per million hours worked	0.7	1.0	1.0
Employees benefiting from supplementary disability cover	%	94	90	90
Employees benefiting from supplementary life cover	%	95	95	95
Employees covered by death benefits representing at least 18 months' salary	%	85	85	84
Compensation				
Employees benefiting from minimum compensation guarantees	%	100	100	100
Employees benefiting from collective variable compensation components	%	73	73	73
Employees benefiting from individual variable compensation components	%	41	37	36
Representation				
Percentage of employees benefiting from personnel representation and/or trade union representation	%	90	90	91
Responsible procurement				
Percentage of purchasing spend from relevant suppliers covered by a TfS assessment	%	71	68	68

(1) Indicators are defined in detail in the methodological note in sections 4.7.2, 4.7.3 and 4.7.4 of this chapter.

(2) The percentage of sales contributing significantly to the United Nations SDGs (ImpACT+) was calculated on the basis of an assessment of 85% of the Group's third-party sales in 2021, 72% in 2020 and 44% in 2019.

(3) The percentage of sales from products made from renewable or recycled raw materials covers products with a renewable or recycled raw material content of at least 25% in 2021 and 20% for previous years (the threshold increase did not impact the value of the indicator).

(4) From 2021, the proportion of sales covered by a life-cycle assessment is measured as a percentage of revenues. The 2020 value was recalculated and is now expressed as a percentage of revenue.

(5) The 2019 LTIR, announced in the 2019 Universal Registration Document as 0.7, was updated to include an injury that had not initially been taken into account.

(6) Since 2019, GHG emissions have included those of American Acryl's Bayport facility (United States).

(7) The Scope 3 categories covered by this estimate are detailed in section 4.4.3.3 of this chapter.

(8) Following correction to the method used for measuring SO_2 release at Kerteh (Malaysia), the 2019 and 2020 values reported in the 2020 Universal Registration Document were adjusted for consistency with the 2021 count.

(9) Waste quantity figures have been adjusted to remove water sent to treatment plants. This water, which returns to the aquatic environment after treatment, is not considered as waste in the legislation of several countries.

(10) The breakdown between recycled and non-recycled hazardous waste in 2019 was corrected following a historical classification error.

(11) The 2019 figure for non-hazardous waste recycled into materials has been corrected, after a co-product was erroneously included in its calculation.

(12) Following a correction of the 2019 metering methodology at the Pierre-Bénite site (France), the 2019 value communicated in the 2019 Universal Registration Document was reassessed by 2.8 million cu.m (corresponding to 0.32 cu.m/€k), consistent with the metering methodology of the other years.

(13) The values for water withdrawal in 2019 and 2020 were corrected following a change in the definition of the indicator, which now considers gross volumes less regulated withdrawals and volumes sold to third parties.

4.7.6 GRI content index

Declaration of GRI compliance

The Group follows the GRI Sustainability reporting Standards and applies their ten principles (GRI 101). Reporting for 2021 was conducted compliant with GRI Standards: Essential Compliance Option (GRI 102-54 GRI Standards Compliance reporting Statement).

In order to ensure a good quality approach, in line with GRI standards expectations, Arkema ensured the implementation of the tests indicated for each reporting principle by MATERIALITY-reporting, a GRI standards expert.

The GRI content index below presents the general and specific items of information, in accordance with their materiality for the Group.

GRI standard	Disclosure	Description	Location or omission
GRI 101: Foundation – 2016			
GRI 102: General disclosures – 2016			
ORGANIZATIONAL PROFILE			
	102-1	Name of the organization	6.1.1 – Information about the Company Cover
	102-2	Activities, brands, products and services	1.2 – Business overview
	102-3	Location of headquarters	6.1.1 – Information about the Company 5.4.2 – Parent company financial statements/SUBSIDIARIES AND INVESTMENTS
	102-4	Location of operations	6.1.2 – Subsidiaries and shareholdings of the Company 5.4.2 – Parent company financial statements/SUBSIDIARIES AND INVESTMENTS
	102-5	Ownership and legal form	6.1.1 – Information about the Company 5.4.2 – Parent company financial statements/SUBSIDIARIES AND INVESTMENTS
	102-6	Markets served	PROFILE 1.2 – Business overview
	102-7	Scale of the organization	PROFILE Key figures Our business model 1.2 – Business overview 6.1.1 – Information about the Company
	102-8	Information on employees and other workers	4.6.1 – Group's People
	102-9	Supply chain	1.4 – Material contracts 4.1.6 – Stakeholders and materiality assessment 4.2.1 – Management of sustainable solutions 4.2.3 – Management of the solutions portfolio
	102-10	Significant changes to the organization and its supply chain	2.2 – Global internal control and risk management procedures
	102-11	Precautionary principle or approach	2.1 – Main risks
	102-12	External initiatives	4.1.1 – CSR policy 4.1.7 – CSR key performance indicators
	102-13	Membership of associations	4.6.6 – Community engagement
STRATEGY			
	102-14	Statement from senior decision-maker	Message from the Chairman and CEO in the introduction of this document
	102-15	Key impacts, risks, and opportunities	AMBITION 4.1.3 – Key impacts, risks and opportunities TABLE OF THE GROUP'S CONTRIBUTION TO THE UNITED NATIONS SDGS 4.1.5 – Duty of care plan
ETHICS AND INTEGRITY			
	102-16	Values, principles, standards and norms of behavior	4.6.2 – Compliance and ethics 4.2.4.4 – Animal welfare
GOVERNANCE			
	102-18	Governance structure	4.1.2 – CSR governance 3.2 – Composition of administrative and management bodies

GRI standard	Disclosure	Description	Location or omission
STAKEHOLDER ENGAGEMENT			
	102-40	List of stakeholder groups	4.1.6 – Stakeholders and materiality assessment 4.6 – Labor and stakeholder relations
	102-41	Collective bargaining agreements	4.6.1.7 – Active social dialogue with employee representatives
	102-42	Identifying and selecting stakeholders	4.1.6 – Stakeholders and materiality assessment 4.6 – Labor and stakeholder relations
	102-43	Approach to stakeholder engagement	4.1.6 – Stakeholders and materiality assessment
	102-44	Key topics and concerns raised	4.1.3 – Key impacts, risks and opportunities/Priority issues, action plan and associated objectives 4.1.6 – Stakeholders and materiality assessment
REPORTING PRACTICE			
	102-45	Entities included in the consolidated financial statements	4.7.3.1 – Environment and climate reporting tools and scope 4.7.3.2 – Safety data reporting tools and scope 4.7.4.1 – Social & employee 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 – Adhesive Solutions 1.2.2 – Advanced Materials 1.2.3 – Coating Solutions 1.2.4 – Intermediates
	102-49	Changes in reporting	4.7 – Reporting methodology
	102-50	Reporting period	4.7.1 – Reporting organization
	102-51	Date of most recent report	Page 1 footnote
	102-52	Reporting cycle	4.7.1 – 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	4.7.6 – GRI content index
	102-55	GRI content index	4.7.6 – GRI content index
	102-56	External assurance	4.7.8 – Independent third-party opinion pursuant to articles L. 225-102-1 and L. 22-10-36 of the French Commercial Code
SPECIFIC ITEMS			
GRI 200: Economic standards			
GRI 103: Management approach – 2016	103-1	Explanation of the material topic and its boundary	4.1.1 – CSR policy 4.1.6 – Stakeholders and materiality assessment
	103-2	The management approach and its components	4.6 – Labor and stakeholder relations
	103-3	Evaluation of the management approach	4.7.5 – Indicators
ECONOMIC PERFORMANCE			
GRI 201: Economic performance – 2016	201-1	Direct economic value generated and distributed	4.6.6.2 – Corporate citizenship
	201-2	Financial implications and other risks and opportunities due to climate change	4.2.2 – Innovation
	201-4	Financial assistance received from government	5.3.3 – Notes to the consolidated financial statements at 31 December 2021/Note 8/8.2 – Other intangible assets/Capitalized research and development costs
MARKET PRESENCE			
GRI 202: Market presence – 2016	202-2	Proportion of senior management hired from the local community	4.6.1.6 – Diversity, inclusion, equal opportunity and equal treatment
INDIRECT ECONOMIC IMPACTS			
GRI 203: Indirect economic impacts – 2016	203-1	Infrastructure investments and services supported	4.6.6.1 – Supporting local communities through innovation
	203-2	Significant indirect economic impacts	4.6.6.2 – Corporate citizenship

GRI standard	Disclosure	Description	Location or omission
PROCUREMENT PRACTICES			
GRI 204: Procurement practices – 2016	204-1	Proportion of spending on local suppliers	4.1.5 – Duty of care plan 4.6.4 – Responsible procurement
ANTI-CORRUPTION			
GRI 205: Anti-corruption – 2016	205-1	Operations assessed for risks related to corruption	4.1.5 – Duty of care plan 4.6.2 – Compliance and ethics
	205-2	Communication and training about anti-corruption policies and procedures	4.6.2 – Compliance and ethics
	205-3	Confirmed incidents of corruption and actions taken	4.6.2 – Compliance and ethics
ANTICOMPETITIVE BEHAVIOR			
GRI 206: Anticompetitive behavior – 2016	206-1	Legal actions for anticompetitive behavior, anti-trust, and monopoly practices	4.6.2 – Compliance and ethics
TAXES			
GRI 207: Tax – 2019	207-1	Approach to tax	4.6.2.6 – Tax policy
	207-2	Tax governance, control and risk management	4.6.2.6 – Tax policy
GRI 300: Environmental standards			
GRI 103: Management approach – 2016	103-1	Explanation of the material topic and its boundary	4.1.6 – Stakeholders and materiality assessment
	103-2	The management approach and its components	4.5.3.1 – Environmental management
	103-3	Evaluation of the management approach	4.7.5 – Indicators
MATERIALS			
GRI 301: Materials – 2016	301-1	Materials used by weight or volume	4.3.3.3 – Raw materials use
	301-2	Recycled input materials used	4.3.3.4 – Circular economy and industrial operations
	301-3	Reclaimed products and their packaging materials	4.3.3.4 – Circular economy and industrial operations
ENERGY			
GRI 302: Energy – 2016	302-1	Energy consumption within the organization	4.3.3.1 – Energy use
	302-3	Energy intensity	4.4.3.2 – Energy
	302-4	Reduction of energy consumption	4.4.3.2 – Energy
	302-5	Reductions in energy requirements of products and services	4.4.3.2 – Energy
WATER AND EFFLUENTS			
GRI 303: Water and effluents – 2018	303-1	Interactions with water as a shared resource	4.3.3.2 – Water use
	303-2	Management of water discharge-related impacts	4.5.3.2.2 – Emissions to water
	303-3	Water withdrawal	4.3.3.2 – Water use
	303-4	Water discharge	4.5.3.2.2 – Emissions to water
	303-5	Water consumption	4.3.3.2 – Water use
BIODIVERSITY			
GRI 304: Biodiversity – 2016	304-2	Significant impacts of activities, products and services on biodiversity	4.5.3.2 – Other emissions and protecting biodiversity
	304-03	Habitats protected or restored	4.5.3.2 – Other emissions and protecting biodiversity

GRI standard	Disclosure	Description	Location or omission
EMISSIONS			
GRI 305: Emissions – 2016f	305-1	Direct (Scope 1) GHG emissions	4.4.3.1 – Scopes 1 and 2 greenhouse gas emissions
	305-2	Energy indirect (Scope 2) GHG emissions	4.4.3.1 – Scopes 1 and 2 greenhouse gas emissions
	305-3	Other indirect (Scope 3) GHG emissions	4.4.3.3 – Scope 3 greenhouse gas emissions
	305-4	GHG emissions intensity	4.5.3.1 – Environmental management 4.4.3.1 – Scopes 1 and 2 greenhouse gas emissions
	305-5	Reduction of GHG emissions	4.5.1 – Health, safety and environmental management
	305-7	Nitrogen oxides (NOx), sulfur oxides (SOx) and other significant air emissions	4.5.3.2.1 – Emissions to air
WASTE			
GRI 306: Waste – 2020	306-1	Waste generation and significant waste-related impacts	4.3.3.4 – Circular economy and industrial operations
	306-2	Management of significant waste-related impacts	4.3.3.4 – Circular economy and industrial operations 4.5.3.2 – Other emissions and preservation of biodiversity
	306-3	Waste generated	4.3.3.4 – Circular economy and industrial operations
	306-4	Waste diverted from disposal	4.3.3.4 – Circular economy and industrial operations
	306-5	Waste directed to disposal	4.3.3.4 – Circular economy and industrial operations
ENVIRONMENTAL COMPLIANCE			
GRI 307: Environmental compliance – 2016	307-1	Non-compliance with environmental laws and regulations	4.5.1.2 – Management system and audits
SUPPLIER ENVIRONMENTAL ASSESSMENT			
GRI 308: Supplier environmental assessment – 2016	308-1	New suppliers that were screened using environmental criteria	4.6.4.4 – Assessment of suppliers and subcontractors
	308-2	Negative environmental impacts in the supply chain and actions taken	4.6.4.3 – Selection of suppliers and subcontractors
GRI 400: Social standards			
GRI 103: Management approach – 2016	103-1	Explanation of the material topic and its boundary	4.1.6 – Stakeholders and materiality assessment
	103-2	The management approach and its components	4.2 – Sustainable solutions 4.5 – Safety and environment 4.6 – Labor and stakeholder relations
	103-3	Evaluation of the management approach	4.7.5 – Indicators
EMPLOYMENT			
GRI 401: Employment – 2016	401-1	New employee hires and employee turnover	4.6.1.1 – Talent management
	401-2	Benefits provided to full-time employees that are not provided to temporary or part-time employees	4.6.1.2 – An agile and collaborative organization 4.6.1.5 – A motivating and competitive compensation system
	401-3	Parental leave	4.6.1.4 – Employee engagement and well-being/Work-life balance

GRI standard	Disclosure	Description	Location or omission
OCCUPATIONAL HEALTH AND SAFETY			
GRI 403: Occupational health and safety – 2018	403-1	Occupational health and safety management system	4.5.1 – Health, safety and environmental management 4.5.2.2 – Employee health and safety
	403-2	Hazard identification, risk assessment and incident investigation	4.5.2 – Health and safety information
	403-3	Occupational health services	4.5.2.3 – Process safety
	403-4	Worker participation, consultation and communication on occupational health and safety	4.5.1.3 – Safety and environmental culture
	403-5	Worker training on occupational health and safety	4.5.1.3 – Safety and environmental culture
	403-6	Promotion of worker health	4.5.1.3 – Safety and environmental culture
	403-7	Prevention and mitigation of occupational health and safety impacts directly linked by business relationships	4.5.2.1 – Safety management 4.6.1.4 – Employee engagement and well-being
	403-8	Workers covered by an occupational health and safety management system	4.5.2 – Health and safety information
	403-9	Work-related injuries	4.5.2 – Health and safety information
	403-10	Work-related ill-health	4.5.2.2.4 – Occupational illnesses
TRAINING AND EDUCATION			
GRI 404: Training and education – 2016	404-1	Average hours of training per year per employee	4.6.1.3 – Personal development and training
	404-2	Programs for upgrading employee skills and transition assistance programs	4.6.1.3 – Personal development and training
	404-3	Percentage of employees receiving regular performance and career development reviews	4.6.1.3 – Personal development and training
DIVERSITY AND EQUAL OPPORTUNITIES			
GRI 405: Diversity and equal opportunity – 2016	405-1	Diversity of governance bodies and employees	4.6.1.6 – Diversity, inclusion, equal opportunity and equal treatment
	405-2	Ratio of basic salary and remuneration of women to men	4.6.1.6 – Diversity, inclusion, equal opportunity and equal treatment/Diversity and equal treatment policy
NON-DISCRIMINATION			
GRI 406: Non-discrimination – 2016	406-1	Incidents of discrimination and corrective actions taken	4.6.1.6 – Diversity, inclusion, equal opportunity and equal treatment
FREEDOM OF ASSOCIATION AND COLLECTIVE BARGAINING			
GRI 407: Freedom of association and collective bargaining – 2016	407-1	Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk	4.6.1.7 – 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	4.6.3 – Human Rights
FORCED OR COMPULSORY LABOR			
GRI 409: Forced or compulsory labor – 2016	409-1	Operations and suppliers at significant risk for incidents of forced or compulsory labor	4.6.3 – Human Rights
SECURITY PRACTICES			
GRI 410: Security practices – 2016	410-1	Security personnel trained in human rights policies or procedures	4.6.3 – Human Rights

GRI standard	Disclosure	Description	Location or omission
HUMAN RIGHTS ASSESSMENT			
GRI 412: Human Rights assessment – 2016	412-1	Operations that have been subject to Human Rights reviews or impact assessments	4.6.2 – Compliance and ethics 4.6.3 – Human Rights
	412-2	Employee training on Human Rights policies or procedures	4.6.2 – Compliance and ethics 4.6.3 – Human Rights
	412-3	Significant investment agreements and contracts that include Human Rights clauses or that underwent Human Rights screening	4.6.2 – Compliance and ethics 4.6.3 – Human Rights
LOCAL COMMUNITIES			
GRI 413: Local communities – 2016	413-1	Operations with local community engagement, impact assessments, and development programs	4.6.6 – Community engagement
	413-2	Operations with significant actual and potential negative impacts on local communities	4.6.3 – Human Rights
SUPPLIER SOCIAL ASSESSMENT			
GRI 414: Supplier social assessment – 2016	414-1	New suppliers that were screened using social criteria	4.6.4.4 – Assessment of suppliers and subcontractors
	414-2	Negative social impacts in the supply chain and actions taken	4.6.4.3 – Selection of suppliers and subcontractors
PUBLIC POLICY			
GRI 415: Public policy – 2016	415-1	Political contributions	4.6.5 – Institutional relations 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 – Sustainable solutions
	416-2	Incidents of non-compliance concerning the health and safety impacts of products and services	4.2 – Sustainable solutions
MARKETING AND LABELING			
GRI 417: Marketing and labeling – 2016	417-1	Requirements for product and service information and labeling	4.2.1 – Management of sustainable solutions
	417-2	Incidents of non-compliance concerning product and service information and labeling	4.2 – Sustainable solutions
	417-3	Incidents of non-compliance concerning marketing communications	4.2 – Sustainable solutions
CUSTOMER PRIVACY			
GRI 418: Customer privacy – 2016	418-1	Substantiated complaints concerning breaches of customer privacy and losses of customer data	4.6.2.4 – Personal data protection
SOCIOECONOMIC COMPLIANCE			
GRI 419: Socioeconomic compliance – 2016	419-1	Non-compliance with laws and regulations in the social and economic area	4.6.2 – Compliance and ethics

4.7.7 SASB cross-reference table

SASB – CHEMICALS

Resource Processing Sector, Version 2018-10

The SASB standards were established to help companies better identify, manage, and communicate financially relevant sustainability information to investors. They identify the most relevant environmental, social and governance (ESG) issues for 77 business sectors.

The following cross-reference table has been prepared to provide a better understanding of Arkema's performance against these standards.

		Disclosures		
		Section of this document	CDP questions 2021	Comments
GREENHOUSE GAS EMISSIONS				
RT-CH-110a.1	Gross global Scope 1 emissions	4.4.3.1		
	Percentage covered under emissions-limiting regulations		C11.1b	
RT-CH-110a.2	Discussion of long-term and short-term strategy or plan to manage Scope 1 emissions, emissions reduction targets, and an analysis of performance against those targets	4.4.1		
AIR QUALITY				
RT-CH-120a.1	Air emissions of the following pollutants:			
	NOx (excluding N_2O)	4.5.3.2.1		
	SOx	4.5.3.2.1		
	Volatile organic compounds (VOCs)	4.5.3.2.1		
	Hazardous air pollutants (HAPs)			Not disclosed
ENERGY MANAGEMENT				
RT-CH-130a.1	Total energy consumed	4.4.3.2	C8.2a	Reported in TWh
	Percentage grid electricity	4.4.3.2		
	Percentage renewable	4.4.3.2	C8.2d, C8.2e	
	Total self-generated energy			Not disclosed
WATER MANAGEMENT				
RT-CH-140a.1	Total water withdrawn	4.3.3.2		
	Total water consumed		W1.2b	Partially disclosed
	Percentage of each in regions with High or Extremely High Baseline Water Stress	4.3.3.2		
RT-CH-140a.2	Number of incidents of non-compliance associated with water quality permits, standards, and regulations			Not disclosed
RT-CH-140a.3	Description of water management risks and discussion of strategies and practices to mitigate those risks	4.3.3.2		Partially disclosed
HAZARDOUS WASTE MANAGEMENT				
RT-CH-150a.1	Amount of hazardous waste generated	4.3.3.4		
	Percentage recycled	4.3.3.4		
COMMUNITY RELATIONS				
RT-CH-210a.1	Discussion of engagement processes to manage risks and opportunities associated with community interests	4.1.6 4.6.6 4.5.1.2 4.6.4		

		Disclosures		
		Section of this document	CDP questions 2021	Comments
WORKFORCE HEALTH & SAFETY				
RT-CH-320a.1	Total recordable incident rate (TRIR)	4.5.2.2.1		Reported per million hours worked
	Fatality rate for (a) direct employees and (b) contract employees	4.5.2.2.1		
RT-CH-320a.2	Description of efforts to assess, monitor, and reduce exposure of employees and contract workers to long-term (chronic) health risks	4.5.1 4.5.2.2		
PRODUCT DESIGN FOR USE-PHASE EFFICIENCY				
RT-CH-410a.1	Revenue from products designed for use-phase resource efficiency	4.2.3		
SAFETY & ENVIRONMENTAL STEWARDSHIP OF CHEMICALS				
RT-CH-410b.1	Percentage of products that contain Globally Harmonized System of Classification and Labeling of Chemicals (GHS) Category 1 and 2 Health and Environmental Hazardous Substances	4.2.4.2		Reported on the basis of SVHC substances subject to REACH authorization or on the REACH candidate list
	Percentage of such products that have undergone a hazard assessment			Not disclosed
RT-CH-410b.2	Discussion of strategy to (1) manage chemicals of concern and (2) develop alternatives with reduced human and/or environmental impact	4.2.4 4.2.3		
GENETICALLY MODIFIED ORGANISMS				
RT-CH-410c.1	Percentage of products by revenue that contain genetically modified organisms (GMOs)			Not disclosed
MANAGEMENT OF THE LEGAL & REGULATORY ENVIRONMENT				
RT-CH-530a.1	Discussion of corporate positions related to government regulations and/or policy proposals that address environmental and social factors affecting the industry	2.1.2		
OPERATIONAL SAFETY, EMERGENCY PREPAREDNESS & RESPONSE				
RT-CH-540a.1	Process Safety Incidents Count (PSIC)			Not disclosed
	Process Safety Total Incident Rate (PSTIR)	4.5.2.3		
	Process Safety Incident Severity Rate (PSISR)			Not disclosed
RT-CH-540a.2	Number of transport incidents			Not disclosed
ACTIVITY METRICS				
RT-CH-000.A	Production by reportable segment			Not disclosed

4.7.8 Independent third-party opinion pursuant to articles L. 225-102-1 and L. 22-10-36 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 December 31, 2021

To the Annual General Meeting,

In our capacity as Statutory Auditors of your company (hereinafter the "entity") , appointed as independent third party, and accredited by the COFRAC under number 3-1049(1), we have undertaken a limited assurance engagement on the historical financial information (actual or extrapolated) of the consolidated non-financial statement, prepared in accordance with the entity's procedures (hereinafter the "Guidelines"), for the year ended December31, 2021 (hereinafter, respectively, the "Information" and the "Statement"), included in the entity's and the Group's management report pursuant to the requirements of Articles L. 225-102-1, L. 22-10-36, R. 225-105 and R. 225-105-1 of the French Commercial Code (*Code de commerce*).

Conclusion

Based on the procedures performed, as set out in the "Nature and scope of our work" section of this report, and the information collected, nothing has come to our attention that causes us to believe that the 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.

Preparation of the Statement

The absence of a commonly used generally accepted reporting framework or as established practices on which to draw to evaluate and measure the Information allows for different, but acceptable, measurement techniques that can affect comparability between entities and over time.

Consequently, the Information needs to be read and understood together with the Guidelines, the main elements of which are presented in the Statement.

Inherent limitations in preparing the Information

As discussed in the Statement, the Information may be subject to inherent uncertainty because of incomplete scientific and economic knowledge and the quality of external data used. Some information is sensitive to methodological choices, assumptions and/or estimates used for their preparation and presentation in the Statement.

Responsibility of the entity

The Board of Directors is responsible for:

- Selecting or establishing suitable criteria for preparing the Information;
- Preparing a Statement in accordance with legal and regulatory requirements, including a presentation of the business model, a description of the main extra-financial risks, a presentation of policies applied to mitigate these risks and the outcomes of those policies, including key performance indicators, and the information provided for in Article 8 of Regulation (EU) 2020/852 (the Taxonomy Regulation);
- Implementing internal control over information relevant to the preparation of the Information that is free from material misstatement, whether due to fraud or error.

The Statement was prepared by applying the entity's Guidelines as mentioned previously.

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 historical financial information (actual or extrapolated) provided in accordance with Article R.225-105-I(3) and II of the French Commercial Code concerning action plans and policy outcomes, including the key performance indicators on the main risks.

(1) Accreditation Cofrac Inspection, number 3-1049, scope available at www.cofrac.fr

As it is our responsibility to provide an independent conclusion on the Information as prepared by Management, we are not authorised to help prepare said Information, as that could compromise our independence.

However, it is not our responsibility to comment on:

- The entity's compliance with other applicable legal and regulatory requirements (in particular, the disclosures provided for in Article 8 of Regulation (EU) 2020/852 (the Taxonomy Regulation), the French duty of care law and anti-corruption and tax avoidance legislation);
- The fairness of the disclosures provided for in Article 8 of Regulation (EU) 2020/852 (the Taxonomy Regulation);
- The compliance of products and services with the applicable regulations.

Regulatory provisions and applicable professional guidance

We performed our work described below in accordance with the provisions of Articles A. 225 1 and following of the French Commercial Code, the professional guidance issued by the French Institute of Statutory Auditors (Compagnie nationale des commissaires aux comptes) relating to this engagement and International Standard on Assurance Engagements 3000 (Revised)[1].

Our independence and quality control

Our independence is defined by the provisions of Article L. 822-11-3 of the French Commercial Code and the French Code of Ethics (Code de déontologie) for statutory auditors. Our firm maintains a comprehensive system of quality control including documented policies and procedures regarding compliance with applicable legal, regulatory and ethical requirements and the professional guidance issued by the French Institute of Statutory Auditors relating to this engagement.

Means and resources

Our work was carried out by a team of six people between September 2021 and February 2022 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 about ten interviews with the people responsible for preparing the Statement.

Nature and extent of the work

We planned and performed our work to address the areas where we identified that a material misstatement of the Information was likely to arise.

We believe that the work carried out, based on our professional judgement, is sufficient to provide a basis for our limited assurance conclusion:

- 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 the information provided in the paragraph 2 of the Article L. 22-10-36 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 risk[2], 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[3].

(1) ISAE 3000 (Revised) - Assurance Engagements Other Than Audits or Reviews of Historical Financial Information

(2) Ethics and compliance, including those relating to the fight against corruption; Human rights; Failure of suppliers and subcontractors in social and environmental issues; Scarcity of non-renewable resources; Exposure to chemicals.

(3) Arkema France, of which Jarrie, Marseille, Mont and Saint-Auban sites (France); Arkema Inc., of which Bayport American Acryl, Calvert City, Franklin, Memphis and West Chester (USA); Casda Ltd. (China).

- 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, as 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[1] and covers between 15% 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.

The procedures performed in a limited assurance engagement are less in extent than for a reasonable assurance engagement performed in accordance with the professional guidance issued by the French Institute of Statutory Auditors; a higher level of assurance would have required us to carry out more extensive procedures.

Paris-La Défense, on February 23, 2022

KPMG S.A.

Anne Garans
Partner
Sustainability Services

Eric Dupré
Partner

(1) Arkema France, of which Jarrie, Marseille, Mont and Saint-Auban sites (France); Arkema Inc., of which Bayport American Acryl, Calvert City, Franklin, Memphis and West Chester (USA); Casda Ltd. (China)

Appendix

Qualitative information (actions and results) considered most important
Actions in favor of innovation
Actions to control the environmental footprint
Employee well-being assessment systems
Talent attraction and retention systems
Actions undertaken that have contributed to improving the Group's environmental performance
Measures taken in favor of Human Rights
Code of business conduct and ethics alert system
Training on responsible purchasing

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
Average number of training hours per employee per year
Percentage of non-French nationals in senior management and executive positions
Equal pay between men and women
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 AIMS (Arkema Integrated Management System) audited sites
Net purchases of energy
Volatile Organic Compounds emissions (VOC)
Total water withdrawn
Chemical Oxygen Demand (COD)
Percentage of recycled waste (hazardous + non-hazardous)
Scope 1 and Scope 2 GHG emissions as defined in the Kyoto Protocol + substances listed in the Montreal Protocol
Indirect greenhouse gas emissions (Scope 3 – Categories 1, 3, 4, 5, 9, 12)
Percentage of sales from products made from renewable raw materials
Percentage of patent applications filed during the year relating to sustainable development
Percentage of ImpACT+ sales
Percentage of sales covered by life cycle assessment
Percentage of purchasing spend from relevant suppliers covered by a TfS assessment
Percentage of suppliers representing 82% of Scope 3, Category 1 emissions that have set Science-Based Targets (SBTs) on their Scopes 1 and 2 by 2025

4.7.9 Contacts

See section 8.2 of this document.

APPENDIX 1: INNOVATION STRATEGY

1.1 Innovation strategy

Clearly defined in a Group policy in 2018, innovation is an integral part of Arkema's growth strategy and its contribution to advancing sustainable development and addressing major challenges arising from global megatrends. Innovation enables Arkema to:

- design and develop products and solutions that meet our customers' needs while contributing to planet-friendly, sustainable development;
- anticipate technological and market changes and adapt the Group's portfolio accordingly while protecting the environment; and
- enhance the Group's operational excellence and help preserve natural resources 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 manufacturer.

Innovation is at the heart of the Group's growth strategy, with Specialty Materials products less than five years old generating almost €1 billion in sales. Innovation is based on:

- a dedicated organization, including an incubator to foster the emergence of new products;
- a portfolio of research and development (R&D) projects;
- active patent and trademark management;
- a collaborative innovation ecosystem; and
- the development of digitalization.

1.1.1 A dedicated organization

Innovation is supported by a network organization incorporating several specialized functions:

- a Research and Development department that reports directly to the Chairman and Chief Executive Officer, which:
  - coordinates all of Arkema's research programs worldwide, the development of long-term research platforms and the implementation of partnerships,
  - ensures that 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 and its sustainable development commitments,
  - creates and steers corporate R&D programs and identifies disruptive development opportunities and new research areas;
- a scientific committee comprising representatives from the R&D department, the Sustainable Development department, the Process department, the Industrial Property department, the Group businesses' global R&D departments, the scientific departments and Arkema'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 and suppliers, and collaborate with academic partners, notably by contributing to the supervision of doctoral theses.

In 2021, R&D expenditure totaled €243 million, representing 2.6% of Group sales. R&D expenditure as a percentage of sales varies between businesses. It is higher in specialty areas and particularly in the Advanced Materials segment, where R&D helps find solutions for customers and respond to global megatrends. Arkema's R&D teams comprised more than 1,600 researchers in 2021, spread across three regional research and innovation hubs.

R&D expenses break down among Arkema's four segments and its corporate research program as follows:

- **11% for the corporate research program**

Defined by the R&D department and subject to the approval of Arkema's Executive Committee, this program addresses major challenges arising from global megatrends by preparing breakthrough innovations, which are developed commercially by the Group's segments at a later stage. It coordinates research efforts in such high-potential, cross-cutting areas as batteries, composite materials and hydrogen storage, photopolymerization processes for fast composite material implementation, adhesives and coatings, and chemical recycling of polymer materials;

- **40% for the Advanced Materials segment**

The global challenges of sustainability and energy transition require the development of new, innovative materials which combine extreme performance, implementation productivity, lightness and recyclability. They are used for high-value-added applications in markets such as transportation, production and storage of renewable energy, 3D printing, water treatment and consumer electronics. In the field of polymers, the Advanced Materials segment's R&D develops polyamides, PVDF and PEKK for the lightweighting of structures by substituting metal parts with thermoplastic composites in the automotive and aerospace industries, and are used for new production techniques such as 3D printing which enable optimal design of complex parts. The R&D department designs innovative and competitive solutions for the production and storage of renewable energy (photovoltaics, wind power, batteries, hydrogen storage), renewable materials (polyamide 11, surfactants, Kynar® CTO PVDF) that contribute to reducing the consumption of fossil raw materials and make recycling easier (surfactants for roads coatings), as well as in water treatment (PVDF, hydrogen peroxide), animal nutrition (Intermediates for methionine), and consumer goods (high performance polymers and

elastomers for consumer electronics, sport, technical textile, etc.). It forms strategic technological partnerships with leading industrial customers, such as those developed with Hexcel in composites for the aeronautics industry, with CJ CheilJedang in animal nutrition and with EOS and HP in 3D printing. The segment's technical excellence is reflected in the strong reputation of brands such as Rilsan®, Pebax®, Kynar® and Luperox®;

- **21% for the Adhesive Solutions segment**

In the widely diverse area of adhesives, Arkema is focusing its R&D efforts on sustainable solutions. The packaging sector is currently undergoing significant change, with numerous projects aimed at redesigning packaging to incorporate recyclability directly at the design stage. Bostik is contributing to these changes through the development of new adhesives. Research on industrial adhesives for the assembly of durable goods or the manufacture of hygiene products is also driven by sustainable development requirements, either through the use of renewable raw materials or the creation of more efficient assembly technologies. In 2020, Bostik significantly diversified its offering of specialty hot-melt adhesives by offering films and powders in addition to the traditional granules. One of the main areas of innovation is in engineering adhesives, which are experiencing high growth in the electronics, security and medical markets. Lastly, a large portion of Bostik's R&D is dedicated to reducing the environmental impact of buildings and developing innovative, functional adhesives and waterproofing products for the construction and DIY markets, thus helping to reduce buildings' climate impact while improving indoor air quality;

- **21% for the Coating Solutions segment**

The segment's R&D develops innovative solutions for the coatings market. There is a constant evolution of coatings toward solutions without controversial substances that meet the increasingly strict requirements with regards to the protection of people and the environment. Thus water-based resins technologies are being developed to replace conventional solvent-based technologies, while maintaining the same level of technical performance. R&D is also developing technologies for industrial coatings, with photocure resins for the food Packaging ink and furniture markets, and powder resin technology for high performance and durability applications. In solvent technologies, an important line of research consists in optimizing drying speeds while lowering the environmental footprint by reducing the use of volatile organic compounds in favor of raw materials from renewable sources or from the circular economy. At the same time, new additive technologies using solvent-free processes are being developed, with optimized cost/performance profiles, for the decorative paints and industrial coatings markets, with the integration of bio-based technologies. Lastly, 3D printing solutions constitute another development focus, using the know-how gained in the area of photocure resins for coatings. In addition to working closely with customers to provide responsive technical support, the segment's R&D teams also carry out process research, which enables them to optimize production costs and produce new formulas on an industrial scale; and

- **7% for the Intermediates segment**

This segment's R&D objectives focus on ensuring that its processes are competitive and finding new applications and end markets for its products. One of its primary objectives is to continuously improve its processes 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.

1.1.2 A portfolio of research and development projects

Global population growth and changing lifestyles are affecting demand for energy and materials, as well as needs in the areas of health, well-being and mobility. They are also driving climate change and resource scarcity. 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 4.2 of this document.

The Group's analysis led to the definition of the following five cross-business platforms, which target areas with strong development potential and form the base of its portfolio of R&D projects:

- new energies;
- natural resources management;
- lightweight materials and design;
- living comfort and home efficiency; and
- electronics solutions.

In addition to these five innovation platforms, a number of process technology platforms focused on generating innovative production methods promote the principles of eco-design. These platforms are described in section 1.1.2.6 of this chapter.

Moreover, the Group is also prioritizing the development of a circular economy, in line with the recommendations of the materiality assessment conducted in 2019. This area is now associated with renewable products and water management within the "Natural resources management" platform.

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 incorporates corporate social responsibility into all of its R&D projects and implements eco-design and circular economy techniques, as described in section 4.3 of this document. When identifying the risks and opportunities of each project, Arkema takes into account the entire value chain, from raw material extraction to product end of life, as well as the United Nations' Sustainable Development Goals. For further details, see section 4.3.5 of this document.

1.1.2.1 "New energies" platform

The development of new energies is a megatrend driven by the world transition to a less fossil-fuel-dependent economy. Through this 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, wind turbines and solar thermal power plants.

Thanks to its technological expertise, Arkema offers a number of new 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 electrolyte salts, Arkema has a range of solutions designed for use in the development of batteries.

The Kynar® PVDF 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. For this reason, they are the subject of constant, innovative research to improve current-generation batteries and to develop tomorrow's solid-state batteries.

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, such as the Foranext® solution, that can withstand the increasingly demanding conditions of use placed on their products amid the need for constantly growing electric vehicle driving range and charge speeds.

FOCUS

Christian Collette Center of Excellence dedicated to batteries

In a context of rapidly accelerating growth in electric mobility around the world and renewable energy storage needs, Arkema opened a new center of excellence dedicated to batteries at its Pierre-Bénite Research Center in France in November 2021.

Improvements in battery performance, greater energy density and shorter charging time, greater autonomy and lighter weight of vehicles today represent key R&D areas to meet the challenge of energy transition. Thanks to its recognized expertise and unique offering of innovative, durable and high performance materials, Arkema is ideally positioned at the heart of the battery ecosystem to support its customers and partners in the clean mobility revolution. This center of excellence is equipped with state-of-the-art design and analysis equipment, including a dry room and an electrode coating line. It draws on the scientific and technical complementarity of the Pierre-Bénite Research Center's researchers. Alongside this platform, a pilot line dedicated to the pre-industrialization of the next generations of electrolytes for the batteries of the future is already operational. The teams will conduct research with the Group's academic partners (CNRS, CPE in Lyon, LEPMI in Grenoble and ENSCM in Montpellier), as well as with partners in the battery ecosystem, with which strategic agreements have been concluded (start-ups, manufacturers, gigafactories).

This Center of Excellence has been named the Christian Collette Center of Excellence for Batteries, in honor of the Group's R&D Vice President who passed away in April 2020. It was partly financed by the *Région Auvergne-Rhône-Alpes*.

Materials solutions for hydrogen mobility

Arkema has positioned itself as a benchmark "materials" partner for hydrogen mobility systems. The technical challenges to address correspond to the areas of development of high performance materials that are both lightweight and resistant to extreme conditions. Moreover, the deployment of hydrogen as the energy solution of the future will require an industrial scale-up. As a major chemicals group, Arkema has the appropriate know-how to achieve this.

The Rilsan® polymers offer low hydrogen permeability and so can be used in the manufacture of tank liners resistant to low temperatures (-40°C).

The carbon fiber composites and related processes developed by Arkema open up possibilities for the production of entirely thermoplastic high-pressure (700 bars) tanks for cars, trucks, buses or trains, which would be more resistant to alternating stress and fully recyclable at the end-of-life stage. The Group is also looking into composite solutions for electrolyzer or cryogenic (liquid hydrogen) tanks for long-distance or air transportation.

Lastly, its Kynar® high-chemical resistance fluoropolymers are prime candidates for fuel cells to improve the durability of bipolar plates and to provide innovative and competitive solutions for materials comprising membrane electrode assemblies (MEAs).

Materials for photovoltaic cells

Photovoltaic cells are made up of a number of highly technical organic materials that protect the silicon 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;
- Luperox® organic peroxides, for the production of transparent films to encapsulate photovoltaic cells;
- Kynar® fluoropolymers, for panel backsheet protection; and
- Bostik Vitel® polyester adhesives, which are used for binding photovoltaic backsheets.

Materials and products for the wind turbine industry

With its Elium® thermoplastic liquid resin and its structural adhesives, Arkema offers a breakthrough innovation in the composites market, especially in the production of wind turbine blades. The resin's recyclability represents a significant advantage for wind turbine blades, for which end-of-life recycling is a major industrial and environmental issue. Arkema has been participating in the Zero wastE Blade ReseArch (ZEBRA) project since September 2020. Led by IRT Jules Verne, this project aims to create the first 100% recyclable wind turbine blade and brings together Arkema, Engie, LM Wind Power, Owens Corning and Suez. Arkema's position in this consortium demonstrates the Group's commitment and drive to be part of a product design model with a circular economy approach.

In 2020, the Elium® technology won the Pierre Potier prize, which is awarded by the French Ministry of Industry to commend sustainable development initiatives by the chemical industry.

1.1.2.2 "Natural resources management" 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." In 2020, Arkema joined the World Business Council for Sustainable Development (WBCSD), with a view to acting in partnership with the network to help boost the transition to a more sustainable world.

Arkema has developed a wide range of bio-based polyamides derived from the castor plant, which is mainly grown 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, transparent Rilsan® Clear can also be produced from bio-based raw materials (Rilsan® Clear Rnew®), creating interesting new design possibilities for injection-molded parts. These transparent polymers offer greater flexibility and easier processing capabilities than existing solutions. Combining ultra-light weight, high transparency as well as chemical and mechanical resistance, Rilsan® Clear products offer new opportunities in various markets.

The Group's expertise and innovation mean that it can offer a wide range of renewable polyamides in diversified markets such as transportation, consumer goods, energy and 3D printing. Examples include:

- evolutions in the flagship Rilsan® polymer range, a reference in the automotive industry at the heart of technological solutions for the energy transition, with applications in hybrid vehicle fuel supply, electric vehicle battery cooling and, more recently, in fuel cells;
- 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 eyewear frames, watches and respiratory masks;
- light, resilient elastomers capable of returning the elastic energy absorbed during deformation, like those used in Pebax Powered® sports shoes;
- rigid materials designed to serve as reinforcements in composites, such as the cross-linkable Platamid® or the Rilsan® XDM50 and XZM60 ranges designed for the numerous structural parts found in smartphones, tablets and other mobile devices; and
- Rilsan® Invent Natural fine powders used in powder bed fusion additive manufacturing.

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 set up a research program on enzyme catalysis as a synthesis process for other products in its portfolio.

FOCUS

Kynar® CTO, a new breakthrough range of renewable PVDF grades for lithium-ion batteries

Arkema has introduced a major innovation with the launch of its new fluoropolymer range, made from carbon derived from renewable raw materials. Kynar® CTO PVDF grades, using the Mass Balance approach under the ISCC+ certification process, will be specifically targeted for the lithium-ion battery market, as functionally identical alternatives to Arkema's flagship binder grades, Kynar® HSV900 and Kynar® HSV1810.

This patent pending technology allows a climate change impact reduction of almost 20% of the Kynar® PVDF binder (expressed in kg CO_2 eq./kg, according to the ISO 14040 standard) while reducing dependence on upstream crude oil consumption. The crude tall oil used in upstream feedstock production is a residue of the Kraft process of wood pulp manufacture. The new Kynar® CTO grades are certified to be compliant with industry leading responsible forestry standards. They do not result in deforestation, and there is no direct competition with food crops.

These grades will initially be produced at the Pierre-Bénite plant in France for the European market. In a second phase, the production of this range of sustainable PVDF grades will be extended to each of Arkema's PVDF manufacturing sites worldwide and will be made available to all traditional PVDF markets and applications.

In the field of water treatment, Kynar® resins are used as ultrafiltration membranes to treat wastewater or make water drinkable. They allow for much finer filtration of suspended matter, bacteria and viruses while increasing the volumes of treated water by 20%, at constant energy levels. They also allow the doubling of the service life of certain filtration systems from five years to ten years.

Among the Group's product offering, acrylic acid is used to manufacture polyacrylates used in water treatment facilities for the flocculation of suspended matter. Arkema also continues developments to increase the use of Albone® hydrogen peroxide in the disinfection of cooling systems or as a product to treat drinking water or swimming pool water. Compared with traditional chlorine-based treatment solutions, this solution allows the elimination of chlorinated discharges.

Lastly, the Group has made the circular economy a development priority and offers, in particular, Elium® resin-based composite parts, ensuring scraps and end-of-life parts are 100% recyclable through mechanical or chemical recycling processes. Since it is chemically recyclable, the resin can be used over and over again while preserving the same properties as a virgin resin, making this technology a perfect fit for the circular economy.

Arkema's R&D teams also form partnerships in order to assess and develop processes for recycling the polymers used in thermoplastic composites, which will enable users to recycle their waste *via* dedicated channels.

The Group's ongoing commitment to bio-based and recycled products is demonstrated by the fact that products at least 25% made from renewable or recycled raw materials account for around 10% of Group sales.

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Arkema strengthens its commitment to the circular economy with the acquisition of Agiplast

Agiplast, specialized in the regeneration of high performance polymers, in particular specialty polyamides and fluoropolymers, was a historical Group partner in recycling operations. The company generates annual sales of around €15 million and operates a plant in Italy. Agiplast's strong know-how in mechanical recycling technologies will now enable Arkema to offer high quality recycled polymers to its customers. Prior to the deal, in October 2019, Arkema launched the Virtucycle® program in collaboration with Agiplast to develop loops for the collection and regeneration of high performance polymers while minimizing CO_2 emissions.

With this 2021 acquisition, Arkema has become the first fully integrated high performance polymer manufacturer, offering both bio-based and recycled materials in order to address the challenges of resource scarcity and end-of-life products. This acquisition is thus in line with Arkema's sustainable growth strategy, and in particular the transition to a circular economy.

1.1.2.3 "Lightweight materials and design" platform

Global population growth, rising living standards, increased mobility 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 this 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 are extremely hard to recycle 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 power, shipbuilding and construction 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 substitutes made from these thermoplastic resins is expected to deliver weight savings of between 30% and 50%.

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 the Rilsan® Invent Natural polyamide 11 powders, Kepstan® PEKK powders, N3xtDimension® UV curable resins and Pebax® thermoplastic elastomers. 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 third global center of excellence for 3D printing based on powder bed fusion technologies in Serquigny, France in 2019. This center has reinforced the Group's 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. Lastly, Arkema also launched a commercial platform dedicated to 3D printing. Named "3D Printing Solutions by Arkema", this 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.

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Arkema invests in ERPRO 3D FACTORY, a specialist in large-series additive manufacturing

ERPRO 3D FACTORY (E3DF) is a French company founded in 2017 that specializes in large-series additive manufacturing. Since its creation, E3DF has already produced more than 19 million parts, most of which have been made with 100% bio-based polyamide 11 powder. Arkema has acquired a 10% stake in E3DF to gain new expertise and accelerate the development of new applications for its high performance polymers.

Arkema set up a close partnership with E3DF in 2018, in order to develop numerous projects in cosmetics, medical, automotive and eyewear applications using its unique range of bio-based and recyclable specialty polyamides, and its N3xtDimension® advanced liquid UV curable resins, perfectly suited to the fast-growing and demanding additive manufacturing market.

With this investment, Arkema has become a member of the strategic committee of the company and thus reinforced its existing partnership. The combination of Arkema, designer of innovative solutions, and E3DF, a specialist in large-series additive manufacturing, will accelerate the development of new high-value added applications in 3D printing.

1.1.2.4 "Living comfort and home efficiency" platform

Energy efficiency, health, comfort and environmental friendliness 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 it a key focus of its R&D strategy.

Arkema thus 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. The Kynar Aquatec® PVDF emulsion is used in the formulation of white coatings for cool roofs, which reduce buildings' energy consumption. These resins are exceptionally durable, thus preserving the white finish for an especially long time without maintenance.

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) content to obtain health certifications like EMICODE® EC1 Plus and to meet the environmental standards required for LEED® and BREEAM® certification.

The coating resins activity in the Coating Solutions segment 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 from the air. Moreover, 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.

This 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.

1.1.2.5 "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 high performance polymers range (specialty polyamides and fluoropolymers), Arkema offers innovative solutions for the mobile device market, which includes smartphones and tablets. These solutions relate to battery safety and life per charge and to the internal structural parts of these devices, which are required to be increasingly thin while offering ultra-high rigidity and made using the same simple injection molding process, as well as to the external parts, which need to be stain- and shock-resistant but also have aesthetic and haptic qualities. Rilsan® polyamide 11 is the foundation for these latest innovations, combining the very high level of performance required for these applications with the guarantee of a 100% bio-based and recyclable solution. Arkema has developed an elastomer version of Rilsan®, Pebax® Rnew®, and a transparent version, Rilsan® Clear Rnew®. Arkema completes this range of materials with adhesive solutions for their assembly. A new range of engineering adhesives has been developed and marketed by Bostik under the brand name Born2Bond®. The range includes photocure adhesives for the assembly of electronic equipment with enhanced precision and productivity, and photocure sealants shaped *in situ*, which ensure that the devices are watertight and can be dismantled and repaired.

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 dielectric permittivity 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, solid-state cooling systems, energy recovery systems, printed loudspeakers and more. Depending on their composition, these materials offer a wide range of functional properties, including extreme sensitivity to deformations, vibrations, heat and the creation of sensations, energy, or even cold. Already used in smartphones and acoustic sensors, these materials also offer attractive possibilities in consumer electronics such as car dashboards and seats, virtual reality gloves, smart textiles and footwear, fitness trackers, video game controllers, flexible screens, smart pill dispensers and more. Professional applications currently being evaluated include connected labels and packaging (see "Smart labels" box), border controls, medical imaging, catheters, organic photovoltaic and connected sensors for cutting-edge manufacturing facilities. To develop these innovations, Arkema draws on a vast network of partners, including universities, industrial companies and trade organizations in the European Union and around the world.

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Smart labels: Piezotech® materials in the spotlight

The SUPERSMART European project funded by EIT (European Institute of Innovation and Technology) and coordinated by Arkema with 10 partners won the 2021 Organic Electronics Association competition award for the Best Publicly Funded Project Demonstrator. This project advances the emerging technology of paper printed organic electronics to the industrial phase.

Two innovative demonstrators were designed and produced on a pilot scale: a smart label including an impact sensor based on Arkema's Piezotech® piezoelectric material and a smart counterfeit-proof label with conductive tracks and an electrochromic display directly printed on paper. The data detected on both components can simply be read *via* a cell phone application. Life cycle assessments and recycling studies have demonstrated the environmental benefit of these new solutions. Potential applications include packaging of pharmaceutical and medical products to track their exposure to impacts, falls or vibration during transit, and flooring to detect falls or abnormal patient movements in medical facilities. This recognition by the organic electronics community paves the way for a new, more sustainable electronics industry and a large number of new applications using Arkema's piezoelectric materials.

Certain Foranext® high-purity fluorinated Intermediates play an important role in the various stages of the manufacture of semi-conductors, where they are used to selectively eliminate matter through plasma etching.

The Sartomer® and Sarbio® specialty monomers and photocure resins have been developed to protect printed circuits and electronic components through encapsulation and coating. They improve the mechanical resistance of electronic devices and provide better protection against damage caused by the environment, thus increasing longevity.

Moreover, the arrival of 5G telecommunication networks brings a strong increase in demand for functional materials (dielectric properties, transparency to microwaves) and for specific energy storage systems, which represent development opportunities for the Group's innovative materials, such as Kynar® fluoropolymers, Elium® resins, Nanostrength® additives and Sartomer® resins.

1.1.2.6 "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 notably uses patents to protect the innovations generated by its research and development efforts, whether in relation to its innovative manufacturing technologies or 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 materials with high technical performance, 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 2021, Arkema filed 222 priority patent applications, of which 200 related to sustainable development. At 31 December 2021, it held 10,196 patents and had 5,254 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, Asia, 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 patent licenses to meet operating requirements, or granting them to third parties. 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 Kynar®, Pebax®, Rilsan®, Forane®, Carelflex®, Evolution®, 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 purpose – 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 segments (one project may involve several Group activities); 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 Nanostrength® nanostructured copolymers, which enhance shock resistance of polymers, and Apolhya®, used notably for photovoltaic cells protection, as well as 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
- impregnated continuous fiber-reinforced thermoplastic solutions, such as the Rilsamid® Matrix range, for automatic fiber placement and thermo-stamping.

The incubator also developed PEKK, a polymer withstanding ultra-high temperatures, under the Kepstan® brand. This activity was initiated 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 set up numerous upstream partnerships with scientific organizations, universities and public and private research laboratories, such as the CNRS and the CEA in France and several universities in France, the United States, Canada, Belgium, Japan, South Korea and Malaysia. These partnerships take the form of research chairs, shared laboratories 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". Designing and modeling new materials and related processes requires a multidisciplinary approach that goes beyond materials chemistry to include the physical and mechanical aspects involved in their manufacture and implementation. 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 implementation processes and mechanical properties.

In Asia, 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 with Monash University in Malaysia. The purpose of this collaborative research center is to develop, in the Kuala Lumpur campus, understanding of biocatalysis, a discipline that could lead to more sustainable processes than those achieved with traditional chemistry, and to identify new ways to access sulfur products.

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.

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. In 2021, Arkema launched the "Start-up Connect" program, which invites start-ups specialized in advanced materials from around the world to approach Arkema with a view to establishing a dedicated research collaboration and benefiting from the Group's technological support and experience. This initiative combines the dynamism of small, agile, innovative organizations with Arkema's unique expertise in specialty materials to develop the innovations of tomorrow.

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Arkema acquires a stake in Verkor and accelerates its batteries strategy in Europe

In July 2021, Arkema became a shareholder and technological partner of Verkor, a French start-up specialized in the production of high performance batteries for electric vehicles. Arkema is thus strengthening its development in batteries and clean mobility.

Arkema contributed several million euros to the company's €100 million round of fundraising, which will enable the construction of the Verkor Innovation Center near Grenoble in France, then the launch of the 1st gigafactory dedicated to battery production whose construction is expected to start in 2023. The Verkor Innovation Center, which should be operational in 2022, will provide a collaborative space to optimize industrial processes and create new generations of batteries.

Arkema is thus joining an ambitious project involving close technological collaboration with leading partners such as Renault Group, EQT Ventures, EIT InnoEnergy, Groupe IDEC, Schneider Electric, Capgemini, Tokai Cobex and Demeter. The Group will bring its wide range of high performance materials and products for batteries and will thus participate in setting up an integrated industrial battery production chain in Europe.

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.

The digital transformation roadmap, which has been rolled out across R&D, aims to reduce time-to-market for new products and materials by focusing on five priorities:

- digitization of laboratories to capture data;
- data governance to share and organize data using cloud-based software platforms;
- use of data science (modeling, artificial intelligence) to predict how formulations and materials will behave;
- adoption of data visualization tools (business intelligence – BI) to manage project portfolios in real time; and
- implementation of new customer support services using data sharing.

APPENDIX 1: INNOVATION STRATEGY

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. Thus, the health crisis that marked 2020 and continues today, has increased the criticality of certain risks to which the Group is exposed, particularly supplier dependence, raw material price changes, supply chain risks, cyberattacks as well as risks linked to capital expenditure projects. Nevertheless, while the pandemic affected the Group's operating and financial performance in 2020 and, to a lesser extent, in 2021 in certain regions, the risk mitigation and prevention measures in place enabled the Group to diminish the consequences thereof. In addition, stakeholders' increasingly demanding expectations with regard to the climate have led the Group to pay particular attention to the related risk and particularly to "transition" risks.

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 this 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;
- economic and business risks;
- project and innovation 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 ranked 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. Moreover, 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

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 (notably customers, suppliers and people living nearby).

Accident 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 or finished products, and production, supply or delivery 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 30 "Seveso" classified sites in Europe (as defined by directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of hazards linked to major accidents involving dangerous substances), *i.e.*, more than half of the Group's European sites. Outside Europe, the Group operates industrial facilities that fall under a similar classification, including 17 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 53% of Arkema's total sales in 2021.

Incidents or accidents at certain Group sites may also occur due to certain weather phenomena (storms, floods, droughts), the frequency and intensity of which may have increased due to climate change. For further details on this subject, see the "Climate" heading in section 2.1.3 "Operational risks" of this document. In addition, like other chemical sector players, Arkema owns or uses a small number of pipelines to transport hazardous chemical products.

Finally, 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. Should an accident occur, Arkema could also be held liable (i) owing to injury or damage to people (notably due to exposure to hazardous substances being used, produced or destroyed by Arkema or present on its sites), and/or to property, 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. As part of its preventive measures, all Arkema facilities and activities worldwide are also covered by a Group-wide safety management program adapted to the risks that each may face. Details are provided in section 4.5 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 that specify consequence prevention and mitigation measures and implements regularly tested monitoring and response plans.

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 enabled minor adjustments to be made where necessary. In addition, in the context of ever-increasing caution linked to terrorist attacks since 2015 and malicious acts, additional security measures have been put in place.

Lastly, 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 2021, 26 occupational illnesses were reported Group-wide, of which 10 were related to exposure to asbestos and 9 to exposure to chemicals. These figures include illnesses not yet included in the tables listing occupational illnesses. In France, 4 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 4.5.2.2.4 of this document.

Certain Group products may moreover 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 in general. These aspects are taken into account during the product design stage. Regulatory compliance plays a key role in ensuring product safety for the entire value chain, customers 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, the Group employs regulatory experts supported by a global network of correspondents based in its industrial sites and within its 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. These two committees communicate regularly to coordinate opinions while taking into account the specific regulations of each region.

Furthermore, Arkema may, if necessary, 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 resulting in pollution 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. In particular, 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. Moreover, 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 and the related provisions are detailed respectively in notes 10.2.1 and 10.2.2 to the consolidated financial statements at 31 December 2021 in section 5.3.3 of this 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 sections 4.5.1 and 4.5.3 of this document.

Arkema also benefits from guarantees from subsidiaries of TotalEnergies 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 10.3 to the consolidated financial statements at 31 December 2021 in section 5.3.3 of this 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 the 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 "Profile, ambition and strategy" 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 33% of its consolidated sales.

As indicated in section 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 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, 21 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).

Finally, 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 any of these laws or regulations in one or more 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. In 2021, 66% of the Group's employees took the anti-corruption training module.

In 2021, internal audit and internal control frameworks as well as due diligence processes applicable to mergers and acquisitions for the Group were also updated to strengthen the points relating to the compliance program. In this respect, particular attention was paid to anti-corruption.

In addition, pursuant to the French law of 9 December 2016, known as the "Sapin II Law", a corruption risk map was drawn up in 2018 and continues to be refined and updated regularly based in particular on interviews 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 societal expectations CSR

Arkema's operations, carried out in 55 countries, are subject to constantly changing national and international laws and regulations in a large number of fields, including safety, environmental protection, antitrust legislation, company law, commercial law, intellectual property, labor law, personal data protection, tax law, customs regulations and product stewardship. These laws and regulations impose increasingly strict obligations, particularly concerning industrial safety, occupational health, emissions and discharges into air, water and land of toxic or hazardous substances, rational use of resources, labeling, traceability, handling, transportation, storage and disposal of toxic or hazardous substances and exposure thereto, clean-up of past industrial sites, and soil and groundwater remediation.

If existing product regulations were to be amended to become more restrictive for Arkema or if new regulations were adopted, 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, (iii) possibly compel Arkema to abandon certain markets, incur significant expenditure to produce substitute substances or 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 have been identified as the most exposed to regulatory changes.

The implementation of the Montreal and Kyoto Protocols and the Kigali Amendment has led to a change in regulations with regard to emissive fluorogas applications in a certain number of countries. For this reason, the transition from old-generation refrigerants (hydrochlorofluorocarbons, or HCFCs) to existing generations (hydrofluorocarbons, or HFCs) then to new generations of low global warming potential refrigerants (hydrofluoroolefins or HFOs) is taking place progressively at different paces depending on the region, application and product. For example, the European F-gas regulation no. 517/2011, which aims to reduce volumes brought to market by more than 80% between 2015 and 2030, has introduced a quota system and gradual bans on certain usages, while the European MAC (Mobile Air-Conditioning) directive has banned the use of refrigerant gases with a global warming potential higher than 150 in all new vehicles sold in Europe since 1 January 2017. In the United States, HCFC-22 quotas were revised downward for the 2015-2019 period and, since 2020, the production and import of HCFC-22 are no longer allowed. Only sales of stockpiles and recycled products are authorized. In late 2021, the United States also adopted regulations (the AIM Act) to reduce HFC gas emissions by 85% in 15 years through the implementation of quota allocations starting in 2022.

The implementation of the European F-gas regulation substantially tightened the balance between HFC supply and demand in Europe, in second-half 2017 and in 2018. Since 2019, however, illegal imports of HFCs into Europe have weighed on both prices and volumes, significantly affecting the business' performance in the region.

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 to 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.

In parallel, in 2022, the European Commission is expected to finalize a proposed restriction on the use of microplastics in certain applications, which could mean that France will eventually have to align its own legal provisions with the new European regulatory framework.

As part of the "Green Deal" and with the launch of the "Chemicals Strategy for Sustainability", Europe opened a major new regulatory chapter for the assessment and management of chemical risks, based on a heavily revised generic approach to hazard and risk. The strategy will be implemented over the coming years according to the normal process for developing – or revising – the related regulations.

As a general rule, Arkema pays particular attention to ensuring compliance with all laws and regulations applicable to the Group. Non-compliance could result in significant fines being levied on Arkema or in civil or criminal charges being brought against it and/or its employees. As regards tax, 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. A description of the most significant current or potential litigation is given in note 10.2.2 to the consolidated financial statements at 31 December 2021 in section 5.3.3 of this document.

Lastly, the Group is especially attentive to the societal expectations expressed by civil society, non-governmental organizations and local 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 reputational damage for the Group.

Risk management

All of the Group's operational and corporate departments, both at the corporate and local levels, assisted by the Group's Legal department and, where necessary, specialist consultants or the relevant government authorities, work continuously to ensure that a high level of knowledge of the applicable legal framework 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 its industrial sites and within its operational units 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 section 4.2.4 of this document in particular.

In cases where regulatory changes lead to restrictions on the use of raw materials or the marketing of finished products, Arkema works to develop new products or substitutes and 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 10.2.2 to the consolidated financial statements at 31 December 2021 in section 5.3.3 of this 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 12 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

The Group has implemented a policy whereby the Legal department monitors all administrative, legal or arbitration actions, suits and proceedings, with support from specialist law firms where necessary.

All legal risks related to current or potential litigation are subject to a quarterly review. In this context, each business, corporate department and subsidiary must provide the Group Accounting and Consolidation department and Legal department with a written summary of any legal risks or proceedings that affect, or are likely to affect, the Group's business activities, results or financial position. These two departments analyze the risks and legal proceedings that were identified and 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 2 "Accounting policies and new standards" and note 10 "Other provisions and other non-current liabilities, contingent liabilities and litigation" to the consolidated financial statements at 31 December 2021 in section 5.3.3 of this document.

Internal control failures linked to recently acquired subsidiaries

As part of its overall corporate strategy, Arkema pursues a bolt-on acquisition program that targets small and mid-sized businesses. Over the past three years, the Group has acquired several companies or groups of industrial companies, such as ArrMaz, Lambson, Prochimir, LIP, Fixatti, Poliplas and Agiplast. 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.

Risk management

Following the completion of an acquisition, Arkema needs an average of two years to deploy its global internal control and risk management procedures. This system, its organization, main stakeholders and framework are described in section 2.2 of this chapter.

2.1.3 Operational risks

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 has entered into certain multi-year supply contracts, including those governing Arkema's supply of propylene and oxo alcohols, hydrofluoric acid (HF), 1.1.1-trichloroethane and cyclododecane (CDA), which are used as a main raw material for acrylic monomers, fluorogases, fluoropolymers 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 Carling, the Group signed an agreement with Total on 3 September 2015, which ended on 30 April 2021. On 19 May 2021, the two companies signed a long-term agreement extending the supply of propylene to the Carling site.

In the first half of 2021, Arkema France negotiated new terms and conditions for the electricity supply to some of its industrial sites to cover its medium-term needs.

Some of Arkema's French production plants, which consume and ship significant quantities of bulk raw materials classified as "hazardous materials" for transportation 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 transportation 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. The supply chain pressures seen in 2021 once again highlighted the importance of this matter.

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;
- prudent 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 risk

For some of its business activities, Arkema has entered into agreements representing significant income with certain customers, the most significant of which are described in sections 1.2 and 1.4 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, see note 10.2.2 to the consolidated financial statements at 31 December 2021 in section 5.3.3 of this document.

More generally, the Group's relationships with a large number of customers expose it to credit risk. At 31 December 2021, accounts receivable net of provisions amounted to €1,432 million. These accounts receivable are detailed by due date in note 11.6.4 to the consolidated financial statements at 31 December 2021 in section 5.3.3 of this 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.

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, see note 11.6.4 to the consolidated financial statements at 31 December 2021 in section 5.3.3 of this document. The policy concerning provisions for fully or partially uninsured bad debt 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, user awareness-raising, user access management, business continuity plan) and technical measures (global cybersecurity operational center, data protection, networks and infrastructure) that reduce the Group's cyber risk exposure.

To ensure the reliability of its critical processes and compliance with security rules, the Group has set up an internal control system consisting of a number of IT general 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 a local level, the IT department has implemented a new regional organization as described in section 4.5.2.6 of this document. Moreover, every Group site must comply with ten directives. Accordingly, the technical requirements of the Group's IT systems security policy comprise a behavioral component, which notably includes the implementation of the iSafe program to raise employee awareness about cybersecurity and data protection, and regular campaigns to build awareness and test responses around new fraudulent practices such as phishing.

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, Arkema may not reach the minimum 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 €1,072 million at 31 December 2021. For more information, see note 5.3.2 "Contractual commitments related to the Group's operating activities" to the consolidated financial statements at 31 December 2021 in section 5.3.3 of this 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.

Climate CSR

The 6th assessment report of the Intergovernmental Panel on Climate Change (IPCC), published in 2021, clearly shows the impact of greenhouse gas (GHG) emissions from human activities on climate change. The report specifically states that limiting climate change by 2100 is contingent on rapidly and substantially reducing GHG emissions and achieving carbon neutrality by 2050. Arkema, as an industrial company, takes into account both "transition" risks, related to the transformation of the economy to limit global warming, and "physical" risks, corresponding to the impacts of climate change on its business activities.

- **Climate transition risks**

To manufacture the products it sells, the Group consumes energy, implements processes that emit greenhouse gases and uses materials which themselves emitted greenhouse gases when manufactured. Downstream, the transportation, implementation, use and end of life of products sold also generate greenhouse gas emissions.

Given society's increasingly high expectations for climate action, a lack of, or insufficient, commitment from Arkema, or an inability by the Group to reduce its emissions across its value chain, could have multiple consequences, in particular: (i) less appeal to investors, which could limit the Group's ability to grow, (ii) less interest from customers for the Group's products, due to a lack of solutions contributing to a low-carbon economy in response to their needs, and, more generally, (iii) a tarnished image, which could also impact the Group's ability to attract and retain the talent it needs. Falling short of regulatory requirements in countries or regions with emissions reduction policies (carbon taxes or quotas) could also generate additional costs (taxes or penalties) or require significant expenditure and investment to adapt to such requirements, thereby reducing the Group's profitability. Fluorogases, for example, have been identified as the products that are most exposed to regulatory changes for many years.

Moreover, as the economy shifts toward new, low-carbon technologies, difficulties accessing certain current raw materials could arise, impacting their availability or price, with potential consequences for the Group's business activities or profitability.

Risk management

Arkema has long been committed to meeting the climate challenge and managing the related risks, continuously improving its global warming response policy and stepping up its actions year after year. Between 2019 and 2021, for example, Arkema set Science-Based Targets across its value chain and implemented a number of measures in line with recommendations from the Task Force on Climate-related Financial Disclosures (TCFD). The Group also ensures it is taking appropriate climate measures by responding each year since 2016 to the CDP questionnaire, receiving a score of B in 2021. For further information on risk identification, policies, measures and projects implemented, results achieved and the related climate change performance indicators, see section 4.4 of this document. Capex and Opex for climate change mitigation action plans within the scope of activities eligible for the EU taxonomy regulation are included in the reporting disclosures in section 4.1.4 of this document. Concerning fluorogases in particular, Arkema is already anticipating the applicable regulatory changes by developing new blends or substitutes. For further details, see section 4.4.3.3 of this document.

- **Physical risks and natural disasters**

For several years now, climate change has been driving an increase in the frequency and intensity of certain weather events (floods, droughts and storms, in particular), which could lead to incidents or accidents at some of the Group's production sites. Due to their geographic location, 38 of Arkema's 141 industrial sites (especially those located in Texas in the United States) are exposed to these effects of climate change or to seismic risks. In 2021, 26 of these 38 sites were identified as being specifically exposed to climate risks. These classified sites account for around 34% of Arkema's total sales. For most of these sites, there are alternative production arrangements within the Group. Some, however, are the only manufacturing sites for the products in question. If all of these sites 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.

The effects of climate change could also impact Arkema's supply chain if, for example, a supplier or subcontractor could not supply one or more Group facilities, for reasons also related to climate change, thereby impacting the Group's operating and financial performance and its ability to deliver to its clients.

Risk management

Physical risks pose a threat in the long term, with increasing effects as time goes on, requiring the company to plan ahead in order to mitigate risks and seize opportunities. To prevent and limit the impacts of climate change to the greatest extent possible, the Group has drafted scenarios that notably take into account its evolution and consequences. Section 4.4 of this document, and more specifically sub-section 4.4.4, provides information on all adaptation measures implemented by the Group and the deployment of scenario-based approaches.

Risk related to health crises

CSR

Serious health crises or pandemics, such as the Covid-19 pandemic which emerged in China at the end of 2019 and then spread to most regions throughout the world in 2020 and 2021, may lead public authorities in France and across the world to adopt measures to restrict the movement of people and the transportation of goods or even to lock down whole populations. These measures could cause disruptions on several levels for the Group. In particular, they could impact supply chains and weigh on customer demand in the different regions of the world. They could also result in partial or total closures of production units, research centers, head offices and other sites.

Health crises or pandemics may impact employees' health and limit their availability, as well as create difficulties with respect to the supply of certain raw materials or the delivery of products to customers.

They may also have a significant impact on the Group's business activity, financial performance and cash flow generation.

Risk management

In the event of a pandemic or serious health crisis, Arkema, in compliance with the applicable regulations, implements the necessary measures to protect its employees' health as a priority, to limit the impact of the exceptional situation on its business activities and results to the greatest extent possible, and, lastly, to prepare the return to more normal conditions. To this end, the Group notably deploys crisis management measures at both the central level and in the different countries in which it operates, led by trained personnel.

More generally, the Group ensures that business continuity plans are defined for its main industrial and administrative sites around the world. The plans include actions on two levels:

- health measures to limit the transmission of viruses and protect the health of employees and subcontractors working on the sites by (i) informing all personnel about health measures, raising awareness and providing alcohol-based sanitizers and protective masks, (ii) issuing instructions on how to contain isolated cases, and (iii) reducing the number of meetings and business trips;
- organization measures to ensure business continuity by introducing teleworking solutions and virtual meetings, wherever possible; and
- measures to adapt business activity to the level of absenteeism by organizing work in such a way as to enable a site to continue operating despite the absence of significant numbers of employees and, in extreme cases where a very large number of employees are absent, to ensure the safety of the site in question and environmental protection.

Lastly, the Group adopts a strict disciplined approach to financial policy in order to maintain a solid balance sheet and a high level of liquidity and regularly reviews its sources of financing in order to ensure they are sufficiently diverse and have an average maturity of more than three years. The Group may also reduce its recurring fixed costs, adapt its investment expenditure and further optimize its working capital when circumstances so require.

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), supplier or customer production site, 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 or 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.

Lastly, 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 products manufactured by the Group.

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 risk

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 the 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 solid 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 risk 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 in which the Group operates.

Arkema's experienced and committed teams enable the Group to:

- innovate by creating sustainable product and application solutions (in 2021, 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 and, more recently, the specialty polyamides platform in Singapore);
- successfully integrate acquisitions (in particular within Bostik); and
- more generally, adapt to different macro-economic environments and significantly improve Arkema's financial and non-financial performance.

Given that 33% of Arkema's employees are over 50 years old at the date of this document, the Group is organizing 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 4.6.1 of this document.

Arkema's compensation policies value and fairly reward 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 4.6.1.5 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.

Since 2020, the health crisis has highlighted the need to adapt ways of working to previously unimaginable circumstances, in particular with the introduction of temporary lockdowns in most countries in which the Group operates. Arkema responded quickly to these situations, implementing a remote working policy tailored to each country. The policy is reviewed to reflect changes in the health situation.

2.1.4 Economic and business risks

Change in prices of key raw materials and energy

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 11.6.5 and 11.2.2 to the consolidated financial statements at 31 December 2021 in section 5.3.3 of this document).

The Group also forges partnerships with certain 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 downstream acrylics, in order to pass on to its selling prices increases in the cost of the raw materials used to manufacture its products.

Strengthening competition

Arkema is confronted with strong competition in each of its businesses, especially in intermediate activities, with the strengthening of some of its competitors and the emergence of new players that could impact its own competitive position. Regarding the Group's intermediates activities, some competitors are larger and more vertically integrated, which could enable them to benefit from lower production costs for certain products that the Group also manufactures. Moreover, the economic development of certain countries like China has been accompanied by the rise of local competitors, resulting notably in new global capacities and the development of new technologies. This has led to growing competition on certain product lines, which could place lasting downward pressure on the selling prices and margins 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.

Moreover, thanks in particular to its innovation, the Group is deploying a repositioning strategy to diversify its portfolio of products and application markets and strengthen its position in niche markets with higher added value.

Lastly, the Group forges 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.

Geopolitical and macroeconomic instability

Arkema's global business, which generates a significant portion of its sales in certain regions of the world or countries (36% in Europe, 27% in the United States and 16% in China in 2021), exposes it to the direct and indirect consequences of trade disputes, embargoes, epidemics or pandemics, sudden changes in customs duties, terrorist activities, political instability and armed conflict. 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 and insurance premiums.

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. As Arkema gradually establishes production plants in the main geographical regions, this also 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.

2.1.5 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 investment in Specialty polyamides in Asia and the investment in Thiochemicals in Malaysia that was finalized in early 2020. For the 2020-2024 period, the Group estimates that its exceptional capital expenditure will total approximately €525 million. These investments are described in the "Profile, ambition and strategy" section of this document. 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 elements could weigh on the Group's growth prospects and the expected profitability of these investments and thus have a negative impact on its business, earnings and financial position.

In line with its ambition to become a pure Specialty Materials player, Arkema also deploys an ambitious bolt-on acquisition program that targets small and mid-sized businesses to strengthen its portfolio and Specialty Materials platform. In this respect, the Group has spent around €1 billion 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, in particular 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.

Lastly, as part of disposals of non-strategic activities, 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.

Risk management

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.

Innovation and technologies CSR

The Group's innovation policy, 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 provide its customers with the technical support and solutions they need; 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 2021, R&D expenditure totaled €243 million, representing 2.6% of Group sales.

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 could drag down the Group's sales. In the field of batteries in particular, many technologies are currently being developed but it is impossible to say which ones will be successful. The Group is devoting significant R&D resources to preparing for the emergence of tomorrow's battery technologies. At this stage, however, the level of uncertainty remains high.

Risk management

With more than 1,600 researchers and €243 million in R&D expenditure, Arkema invests heavily in R&D each year to develop new products and processes that cater to both market demand and major challenges arising from global megatrends. This strong focus on innovation also enables the Group to adapt to regulatory changes. The R&D teams carry out important monitoring work, both in Arkema's own technological fields, but also further downstream in the technologies 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 intellectual property and know-how

Arkema is developing an innovation-based growth strategy structured around a dedicated organization, 15 R&D centers spread throughout the world and a research incubator. It therefore has a large R&D project portfolio. As such, the patents that protect the innovations generated by its research together with its trademarks represent a key asset for its business. At 31 December 2021, Arkema owned 10,196 patents and 222 new patent applications were filed in 2021 (203 in 2020), 200 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 type of intellectual or industrial property rights infringement could also harm the reputation and the perceived quality of the products concerned as well as the image of the Group. The Group also monitors patent applications filed by third parties. Such applications are only made public on publication and could have an impact on ongoing developments within the Group or on products recently brought to market. They 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 the Group's business and earnings.

Risk management

Arkema has developed an assertive policy to protect its innovations through the registration of patents, particularly with the support of a global network of industrial property consultants. For further details, see section 1.1.3 of this document.

When it comes to protecting its know-how and 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.

2.1.6 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 subsidiaries' accounts that are denominated 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 would have an estimated impact on consolidated EBITDA of around €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 earnings.

Risk management

Arkema's objective is to minimize the impact of exchange rate fluctuations on its earnings and financial position.

Transactional risks are systematically hedged, at the latest 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 11.6.1 and 11.2 to the consolidated financial statements at 31 December 2021 in section 5.3.3 of this 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 11.3 and 11.6 to the consolidated financial statements at 31 December 2021 in section 5.3.3 of this 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 (including subordinated debt) to EBITDA ratio of less than 2;
- maintaining cash reserves in excess of €500 million;
- having a Euro Medium Term Note (EMTN) program, to facilitate access to bond markets;
- maintaining average maturity at over 3 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 segments of the Specialty Materials platform, which each comprise two Business Lines encompassing one or several activities, and the Intermediates segment, which includes two activities, with each activity responsible for its own performance and the implementation of internal control procedures (see section 1.2 of this document);

- the corporate departments (or support functions), which assist the segments and activities in their area of competence, such as finance, human resources, industry, legal affairs, IT, insurance and procurement, and ensure coherence and optimization at the Group level (see section 1.3 of this document); and
- the subsidiaries, in which Arkema performs its business activities (for further details, see section 6.1.2 of this 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 and its three committees (the Audit and Accounts Committee, the Nominating, Compensation and Corporate Governance Committee and the Innovation and Sustainable Growth Committee [1]), supported by the experience and expertise of their members, 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 for the entities and 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 Group Accounting and Consolidation, 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 Group Accounting and Consolidation 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 2021.

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.

Arkema's internal control system meets the principle of the three lines of defense, 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 notably 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.

(1) The Innovation and Sustainable Growth Committee was set up on 20 May 2021.

All processes and management systems (at the legal entity, Business Line, corporate department or other level) may be subject to an internal audit. The Internal Audit department discusses and agrees on its findings with the managers of the audited area before presenting them with a set of recommendations and related action plans that the managers of the entities or management systems 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 2021, the Internal Audit sub-department, made up of 8 internal auditors, carried out the following 39 audits:

- 14 audits of industrial sites or R&D centers in Europe, North America and South America;
- 19 audits of subsidiaries in Europe, Asia, Africa, North America, South America and Australia;
- 3 audits of processes or projects in Europe and Asia; and
- 3 audits of businesses in Europe and North America.

In 2021, 38% of audits were carried out remotely.

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 sub-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 2021. Its performance is measured annually, by self- or peer assessment, and recorded in the dedicated GRC (Governance, Risk and Compliance) tool.

Segments, Business Lines, activities, corporate departments and subsidiaries

Arkema is organized into segments as described in section 1.2 of this document. The segments of the Specialty Materials platform each comprise two Business Lines encompassing one or several activities, and the Intermediates segment includes two activities following the divestment of the PMMA activity in May 2021. Each activity coordinates the use of the resources required to meet the targets set in their respective areas and 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, Business Conduct and Ethics Code, 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 Business Conduct and Ethics Code put in place by Arkema, available on Arkema's website under the heading "Ethics". 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 the internal control system.

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 Business Conduct and Ethics Code 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 Business Conduct and Ethics Code, 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 described in section 4.6.2 "Compliance and ethics" of this document.

In addition 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 annually 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 Arkema.

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 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; and
- 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 notably 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, see 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 actively contributes to 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 sub-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, who is a member of the Executive Committee, and the Executive Committee reviews the results of the segments and their respective activities;

- the Group 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 Group Accounting and Consolidation 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 among 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,
  - economic and business risks,
  - project and innovation risks, and
  - financial risks.

2.2.5 Accounting and financial control procedures

Operational and corporate managers' control and understanding of their business' financial performance represents 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:

- a Group 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 controlling

The Group 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 Group 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 four segments and their respective businesses, the corporate departments and Arkema's subsidiaries as a whole; and
- 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 segment and by activity, based on the consolidated data provided by the Group 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 Group 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 department and submitted to the Company's Board of Directors for approval.

At the end of each accounting period, the Group 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 program to transform and rationalize its IT systems using SAP integrated software, which is helping to improve the Group's control environment, particularly through procedure review and improved automated checks. This integration effort also applies to Group acquisitions.

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 2021, 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 €700 million 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 2021, the maximum total retention in the event of a claim was €20 million. It is now €40 million as of 1 January 2022.

The combined cover limit of the policies in place for direct damage and business interruption, over and above the total retention, is €500 million.

Transportation

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 Group's production sites. 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 €30 million with effect from 1 March 2022 to 31 March 2023, with a deductible of €5 million per claim.

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 analyzes 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 of Directors 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. Information on these objectives, the implementation thereof and the results achieved is provided in sections 3.2.2 and 4.6.1.6 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 own internal rules as updated most recently on 24 February 2021.

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 videoconference or 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 convening notice if all members are present or represented. In accordance with its internal rules, in all cases permitted by law and if specified in the convening notice, 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 practices 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, whilst also taking the social and environmental challenges of its business into consideration;
- 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 of Directors; 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 meetings of the Board of Directors and of the committees to which they have been appointed, as well as 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 convening notice 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 meeting 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 Board of Directors' 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 this chapter.

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. 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 director and directors who are employees of the Group are excluded.

3.3.2.3 Activities of the Board of Directors

The Board of Directors met eleven times in 2021. There was a high attendance rate at these meetings of 92% (*versus* 95% in 2020). Regularly scheduled meetings lasted slightly longer than four hours, the same as in 2020, and the more exceptional, context-related meetings (notably about the pandemic and M&A activity) varied in length depending on the topic at hand.

The following table summarizes the individual attendance rates of directors at the meetings of the Board of Directors and its committees in 2021.

	Board of Directors		Audit and Accounts Committee		Nominating, Compensation and Corporate Governance Committee		Innovation and Sustainable Growth Committee	
Director	Attendance rate	Number of meetings	Attendance rate	Number of meetings	Attendance rate	Number of meetings	Attendance rate	Number of Meetings
Thierry Le Hénaff	100%	11/11	-	-	-	-	-	-
Yannick Assouad [1]	75%	3/4	-	-	-	-	-	-
Jean-Marc Bertrand	100%	11/11	-	-	-	-	100%	1/1
Bpifrance Investissement represented by Sébastien Moynot [2]	100%	7/7	-	-	-	-	100%	1/1
Marie-Ange Debon	100%	11/11	91%	5/6	-	-	-	-
Fonds Stratégique de Participations represented by Isabelle Boccon-Gibod	91%	10/11	100%	6/6	-	-	100%	1/1
Ilse Henne [2]	100%	7/7	100%	4/4	-	-	-	-
Ian Hudson	91%	10/11	100%	6/6	-	-	100%	1/1
Alexandre de Juniac	60%	6/10 [3]	-	-	100%	3/3	-	-
Victoire de Margerie [4]	91%	10/11	-	-	100%	2/2	100%	1/1
Laurent Mignon	64%	7/11	-	-	-	-	-	-
Hélène Moreau-Leroy [5]	100%	11/11	100%	2/2	100%	1/1	-	-
Nathalie Muracciole	100%	11/11	-	-	100%	1/1	-	-
Thierry Pilenko [2]	100%	7/7	-	-	100%	1/1	-	-
Susan Rimmer	100%	11/11	-	-	-	-	-	-
Philippe Sauquet [6]	100%	1/1	-	-	-	-	-	-
TOTAL	**92%**	**11**	**96%**	**6**	**100%**	**4**	**100%**	**1**

(1) Term of office expired on 20 May 2021.
(2) Appointed on 20 May 2021.
(3) Did not attend meetings on subjects that put him in a conflict of interest due to his duties at Morgan Stanley.
(4) Left the Nominating, Compensation and Corporate Governance Committee and became Chairman of the Innovation and Sustainable Growth Committee on 20 May 2021.
(5) Left the Audit and Accounts Committee and joined the Nominating, Compensation and Corporate Governance Committee on 20 May 2021.
(6) Co-opted since 9 November 2021.

The agendas of the Board of Directors' meetings included recurring annual topics as well as more specific topics, as follows:

Operations, strategy and risk management	**Recurring annual topics** • review and approval of the strategy and main operational priorities presented during the annual seminar • monitoring of the implementation of the bolt-on 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 strategy (actions and results) for cybersecurity • progress report on the Group digital transformation program • business presentation by the industrial division, including major projects • presentation and review of the business of each division **Specific topics in 2021** • various strategic projects: monitoring of the partnership with Nutrien Ltd. for the supply of hydrofluoric acid, and of the construction of a bio-based polymer manufacturing plant in Singapore • consequences of extreme cold weather in the United States on energy supply, impacts of higher raw materials costs and supply chain disruptions, and the emergence of new Covid variants • the Group's brand identity and positioning • various M&A transactions: divestment of the PMMA activity and acquisition of Poliplas, Ashland's adhesives business, Agiplast and Permoseal • risk review within the context of the Covid-19 crisis
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, the management report and, more generally, 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 2021** authorization to renew the Euro Medium Term Notes (EMTN) program for a maximum amount of €5 billion publication of the financial statements in European Single Electronic Format (ESEF) launch of a €300 million share buyback program signing of an amendment to the syndicated credit facility agreement
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 2021** • self-assessment of the Board of Directors' operating procedures • decision to hold the annual general meeting of 19 May 2021 behind closed doors • appointment of Thierry Pilenko, Bpifrance Investissement, represented by Sébastien Moynot, and Ilse Henne, as directors • appointment of Thierry Pilenko as Chairman of the Nominating, Compensation and Corporate Governance Committee, Hélène Moreau-Leroy and Nathalie Muracciole (for compensation matters) as members of the Nominating, Compensation and Corporate Governance Committee, and Ilse Henne as a member of the Audit and Accounts Committee • creation of the Innovation and Sustainable Growth Committee and appointment of Victoire de Margerie as its Chairman and Bpifrance Investissement, represented by Sébastien Moynot, the Fonds Stratégique de Participations, represented by Isabelle Boccon-Gibod, Ian Hudson and Jean-Marc Bertrand, as members • acknowledgment of the fulfillment of the performance conditions applicable to the 2018 performance share plan • 2021 performance share plan
Corporate social responsibility	**Recurring annual topics** • Group's situation in terms of safety and the environment (particularly the climate) • Group human resources policy, especially its diversity and talent management policy • Group ESG approach and roadmap • non-financial information statement and duty of care **Specific topics in 2021** • detailed review of ESG aspects, in particular climate-related ones, within the scope of recent acquisitions and investments

In 2021, the Board of Directors continued to be responsive and adaptable in the context of the ongoing Covid-19 pandemic, meeting regularly (11 meetings) in person when possible or remotely thanks to well-functioning videoconferencing systems.

At each meeting, the Chairman updates the Board on 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 also 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 typically 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 among senior management in general. Each year, it reviews the policy established by executive management in this regard, including the objectives, actions implemented and results achieved. For further details on the 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, as well as the career management policy for Group executives. This work is used in particular 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, it has set out the conditions for replacing the Chairman and Chief Executive Officer, notably in the event of an emergency (so-called "tramway" scenario), and the key principles for his long-term succession.

Since the beginning of 2022, the Board of Directors has met twice, with an attendance rate of 96%. Beyond the recurring topics such as the approval of the 2022 annual budget, the approval of the annual consolidated and Company financial statements for 2021, the proposed allocation of profit and, more generally, the preparation of the annual general meeting including approval of the proposed resolutions, these meetings focused in particular on:

- the review of achievements and strategy in terms of human resources and talent management;
- the distribution of a dividend of €3 per share in respect of 2021;
- the examination and review of the financial performance and achievements of the High Performance Polymers Business Line;
- the Chairman and Chief Executive Officer's 2022 compensation policy;
- directors' compensation in accordance with the compensation policy applicable in 2020, as well as the compensation paid or awarded to the Chairman and Chief Executive Officer in 2021;
- the Executive Committee members' compensation for 2021 and their compensation policy for 2022;
- the review of the Group's social and environmental challenges as part of the non-financial information statement pursuant to articles L. 225-102-1 and L. 22-10-36 of the French Commercial Code and the report on the effective deployment of the *plan de vigilance* (duty of care plan);
- the review of the Group's 2022 insurance policy;
- the share-based compensation policy, in support of the proposal submitted to the annual general meeting to renew the authorization to grant performance shares;
- the annual assessment of the operating procedures of the Board of Directors and its committees carried out in 2021 by an independent advisory firm;
- the proposed reappointments of directors whose terms of office were due to expire at the annual general meeting of 19 May 2022, and the proposed appointment of Nicolas Patalano, as director representing shareholder employees; and
- the Board of Directors' annual on-site meeting, which took place at the Genay Coatex and Pierre-Bénite Arkema France sites in the Lyon area. As part of this event, directors visited both sites' plants and research centers, including the new Christian Collette Center of Excellence for Batteries. They were also given demonstrations of product applications and presentations of new developments in the Coating Solutions segment and the High Performance Polymers Business Line.

Lastly, an executive session was held at the end of the 23 February 2022 meeting, as provided for in the internal rules. Senior independent director Hélène Moreau-Leroy conducted the session, during which the non-executive and non-employee directors were able to discuss matters in the absence of the executive director and directors bound to the Group by an employment contract.

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).

At the beginning of 2022, the Board of Directors' 2021 operating procedures were assessed by 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 17 February 2022 and then to the Board of Directors on 23 February 2022.

In general, this assessment shows that, again this year, Arkema's governance practices are among the best in the industry. On average, more than 90% of the directors said they considered the dynamics of the Board's operating procedures and its performance to be very satisfactory, despite the significant changes in its composition in recent years due to the expiry of the terms of office of several directors present in 2006. The directors unanimously agreed that they genuinely enjoyed working together in the professional and friendly atmosphere.

The assessment highlighted the following strengths:

- the leadership of the Chairman, who facilitates discussions and leaves room for debate and questions. The directors commended the way in which the Board is run and unanimously expressed their pleasure in contributing to and participating in this Board;
- the dynamics and commitment of the Board thanks to its high level of cohesiveness, collegiality and diversity and the deep respect that all members have for each other, allowing for lively discussions and the free expression of opinions. The Board of Directors was found to be very balanced, well-paced and highly constructive;
- strategic discussions with a good balance between governance matters and strategic issues, as well as transparency and consistency in strategic thinking. The Board found the management team working alongside the Chairman and Chief Executive Officer to be effective and committed in their dealings with the Board;
- the composition of the Board, with prompt induction of new directors and experienced, diversified and complementary director profiles that are well aligned with Arkema's needs;
- the role of the senior independent director, which was recognized as positive and well positioned, particularly in terms of dealings with external stakeholders and the good relationships developed with all directors and the Chairman and Chief Executive Officer;
- the role of the committees, whose work was unanimously praised as being well coordinated with that of the Board. The recent creation of the Innovation and Sustainable Growth Committee was deemed positive, and reporting by the committee chairmen met the expectations of directors;
- the quality of the Board's documents, which met directors' expectations in terms of both format, with very concise presentations of the subjects, and content, with a clear understanding of priorities; and
- The Board secretary, who was found to be professional and efficient, attentive to the needs of directors, and responsive and available.

Following this assessment, the Board identified the following subjects for further improvement:

- the Nominating, Compensation and Corporate Governance Committee's involvement in succession plans, especially that of the Chairman and Chief Executive Officer;
- formalization of the induction program for new directors;
- the possible addition of another, more international profile – without this being an imperative – in line with the desire to strengthen certain skills such as customer businesses and financial expertise; and
- systematic post-mortem analyses of Board decisions to assess their effects.

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