

ENVIRONMENTAL DECLARATION 2018





ENVIRONMENTAL DECLARATION BY KAO CORPORATION, S.A.

Health, Safety & Environment department (HSE Dpt.).

This Environmental Declaration document is based on EC Regulation 1221/2009 of the European Parliament and on the Council dated 25 November 2009, whereby organisations are allowed to participate on a voluntary basis in a community environmental management and audit system (EMAS). All the information provided in this Environmental Declaration is objective and based on the data obtained from the internal and external control processes that are carried out by the Organisation and verified by the competent institutions. This Environmental Declaration encompasses all the activities - the design, production and sale of surfactant agents (anionic, non-ionic, cationic, and amphoteric, isolated or in mixtures), polymers, fatty amines, aromas, fragrances and toner - conducted by Kao Corporation, S.A. at the centres of Barberà del Vallès, Mollet del Vallès and Olesa de Montserrat. This document has been fully validated by AENOR (see verification date in paragraph 11, page 87). All rights reserved. No changes may be made to the content of this document, nor may it be used for purposes other than those for which it was intended, except with the express permission of Kao Corporation, S.A.

MARIA JOSÉ BERMEJO

KCSA President

JOSEP SADURNÍ

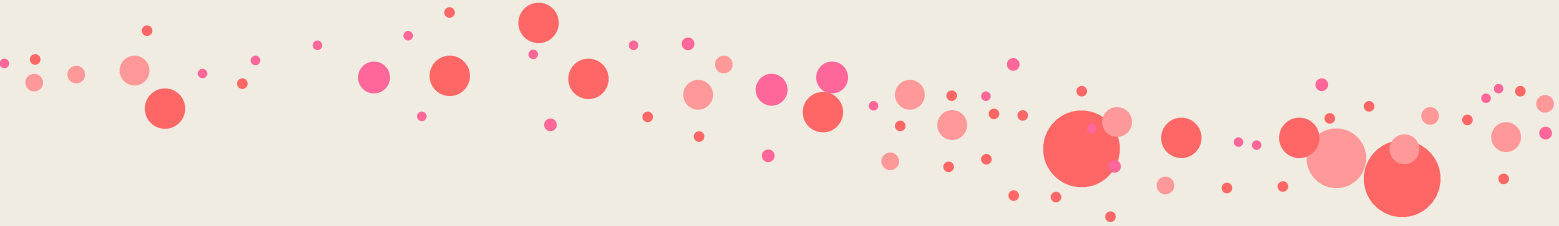
KCSA VP of Operations

OLGA FERRER

HSE Manager

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Environmental Specialist



Children (symbol of the now and future of the company), play with **cherry blossoms** (symbol of nature), all over the **Statement**, among the data, until in the end they catch a flower, get your goal, respect **the nature**, and show it to **the moon** (company logo).

**ENRICHING LIVES,
IN HARMONY
WITH NATURE.**



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1. INTRODUCTION AND PURPOSE OF THE ENVIRONMENTAL DECLARATION



For yet another year we present the company's Environmental Declaration, which we hope will be of interest to you. I would like to highlight that the continuous progress that is reflected in the declaration is the result of the efforts made by many people and whose contribution is greatly appreciated.

One of the developments in 2018 consisted of the 6th review of our General Sustainability and Risk Prevention Policy, via which an explicit commitment is strengthened and acquired in terms of the following aspects:

- Considering the perspective life cycle that is to be taken into account when carrying out our work.
- Deploying concepts driven by the circular economy such as the optimisation of the value of the resources or innovation to create value.
- The strengthening of our participation processes to achieve a maximum collaboration, both internal and external, for the purpose of optimising the creation of mutual value.
- Promote biodiversity.

This last aspect, as explained in the Declaration, began to be developed by approving a specific policy and establishing programmes aimed at materialising this firm commitment, which extends not only to our employees, but also to their families as well as other interested parties.

Also in 2018, the company was certified in accordance with the 2015 version of standard ISO 14001, which is already providing a broader vision in terms of managing the environment and the involvement of the chain of command.

I hereby provide you with our fourteenth Environmental Declaration. I encourage you to provide us with any comment, improvement or suggestion you may have after you have read the declaration by sending an email to kao@kao.es (subject: KSCA Environmental Declaration 2018).

**M^a JOSÉ
BERMEJO**
KCSA President



2. CONTEXT OF THE ORGANIZATION

In response to one of the new requirements incorporated by the new edition of ISO 14001 at the beginning of 2017 and using what occurred in 2016 as a reference, for the first time we have conducted and documented an analysis of the context (external and internal) of the organisation. This analysis is reviewed annually. Regarding the external factors, the possible impact on the achieving of the environmental objectives is analysed in terms of the social, political, legal, regulatory, financial, technological and economic situation surrounding the company.

For this reason, the sustainability policy as well as the strategic line that is to be followed are tied to the United Nation's Sustainable Development Objectives (SDO) as well as to the 10 Principle of the Global Compact.

The company carries out internal actions aimed at becoming knowledgeable with and committing to the SDOs: training employees and managers, assume corporate commitments in terms of the SDOs and communicate



these to the interest groups (for example, through this declaration) as well as carrying out awareness actions throughout the supply chain.

Regarding the internal factors, the possible impact is analysed in terms of the issues related with the activities, products and services, strategic direction, culture and qualifications. The results help to analyse the risks and opportunities for the purpose of ensuring that the RPMS (Risk Prevention Management System) can achieve its expected results in terms of preventing or reducing the undesired effects and achieve continuous improvement.

2.1 WHO WE ARE

2.1.1 HISTORIC EVOLUTION

Kao Corporation is a Japanese multinational whose head offices are based in Japan and whose strategic units are distributed worldwide to ensure operational coverage.

Most of the products manufactured by Kao worldwide are the so-called 'daily use consumer goods' for end consumers (personal hygiene products, cosmetics, detergents and food products). These products are manufactured at factories outside Spain, mainly in Asia, America and Europe (Germany). In Europe, more specifically in Spain, chemical products are developed and manufactured for industry, by supplying companies that use our end product to prepare their own product. In 2017 the group purchased Spanish ink manufacturing company Chimigraf to become Kao Chimigraf.

The Kao Corporation is a member

of the Japan Responsible Care Council (JRCC), in conjunction with another 109 companies that produce chemical substances. The Health, Safety and Environment Directives became particularly relevant for the Worldwide Corporation in 1995, when working targets were set for all operational units and the Safety and Environment strategies were financially strengthened. Kao Corporation, S.A. works in parallel with the parent company, developing its own Safety and Environmental strategies according to Spain's situational context (legislation, technology, etc.) and actively undertakes to protect and conserve the environment through the Responsible Care programme of the Spanish Chemical Industry Federation, FEIQUE, of which it has been a member of since 1993.

Kao Corporation, S.A.

Kao Corporation was founded in Spain in 1970 through the acquisition of 50% of Sinorgan, S.A., a company in Mollet del Vallès engaged in the manufacture of fatty amines. In 1978, Kao Corporation purchased all of Molins i Puigarnau, S.A. (Olesa de Montserrat), dedicated to the manufacture of industrial chemicals (surfactants), basically those destined for the detergent, cosmetic, textile and fertiliser industries.

Considerable investments were made throughout this period, initially to increase production capacity (which doubled between 1980 and 1990) and later to improve safety at facilities and, finally, to improve the automation level of the Mollet del Vallès and Olesa de Montserrat factories.

In 1987, Kao Corporation, S.A. launched a diversification plan to definitively consolidate its presence in Spain. In October 1988, the third production centre was opened in Barberà del Vallès, now the location of the Company's European Headquarters, giving a new impetus to the research laboratories. The Floppy Disk and CD (Info-Systems) factory facilities were located in this centre, but subsequently closed in 1999 and were replaced by the current Toner production lines.

In 2013 Kao purchased land from Hormigones Uniland, S.L. at Olesa de Montserrat, which allowed improving the security of the facility and in turn enabled upgrading the installations of this centre.

In 2016 the hydrogenation installations were scrapped at the Mollet del Vallès plant for the purpose of housing the ink production warehouse of company Kao Chimigraf in 2017. Although this activity is excluded from EMAS's scope, it has an effect on its indicators as it is incorporated in the Integrated Environmental Authorisation of Kao Corporation, S.A.

2.1.2 KAO'S COMMITMENT WITH THE ENVIRONMENT: "ECO TOGETHER" PROGRAMME

In June 2009, Kao introduced the "eco together" programme, which focuses on the life cycle of Kao products -from the supply and manufacturing of materials to their distribution, sale, use and final disposal.

The programme is based on cooperation with suppliers, consumers and other stakeholders, with the objectives of decreasing CO₂ emissions and water consumption, managing chemical substances and protecting biodiversity.

Kao firmly believes in the need for its business to be managed in an ecologically responsible way, with a management style capable of tackling issues as important as global warming, scarcity of resources and the loss of biodiversity.

To achieve substantial reductions in emissions of CO₂ and in water consumption, the company has committed itself to eco-innovation and the development of new environmental technologies. In June 2011, at the headquarters located in Tokyo, a new research centre was opened for these purposes: the Eco-Technology Research Centre (ETRC).

As a result of its efforts in administering water resources, Kao was acknowledged as a global leader and was included in the CDP list in 2016.

CDP is an international, non-profit organization that provides a global system for companies, cities, states and regions to measure, disclose, administer and share vital information about their environmental performance. CDP



Thirsty business: Why water is vital to climate action 2016 Annual Report of Corporate Water Disclosure

is the first provider of climate research for investors, and it works to motivate companies to disclose their impacts on the environment and natural resources and to take measures that reduce them.

At Kao Corporation, S.A. (Spain), application of the "eco together" programme commenced in 2010, through adaptation of the plant's objectives, setting a target of reducing energy consumption by 30%, water consumption by 30% and waste generated by 30%. All these targets are to be met by 2020.

A working group was set up in 2010 to tackle such ambitious objectives. To date, the group's major achievements have been:

- Setting up indicators for the three areas of work.

- The drafting of a work plan: the 'Sustainability Plan'.

This plan allows monitoring all actions targeted at achieving the "eco together" objectives.

- Mobilization of the company's

resources to promote this programme (for example, bringing together employees' proposals –Kaizen– as well as suggestions from specialists and managers at each centre).

In 2014 the working group was restructured and a leader was assigned for each one of the three environmental vectors (water, energy and waste). Kao is one of the seven companies – among 250 that were evaluated – that obtained the maximum number of points in the Forest 500 list that is prepared by the Global Canopy Programme, which analyses the fact that agents in the world have comprehensive policies for protecting tropical forests.

In 2015 Kao Corporation, S.A. was recognised by the European Commission for maintaining the EMAS record for ten consecutive years. This recognition is a testament of the company's commitment towards environmental issues.



2.1.3 LIFE CYCLE ASSESSMENT (LCA)

At the end of 2017, management defined a Product Safety Policy and drafted the PSMS (Product Safety Management System) Manual.

This way the commitment to carry out a sustainable management is explicitly stated regarding the life cycle of the chemical products that are purchased, handled and placed on the market in terms of safety as well as the protection of health and the environment.

The scope of Product Safety covers the handling and use of products throughout their life cycles and over which Kao Corporation, S.A. may have a direct effect on; from the research and development phase to the subsequent phases of manufacturing, marketing and distribution in most cases. Product Safety in the usage and recycling phases and during its elimination, if applicable, is based on the promoting of good practices.

On this base, improvement points are defined each year related with the Life Cycle Assessment. Regarding the activities that have been carried out in the past in terms of the Life Cycle Assessment and flagging the Carbon Footprint (as well as the Water Footprint) of products, we must highlight our experts' participation in international projects to generate accurate and updated data about the main substances.

On the other hand, the project conducted by the Research Institute for Fragrance Materials (RIFM), 'Life Cycle Assessment of Selected Fragrance Materials' has studied the life cycle of five materials selected for their representative structure and production volume. The final report was published in April 2013. On the other hand, the final report of the "ERASM Surfactant Life Cycle & Ecofootprinting (SLE) Project was approved in 2014: Updating the life cycle



inventory data of commercial surfactant production“ which includes the updated inventories (ICV: Life Cycle Inventories) for the most important commercial surfactants used in Europe. This study provides an updated and representative result of the great quality of the inventories (life cycle from the cradle to the grave) of 15 surfactants and 17 precursors of the sector.

— Anionic: LAS; C12-14 Alkyl Sulphate (oil); C12-14AE2S (oil); C12-13AE2S (petrol); Na Cumene Sulfonate
 — Non-ionic: C12-14 AE3 (oil); C12-14 AE7 (oil); C12-13 AE3 (petrol); C12-13 AE7 (petrol); C16-18 AE >20; Alkanolamine; C12-14 Amine oxide
 — Cationic: TEA-Quat
 — Amphoteric: Alkylamidopropyl betaine; Cocoamphoacetate

Of these 32 studied products, Kao provides data for 4 of them. Parallel to this, 3 different forms are generated of the results of the inventories (Ecospold, ILCD and GaBi DB) to be used for calculating product life cycles using different software that is currently available on the market.

An important result of the study is the obtaining of an analysis of the global warming potential (GWP) indicators and the primary Energy Demand (PED) of the surfactants and precursors that are studied.

The presentation of the results of this study at conferences, scientific magazines, etc., was the main activity in 2015. For this purpose, a communication group is created as part of the project to carry out this task:

CESIO 2015 Conference (Istanbul - June), Presentation / Conference: “New and updated Life Cycle Inventories for Surfactants: Summary of the Results of the

ERASM Surfactant Life Cycle and Ecofootprinting (SLE) Project“ SETAC Europe 2015 - 25th Annual Conference in Barcelona (May): Presentation of the poster: “Results of the ERASM Surfactant Life Cycle and Ecofootprinting (SLE) project: New and updated inventory data for oleochemical and petrochemical surfactants“. This year the activity has been limited to monitoring the activities of other groups (also scarce), news and developments in these fields. The reduction in practice of these calculations in the industry is due to the increase in regulatory pressure of required compliance in terms to chemical products, especially in the notifications and international records area (REACH, TSCA, DSL, K-REACH, T-REACH...).

MOST NOTEWORTHY ACTIONS SINCE 1977

1977

Introduction to clean fuels: replacing fuel oil with Natural gas

1983

Creation of the Safety and Environmental Service

1984

First study on the quality of groundwater

1985

Physical-Chemical treatment of waste water at the Mollet del Vallès centre

1989

Physical-Chemical treatment of waste water at the Olesa de Montserrat centre

1990

Biological treatment through percolation of waste water in Olesa de Montserrat

1991

Installation of the first electric cogeneration plant in Mollet del Vallès

1992

First soil-quality analysis

1996

Implementation of the DuPont security system - STOP PROGRAMME

2001

Membrane-based biological treatment of HCA waste water at Mollet del Vallès

2002

Environmental Authorisation (Mollet del Vallès and Olesa de Montserrat) and Environmental Licence (Barberà del Vallès)

2003

ISO 14001 certification: Environmental management systems. Requirements with guidance for use.



2004

OHSAS 18001 certification: Occupational health and safety management system

2005

EMAS European Register

2010

Fitting of the percolator filter in the waste water treatment process at the Mollet del Vallès centre

2011

Environmental Risks Analysis (ARMA) of the Mollet del Vallès and Olesa de Montserrat centres

2012

Environmental Risks Analysis (ARMA) of the Barberà del Vallès centre

Introduction and set-up of the KAIZEN philosophy in the productive structure

2013

Study to reuse waste water at the Olesa de Montserrat centre

Drafting and implementation of the Crisis Communication Manual Establishing and activation of the Crisis Committee

Implementation of the Energy Management System in accordance with ISO 50001

2014

ISO 50001 certification: Energy management systems

Creation of Action Learning groups: Sustainability of the Central Building and waste reduction

2015

Basic soil report for Olesa de Montserrat for renewing the Environmental Authorisation

Integrated environmental inspection (Mollet del Vallès and Olesa de Montserrat)

Acknowledgement certificate for being in the European EMAS registry for 10 years

2016

Environmental Risks Analysis Update (ERAU) of the Olesa de Montserrat centre

New edition of the Risk Prevention Management System to adapt it to the requirements of ISO 14001:2015.

Discontinuance of the cogeneration plant and the fatty acid and glycerine production activity at the Mollet del Vallès centre

2017

Building and commissioning of an ink manufacturing warehouse at Mollet del Vallès

Basic soil report for Mollet del Vallès resulting from a request for a substantial change and partial cancellation of the activity

Participation in the removal of American cane near the Llobregat river in the municipality of Abrera

Renewal (or review) of the Environmental Authorisation of the Olesa de Montserrat Centre

2018

Inventory and evaluation of the conservation of biodiversity at the three establishments. Drafting of the first edition of the Biodiversity Policy.

Environmental Risks Analysis Update (ERAU) of the Barberà del Vallès centre

Certification of the Risk Prevention Management System in accordance with the requirements of ISO 14001:2015.

2.2 WHAT SHOULD WE DO AND WHERE ARE WE

2.1.1 PRODUCTIVE ACTIVITIES
(SPANISH NATIONAL CLASSIFICATION OF ECONOMIC ACTIVITIES - CNAE 20.41)

Chemical Division

This division manufactures and markets 'intermediate' chemical products for industrial application, such as surfactants (anionic, non-ionic, cationic, and amphoteric), their blends and polymers, which are produced at the Olesa de Montserrat and Mollet del Vallès centres.

Aromas Division

Chemical Aromas:

This business division markets chemical products manufactured at the Olesa de Montserrat and Mollet del Vallès production centres, and which are used in the formulation of flavours and fragrances for use in cosmetics, fine perfumery, detergents, household and industrial products.

Fragrances:

This unit prepares the formulations and blends of fragrances for industrial use, cosmetics and household products.

Imaging Materials Division

This division manufactures and markets resins and electrostatic agents (Toner) for professional digital printers through particle mixing, milling and classifying processes. The Olesa de Montserrat Centre performs one part of the process integrated at the Barberà del Vallès Centre.

In this same division, Kao Chimigraf produces inks at the Mollet del Vallès centre, which is located outside the scope of the EMAS certification.

The following is a list of product families manufactured at our installations, bearing in mind that other products are included under these generic titles.



Olesa de Montserrat Centre

SURFACTANT AGENTS

- Anionic: Emal
- Non-ionic:
 - Findet family
 - Amiet family
 - Amidet family
- Cationic:
 - Tetranyl families
- Amphoteric:
 - Oxidet family
 - Betadet family
- Blends:
 - Danox families

POLYMERS

- Polyester resins for toner

CHEMICAL PRODUCTS FOR AROMAS AND FRAGRANCES

- Methyl Dihydro Jasmonate
- Ambroxan, Boisambrene Forte
- Composition of aromas

Mollet del Vallès Centre

CATIONIC SURFACTANT AGENTS

- Softening agents
 - QUARTAMIN and TETRANYL families
- Akypo, Alfanox, Cellesh, Asfier, Fosfodet, Gripper families
- Flotation agents
 - Danox FL family
- Agents for fertilisers
 - SK-Fert family

CHEMICAL PRODUCTS FOR AROMAS AND FRAGRANCES

- Lactone family
- Aldehyde family

INKS¹

Barberà del Vallès Centre

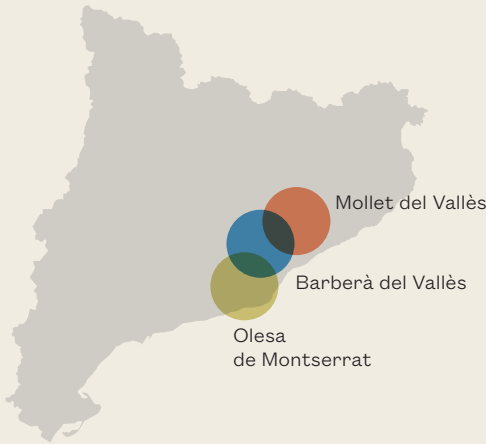
- Toner



¹ Outside the scope of the EMAS certification.

**PRODUCTION CENTRES
IDENTIFICATION DETAILS**

**2.2.1.1 GEOGRAPHICAL SITUATION
AND LOCATION**



Olesa de Montserrat Centre

Polígono Industrial
CanVinyals
Ctra. de la Puda s/n
Olesa de Montserrat



22%
Surface
Busy
UTM
X 407420
Y 4601140

Surface area of the centre: 103.303 m²
Land occupation: 22.498 m²

The centre is close to two municipalities:

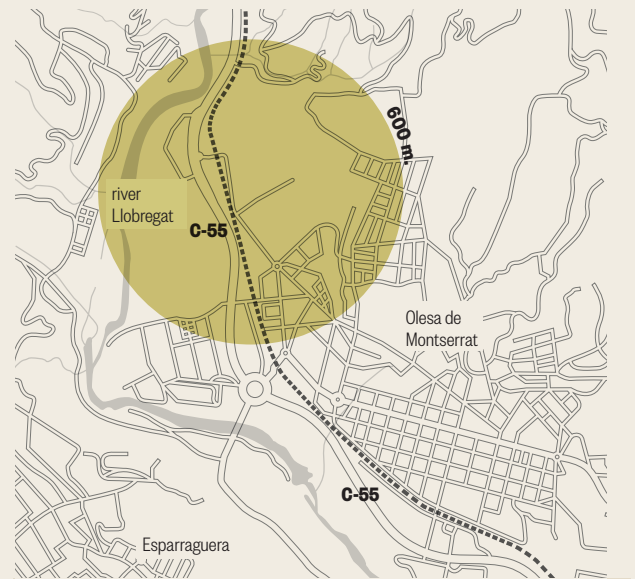
Olesa de Montserrat:

23.536 Population
1.000 m Distance

Esparraguera:

21.701 Population
2.000 m Distance

The height above sea level in the industrial estate varies between 108 m and 134 m.



Centro de Olesa de Montserrat
The KAO industrial estate is approximately located between the following UTM coordinates:
406.675 < X < 406.875; 4.601.105 < Y < 4.601.140
(longitude West 1° 52' 52" and latitude North 41° 33' 23").

Centro de Mollet del Vallès
The KAO industrial estate is approximately located between the following UTM coordinates:
434.400 < X < 434.800; 4.597.550 < Y < 4.598.150

Centro de Barberà del Vallès
The KAO industrial estate is approximately located between the following UTM coordinates:
429.150 < X < 429.400; 4.596.600 < Y < 4.597.200

The first houses belonging to the town of Olesa de Montserrat, to the South-east of the site, stand at a distance of approximately 600 m. There are a few scattered farmsteads in the surrounding area, such as El Mas, 300 m to the North, and Can Vinyals, between 500 and 700 m to the West.

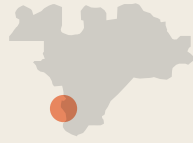
Nearby natural elements:
— The Llobregat River, which runs from North to South on the Western side of the installations.
— The Creu de Beca stream, to the North of the site.

The protected aquifer of La Cubeta de Abrera.
— PEIN (Area of Natural Interest) –Montserrat, 1 km away.

Neighbouring Infrastructures
— Barcelona-Martorell-Manresa railroad, running parallel, to the West of the facilities.
— The regional C-55 road from Abrera to Manresa, which runs parallel to the aforementioned railroad.
— B-120 Highway, from Terrassa to Olesa de Montserrat, bordering the South of the centre.

Mollet del Vallès Centre

Polígono Industrial
Can Prat
C/ Bilbao, 35-61
Mollet del Vallès



Surface area of the centre: 38.918 m²
Land occupation: 14.091 m²

The centre is close to two municipalities:

36%
Surface
Busy

Mollet del Vallès:
51.650 Population
1.000 m Distance

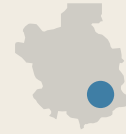
UTM
X 434.600
Y 4.597.800

Martorelles:
4.756 Population
300 m Distance

The height above sea level in the industrial estate varies between 55 m and 60 m.

Barberà del Vallès Centre

Polígono Industrial
Santiga
C/ Puig dels Tudons, 10
Barberà del Vallès



Surface area of the centre: 43.899 m²
Land occupation: 15.180 m²

The centre is close to two municipalities:

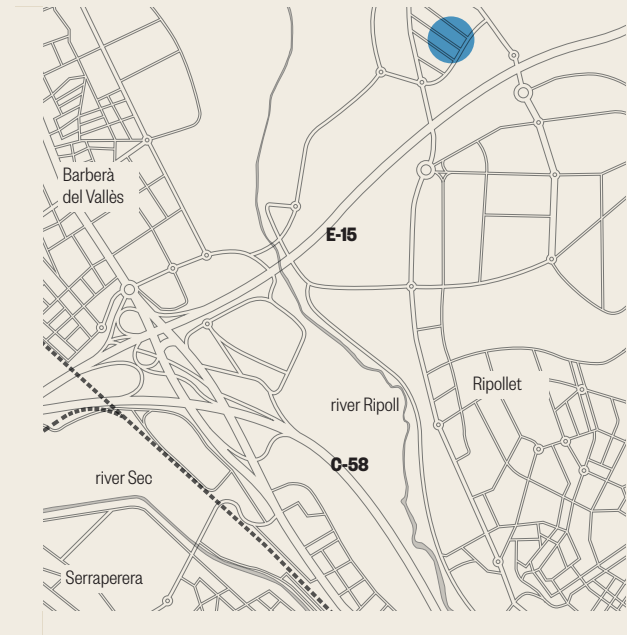
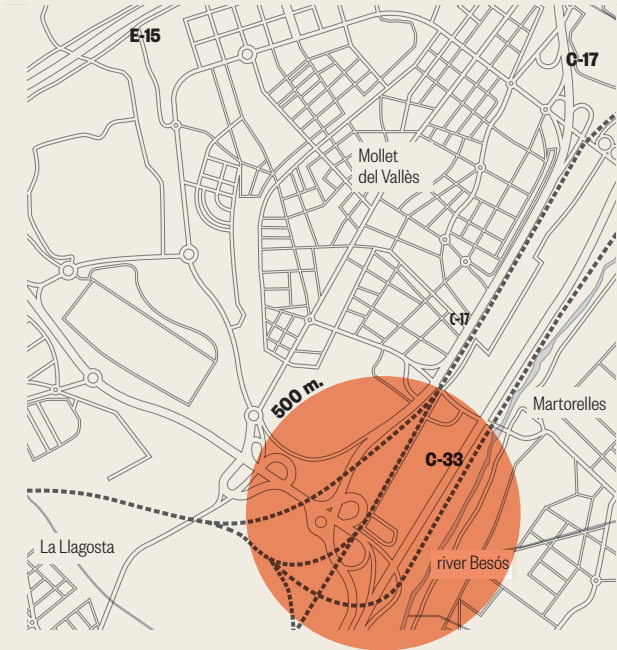
35%
Surface
Busy

Barberà del Vallès:
32.545 Population
2.000 m Distance

UTM
X 429.500
Y 4.597.800

Santa Perpètua de la Mogoda:
25.466 Population
2.000 m Distance

The height above sea level in the industrial estate varies between 130 m and 134 m.



The first houses that belong to the town of Mollet del Vallès are located approximately 500 m to the North of the site. The town of Martorelles stands to the East of the factory on the other side of the Besòs River. The area near the plant includes various sports areas, one 300 m to the West, one 400 m to the North-east and another to the South.

Nearby natural elements:
— The Besòs River, approximately 200 m to

the South-east of the installations.
— The protected aquifer of El Baix Maresme.
— PEIN (Area of Natural Interest): Conreria-Sant Mateu-Céllecs, 3.3 km away.

Neighbouring Infrastructures
— C-33 motorway, to the South-east of the installations.
— Road from Martorelles to Mollet, to the North-east of the installations.
— Railway lines from Mollet del Vallès to El Papiol and Barcelona to Portbou, to the Northwest.

Nearby natural elements:
— The production centre is located in a highly industrialised area, 4.8 km from the nearest Area of Natural Interest (Serra de Collserola).
Neighbouring Infrastructures
— AP-7 motorway, to the South-east of the installations.



2.2.1.2 DISTRIBUTION OF DIVISIONS BY CENTRE

The company has the following plants and divisions:

- **Olesa de Montserrat Centre**
 - HTR plant
 - Ethylene oxide and propylene oxide plants
 - Aroma Compounding plant
 - MDJ plant (aroma)
 - C plant (aromas)
 - OTB plant
 - Blends division
 - Services and Energies (Cogeneration)

- **Mollet del Vallès Centre**
 - HTR plant
 - Aromas I plant
 - Aromas II-III plant
 - Inks Warehouse
 - Blends division
 - Services and Energies

- **Barberà del Vallès Centre**
 - Toner factory
 - Research and development laboratories
 - Pilot Plant
 - Central office installations
 - Developer division
 - Services and Energies

2.2.1.3 ANNUAL PRODUCTION

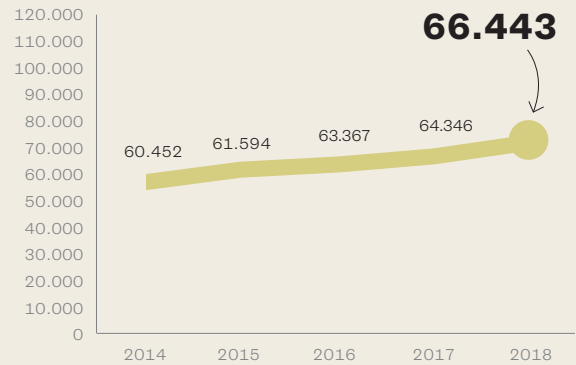
The annual production evolution for each centre is shown below.

ILUSTRACIÓN 1.

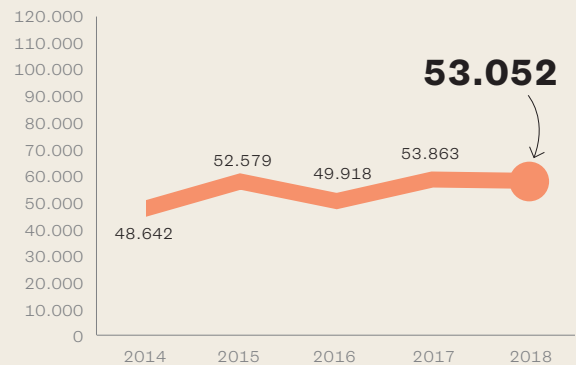
ANNUAL EVOLUTION OF PRODUCTION

Final production = Finished products produced at our facilities. Viz., not including intermediate products (products subject to several processing cycles before they can be considered an end product).

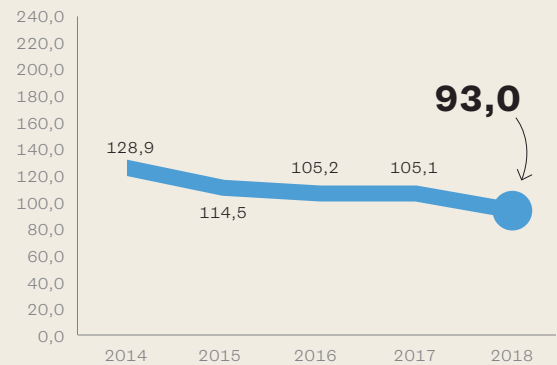
Olesa de Montserrat
Final production (t)



Mollet del Vallès
Final production (t)²

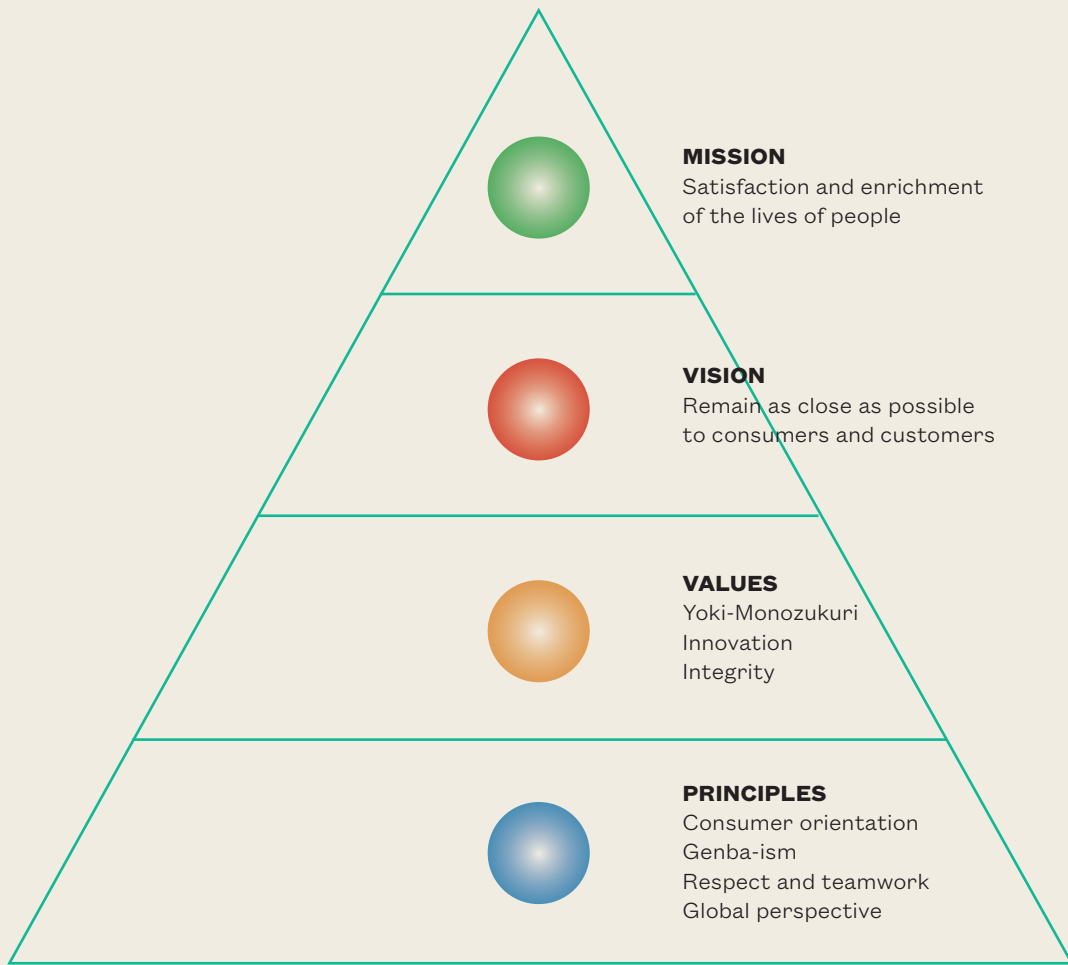


Barberà del Vallès
Production rate (%)³



² Ink production (activity of Kao Chimigraf) is added in 2017 by including it in the Integrated Environmental Authorisation of Kao Corporation, S.A. for Mollet del Vallès

³ Production index = $\frac{\text{Final product year } i}{\text{Final production 2005}} \times 100$



2.3 FOR WHOM AND WITH WHOM WE WORK

The foundation for all corporate activities of the Kao Group is the group's corporate philosophy: The Kao Way.

Since the company was established in 1887, Kao has been providing an unmistakable value to people around the world. Our consumer products promote cleanliness, beauty and health, while our chemical products contribute to developing different industries. As we transform ourselves to promote change, Kao remains attentive to the needs of people and strives to become a company that enjoys global support.

As we can see, satisfying and enriching people's lives and remaining as close as possible to consumers and clients are our reason for being and the path to follow.

This is only possible with the collaboration of our suppliers, contractors, collaborators and personnel that make up the organisation as well as our neighbours, regulating agencies, competitors, non-governmental organisations, investors and pressure groups who drive us to continuously improve our activity.

THE KAO WAY

Is based on the "**Mission**", "**Vision**", "**Values**" and "**Principles**" that guide us. Each one of these terms is defined below:

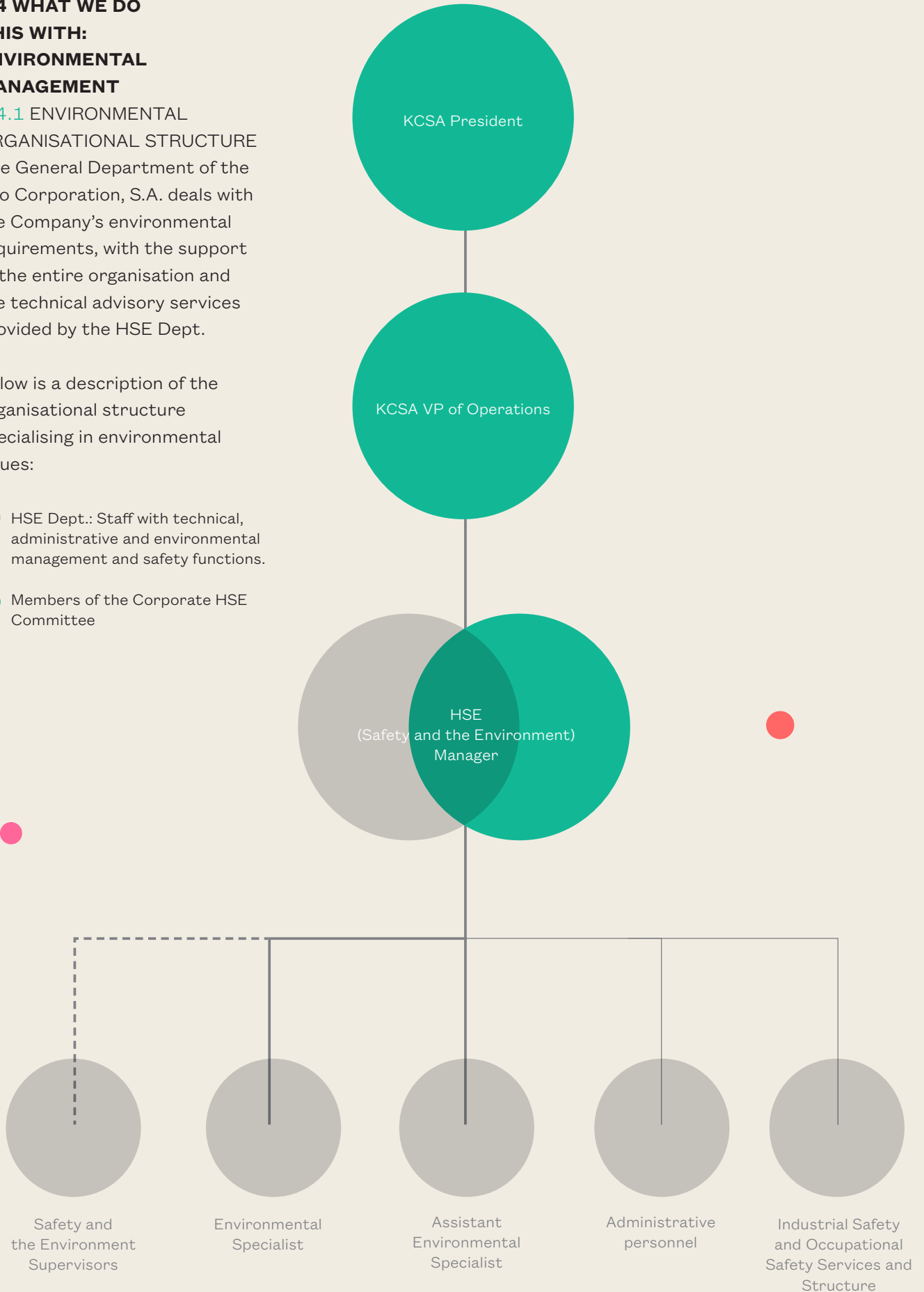
- Mission:** Our reason for existing
- Vision:** The direction we want to go in
- Values:** What we believe in
- Principles:** How we behave

2.4 WHAT WE DO
THIS WITH:
ENVIRONMENTAL
MANAGEMENT

2.4.1 ENVIRONMENTAL ORGANISATIONAL STRUCTURE
 The General Department of the Kao Corporation, S.A. deals with the Company’s environmental requirements, with the support of the entire organisation and the technical advisory services provided by the HSE Dept.

Below is a description of the organisational structure specialising in environmental issues:

- HSE Dept.: Staff with technical, administrative and environmental management and safety functions.
- Members of the Corporate HSE Committee



2.4.2 RISK PREVENTION MANAGEMENT SYSTEM

Since the end of 2011, Kao Corporation, S.A. has had a management system that integrates the areas of safety and the environment.

In 2013 the Safety and Environmental Service (currently the HSE Dept.), with the collaboration of the Engineering and Maintenance Department, conducted a review of the management system for the purpose of incorporating the requirements of standard ISO 50001: Energy Management Systems and subsequently certify the MS also based on this reference.

The process concludes with a system designed and certified in accordance with the ISO 14001, EMAS and OHSAS 18001 and ISO 50001 benchmark standards, and also responds to certain legislative demands that require a management system such as the regulations governing prevention of occupational risks (Prevention Plan) or the norms concerning the prevention of serious accidents.

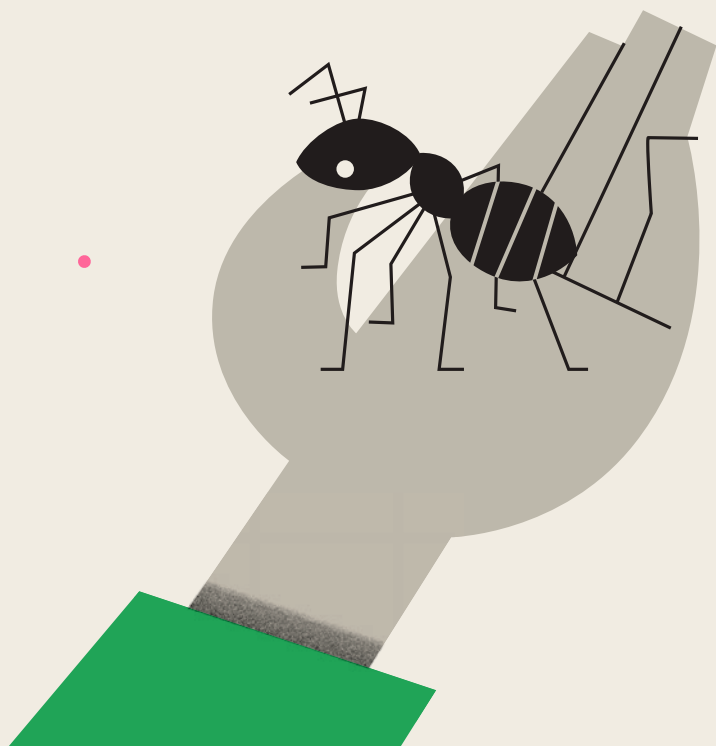
The systems integration procedure seeks greater management efficiency through processes that are simplified to the extent possible and, on occasions, unified. It also facilitates understanding and usage by users and a reduced administrative load.

The risk prevention system is audited annually by a leading system certification agency with specialists in each one of the areas. In 2015 after the annual audit was completed, an extraordinary - document- audit was requested of the energy area. Even though we have experience

in other areas, as a result of the recent incorporation of the energy area in the system, this area needed to mature and its rigour improved. This audit had to be conducted 6 months after the first audit was completed. In 2016 a new edition of the system was reviewed and published for the main purpose of adapting the documents to the version of standard 14001:2015 and the legal requirements approved since the previous edition.

In 2018 the system was once again reviewed for the following purposes:

- Updating the definition of the scope of the RPMS after the incorporation of the activity of Kao Chimigraf at the Mollet del Vallès facility.
- Recording the organisational changes that were made and the reassigning of responsibilities as applicable.
- Adding the flow diagram to each one of the management procedures to make them easier to understand.
- Updating the documentation to meet the legal requirements approved since the previous edition as well as making other smaller changes.
- Initiating the incorporation of the requirements of standard ISO 45001 on Occupational Safety and Health Management Systems, which will replace the current OHSAS 18001.





2.4.3 THE RESPONSIBLE CARE PROGRAMME

Kao Corporation, S.A. has subscribed to the Responsible Care programme since its introduction in Spain through FEIQUE (1993).

Since then, every year the company reports the results of the safety and environment indicators, as established in the programme.

Since then, every two years the company has reported the findings of the self-assessment in each of the codes that make up the programme (see figure).

In 2015, FEIQUE published the Security Code, which incorporated the practices that were distributed among the process security, occupational safety and distribution codes until the day it was published.

In 2016, the Responsible Care Organisation has increased the time required for adhered companies to report the results of the self-assessments from 2 to 3 years.

In 2017, self-assessments with 4 codes were reported: Process



security and RAE, distribution, security and the environment. In 2018 there has been no requirement to report a self-assessment. As primary aspects of improvement, the Product Safety Policy was published in 2017 and the first manual for developing a management system based on planning, control and inspection was developed and published. On the other hand, it is important to develop and implement a selection system that prioritises selecting service providers that have their own Health, Safety, Environmental Protection and resource efficiency systems or working with suppliers to help them apply these practices before contracting with new suppliers of products or services. Regarding the Responsible Company Code, since 2017 we have been systematizing different methods of regular participation, contribution and cooperation with society (RSC). Regarding Kao's global programme to reduce the environmental

- RESPONSIBLE CARE**
- PROCESS SECURITY AND RAE**
- OCCUPATIONAL SAFETY**
- DISTRIBUTION**
- PRODUCT STEWARDSHIP**
- SECURITY**
- ENVIRONMENT**
- RESPONSIBLE COMPANY**

impact, our Green-purchasing area has increased the use of recycled paper for all pre-printed material. This way all the paper used at Kao Corporation, S.A. will be recycled.

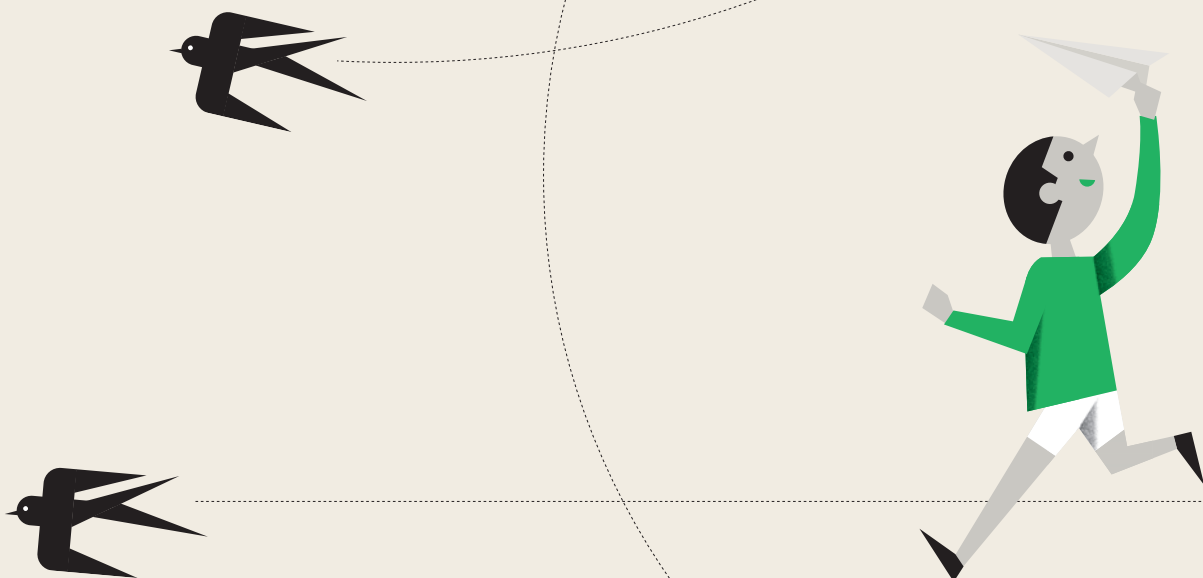
On the other hand, we have continued our effort to reduce the number of printed copies. The areas / departments that print a larger number of copies have been identified and each one of these areas is analysing the process to determine how and in what measure these copies can be reduced. Currently, we have reduced the number of copies by 10% and by reviewing the raw material control plans we have been able to stop printing sheets that were hardly used and have also combined operations into a single sheet.

— Developments introduced in the Central Building's canteen service: Modify menus making them healthier and more balanced, replacing plastic containers with returnable and recyclable containers for all drinks as well as creating a "RECOOPEREM" programme to prevent wasting food.

— Food collection to ensure families in need have access to sufficient food that is also safe and healthy. In this area we have collaborated with the Red Cross of Mollet del Vallès, Voluntariat Vicencià at Olesa de Montserrat and the Church of Santa María in Barberà del Vallès.

— Project to remove cane from the banks of the Llobregat river in the municipality of Abrera.

— Participation in the Solidarity Race of Cardedeu to support the rescues taking place in the Mediterranean.



- Planting trees in Mollet del Vallès
- Making a floral tapestry in Mollet del Vallès
- Paddle tennis tournament in Mollet del Vallès
- Qigong eye workshop consisting of exercises aimed at toning the muscles of the ocular area and improve blood circulation.
- Toy collection campaign for Christmas
- Without forgetting the CUIDA'T programme that during this year focussed on musculoskeletal disorders. This programme promoted healthy food habits (eating fruits and vegetables, controlling cholesterol, controlling high blood pressure, etc.); exercise and mental control (walking, mindfulness, etc.) and avoiding harmful habits (programmes to quit smoking, prevent physical inactivity, etc.).

Other activities such as “Nordic Walking Olesa” were cancelled because of bad weather at the time the events were scheduled to take place.

On the other hand, and beginning in March 2016, Kao Corporation, S.A., as a company adhered to the Responsible Care Programme, was authorized to use the Responsible Enterprise RSE trade mark of Responsible Care for a renewable period of two years, given that they were compliant with all the necessary requirements.

This distinctive sign represents and guarantees to third parties, the company’s commitment to Business Social Responsibility (RSE) under the Responsible Care trade mark.

The objective of this initiative, which was implemented in March 2015, was to give companies such as Kao Corporation, S.A. a

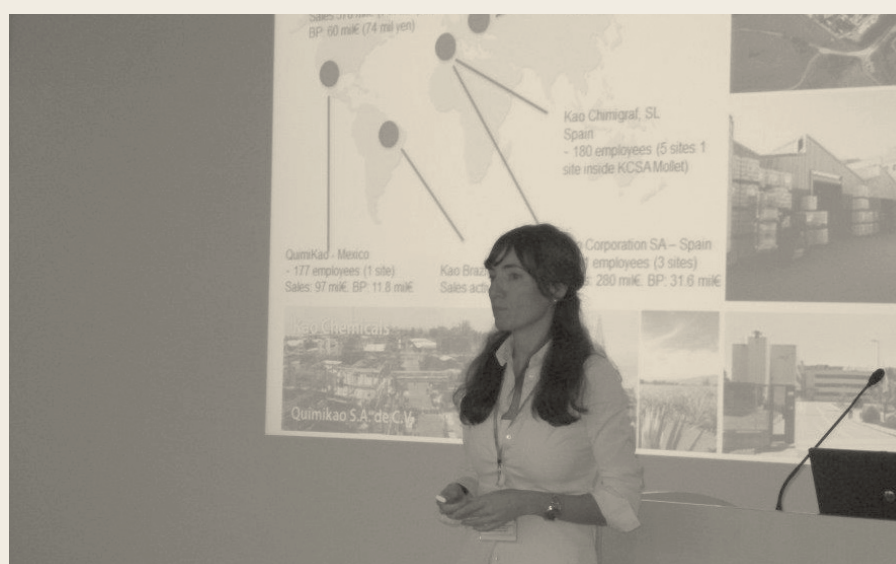
visible recognition that certified their commitment with RSE policies, thereby highlighting the company’s contribution in this area before public and private bodies, competent institutions and society as a whole.

Application of the Responsible Care Programme at all companies of the group is also intensely driven from Kao’s headquarters in Japan. Group management has designed its own audit programme based on the Responsible Care guidelines, which means that, annually, every subsidiary must answer a list of questions that are structured by different codes, very similar to

those of the Spanish programme. Within the framework of this programme, an annual RC Meeting is held in Tokyo, to which the HSE Manager has had the opportunity to attend since 2015.

For three days, different meetings are held aimed at unifying criteria, sharing experiences and explaining the initiatives that were being undertaken in the sustainability area by companies of the Kao group.

Also, guidelines are provided, criteria are standardised and new programmes are to be implemented throughout the next two years.



3.1 GENERAL POLICY ON SUSTAINABILITY AND RISK PREVENTION

In 2013, Kao Corporation, S.A. published the 5th edition of their policy and taking advantage of the implementation of ISO 50001, it became the General Policy on Sustainability and Risk Prevention. This way the scope of this policy is widened while the objective of the previous edition is maintained: simplifying the text as much as possible to make it easier to understand by any of the interested parties.

Furthermore, the policy includes aspects stemming from new legal, economic and social

requirements, as well as the commitment towards prevention of waste, energy efficiency and conservation of biodiversity. It also stresses the company's commitment to compliance with schemes to improve safety and the environment, such as "eco together" and Responsible Care. Lastly, with regard to health protection, the company is committed to ensuring that peoples' health is looked after, not only insofar as the company's partners are concerned but also those in the supply chain, particularly contractors. In 2016, the newly appointed President, M^a José Bermejo, ratified the policy, as was done in 2014 by the newly appointed President at that time, F. Pujadas, who ratified the existing Policy by signing and disseminating it throughout the organisation. The consultation, participation and collaboration process that began in 2017 with the social part, to review and adapt the policy to the context of the company, concluded in 2018 with the 6th edition of the General Policy on Sustainability and Risk Prevention.

This new edition incorporates the following developments:

— In the risk prevention area, the commitment to "fostering the physical, psychological and mental well-being" of the employees.

— In the environmental area, the consideration of the perspective life cycle that is to be taken into account when carrying out our work. Concepts related with the circular economy were also added such as the optimisation of the value of the resources or innovation to create value and the commitment to fostering

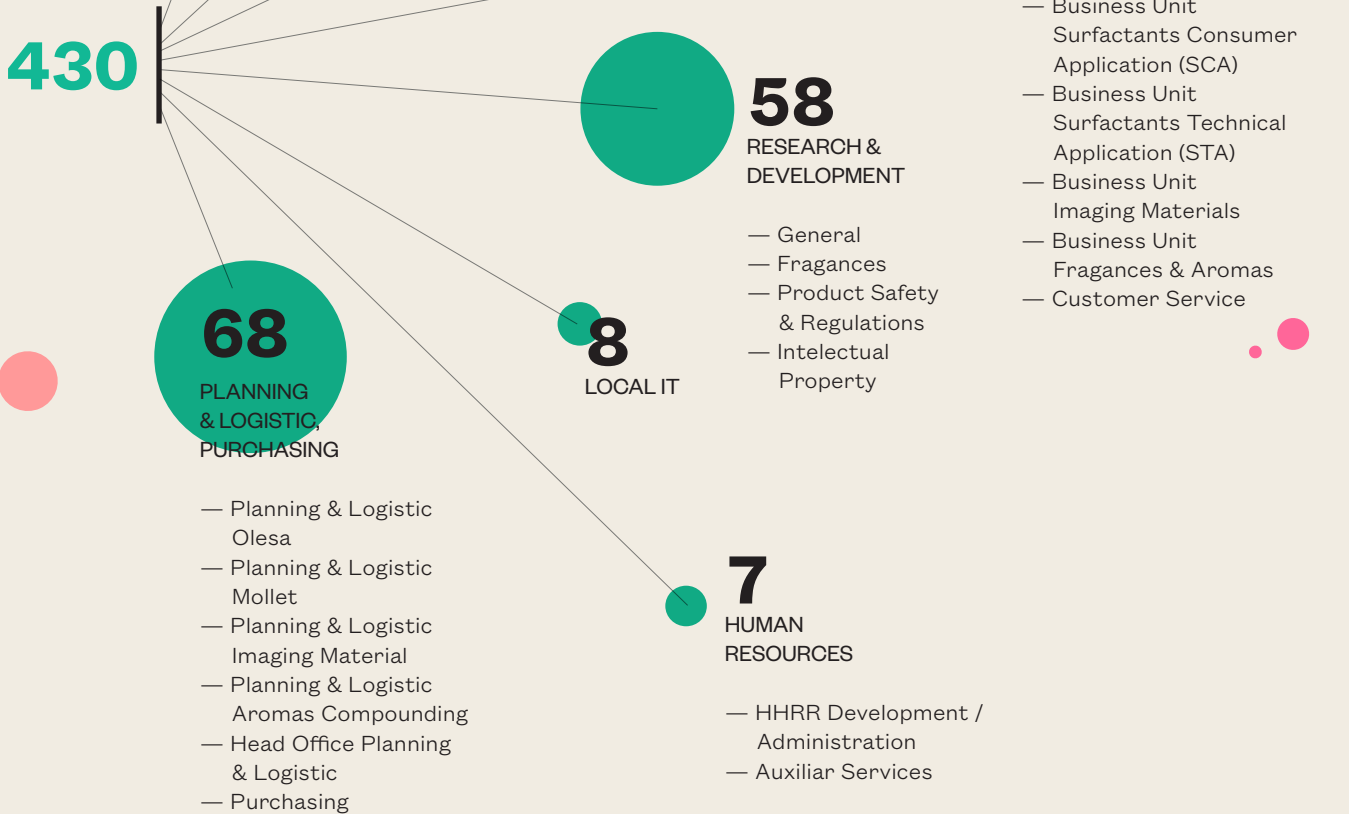


biodiversity in addition to preserving it.

— In all areas, the commitment towards establishing participation processes to achieve a maximum collaboration, both internal and external, for the purpose of optimising the creation of mutual value.

3.2 ORGANISATION OF KAO CORPORATION, S.A.

ILUSTRACIÓN 2. GENERAL MANAGER



4.1 ENVIRONMENTAL ASPECTS

4.1.1 ASSESSMENT METHODOLOGY

Environmental aspects are elements of an organisation's activities, products or services that may interact with the environment. We include the following:

- Resources (material and energy)
- Atmospheric emissions
- Water
- Waste
- Soils
- Other environmental issues that affect the community (smells, noise, etc.)

Kao Corporation, S.A. conducts an annual evaluation of the environmental aspects identified in each one of the centres and reviews the environmental aspects inventory, reorganising them to ensure the evaluation is more efficient and effective.

In 2002, Kao Corporation S.A. developed its own method for identifying and assessing environmental aspects in order to quantify direct and indirect interactions with the environment. The method is based on external criteria⁴ and, therefore, is considered to be an objective and acceptable method.





The review process of this method, which was initiated in 2013 and prompted by the findings of the external audit of the system, was completed in 2014.

The result of this review is the new edition of procedure PGDG-301 Identification and Evaluation of the Environmental Aspects as well as the creation of a new database for evaluating the environmental aspects, which main development is automation for determining the

impact.

Regarding the procedure, the method used is maintained; however, some of its criteria are modified as well as the existing levels for each one of the criteria. The criteria that enable the environmental impact to be assessed are:

- **Nature** (previously referred to as Hazard): Characteristic property of the assessed environmental aspect.
- **Magnitude / trend:** Quantification or intensity of the environmental aspect assessed. If this criterion cannot be applied, specific supplementary magnitudes of the aspect are analysed.
- **Frequency:** The frequency with which the environmental aspect occurs.
- **Approaching the limit** (previously referred to as Supplementary Magnitude): Expresses how close we are to levels that are considered acceptable, limits or references that are not to be exceeded.
- **Evidence of the degree affected:** Expresses the representative level of closeness to the accepted reference. The magnitude of the impact (mi) of each environmental aspect is the product of these factors and the appraisal of the specialist conducting the assessment. In 2017, a review of the procedure was initiated to incorporate an assessment criterion of the impact related with the perspective life cycle in accordance with the requirements stipulated in ISO 14001:2015. The addition of the Life Cycle Analysis criteria (hereinafter referred to as ACV), expresses the opportunities for improvement

-  OLESA DE MONTSERRAT CENTRE
-  MOLLET DEL VALLÈS CENTRE
-  BARBERÀ DEL VALLÈS CENTRE
-  KAO CORPORATION, S.A.

⁴ Legal provisions and other environmental technical references. The methodology is described in the internal procedure PGDG-301.



from this perspective. These criteria for assessing the environmental aspects are added to the product of the previous assessment factors (nature, magnitude, frequency, evidence of the degree affected and approaching the limit), (illustration 3).

$mi = \text{Nature} \times \text{Magnitude} \times \text{Frequency} \times \text{Approach} \times \text{Evidence} + \text{ACV} + \text{Technical assessment}$.
Based on this we have determined what environmental aspects impact (or affect) each one of the phases of the life cycle. Although the new edition of the procedure is in the approval process, an assessment has been made of the impact of the aspects identified in 2017 in accordance with both methodologies, (illustration 4).

The database for assessment of environmental aspects includes the reference of environmental aspects analysed for each area:

- Microbiological agents: Prevention and control of legionnaires' disease in cooling towers
- Waste water: Water quality parameters (pH, suspended matter, conductivity, etc.) at the dumping points
- Groundwater: Water quality parameters (hydrocarbons, solvents, etc.) considering each of

- the existing piezometers
 - Consumption of resources: water, electricity, fuel, raw and auxiliary materials
 - Atmospheric emissions: Sources of combustion and process, transport
 - Greenhouse gases: Coolants for air-conditioning units and refrigerating facilities
 - Waste: Each type of waste produced by the production centre
 - Noise: Noise immission level at each centre
 - Other: Reuse of materials
- In 2017, aspects related with the consumption of raw and auxiliary materials were incorporated. And also the aspects of the activity of Kao Chimigraf (ink warehouse).

ILLUSTRATION 3.
CO₂ RATE AT EACH PHASE OF KAO'S PRODUCT LIFE CYCLE
(CALCULATION BASED ON ISO 14040).

Source: Kao Sustainability Data Book 2019 (Results from 2018)

ILLUSTRATION 4.
NUMBER OF ENVIRONMENTAL ASPECTS IDENTIFIED AND ASSESSED IN 2017

	●	●	●	●
Microbiological agents	3	3	1	7
Waste water	97	96	11	204
Groundwater	93	93	93	279
Water consumption	3	4	1	8
Electrical consumption	2	2	1	5
Gas consumption	2	2	2	6
Material consumption	15	14	5	34
Atmospherical emissions	32	33	24	89
Greenhouse gases	10	6	6	22
Waste	77	72	50	199
Noise	1	1	1	3
Accidents/ Emergencies	22	22	33	77
Others	1	1	1	5
TOTAL	358	349	229	938

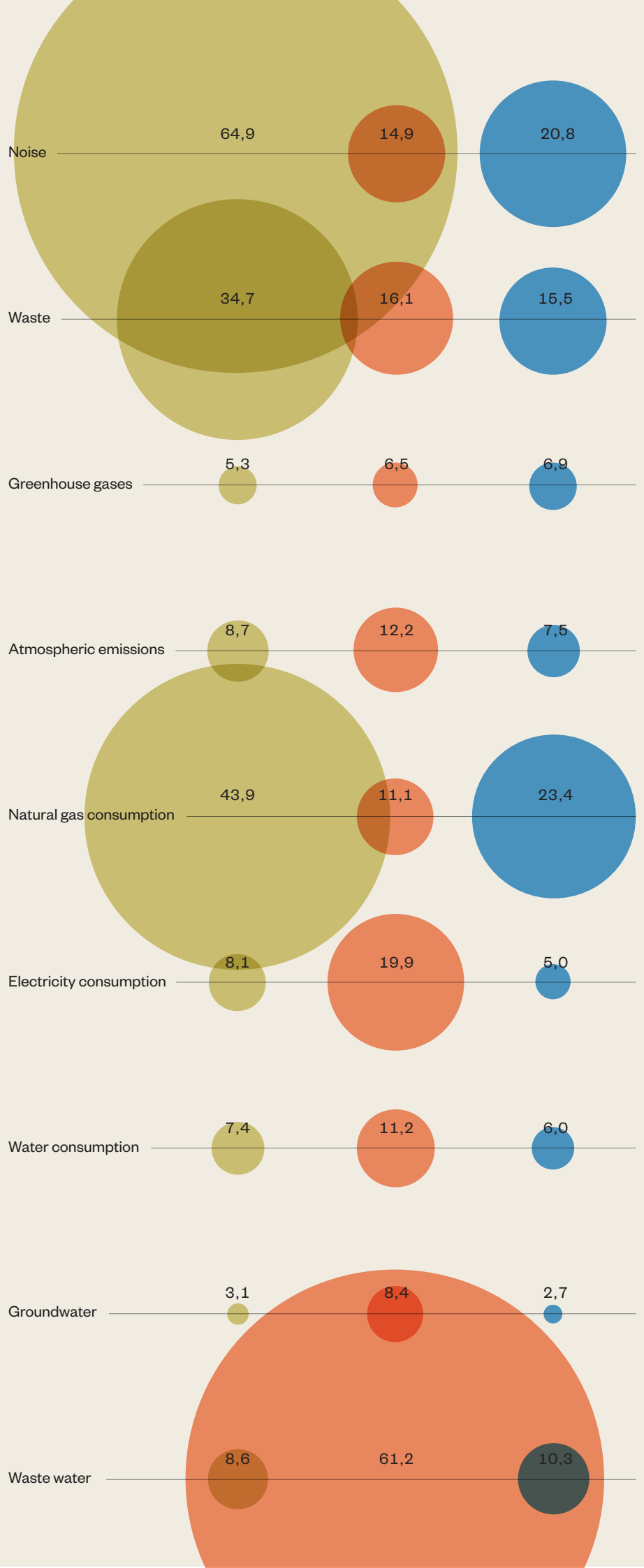
Source: Assessment of the aspects database

4.1.2 DIRECT ENVIRONMENTAL ASPECTS

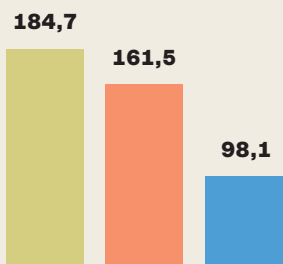
4.1.2.1 IMPACT ASSESSMENT UNDER NORMAL OPERATING CONDITIONS

The following is a list of the average environmental impact corresponding to each production centre under normal operating conditions and in relation to the aspects being assessed.

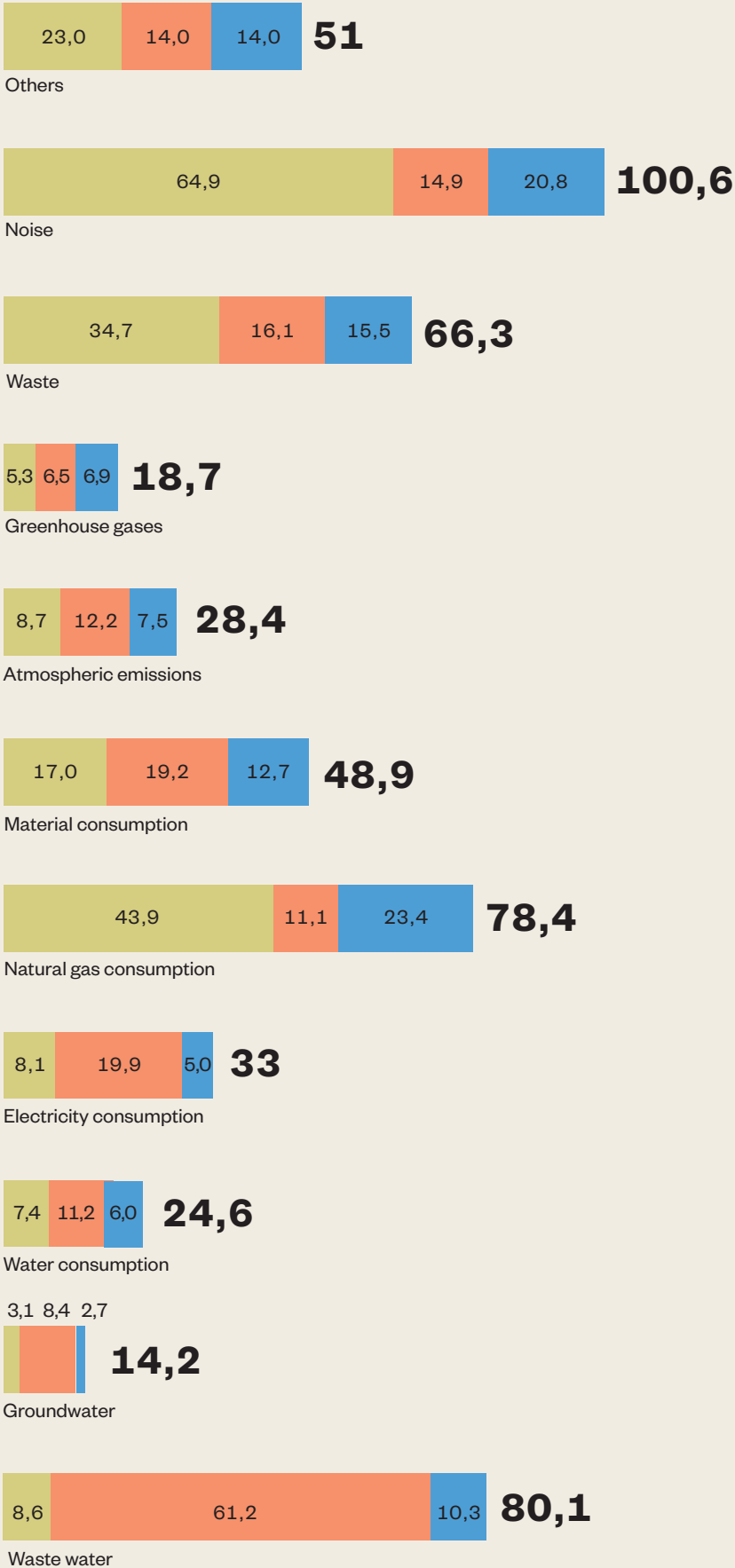
The number of aspects is kept the same even though small modification were made with respect to the previous year, primarily due to the aspects related with the waste vector (greater segregation and incorporation of sporadic waste at the Barberà del Vallès as well as at Mollet del Vallès centres).



ILUSTRATION 5.
AGGREGATE OF THE AVERAGE MAGNITUDE OF IMPACTS BY VECTORS AND CENTRES



ILUSTRATION 6.
AVERAGE MAGNITUDE OF IMPACT
BY VECTOR AND CENTRE



4.1.2.2 ASSESSMENT OF THE IMPACT UNDER ATYPICAL CONDITIONS

Atypical conditions at Kao Corporation, S.A. are those due to abnormal conditions (such as industrial tests) as well as possible emergency situations. Possible emergency situations are those included in the respective Self-protection Plans of the centres. In the case of the Olesa de Montserrat and Mollet del Vallès centres, as they are both affected by the regulations governing the prevention of serious accidents (see paragraph 14), the major environmental aspects are those resulting from accident scenarios shown in the 'Serious Accidents Safety Report'.

4.1.2.3 ENVIRONMENTAL ASPECTS WITH A SIGNIFICANT IMPACT

Kao Corporation, S.A. considers an environmental aspect to be significant when the magnitude of impact is higher than fifty (mi > 50). A consideration of significant may represent the implementation of preventive and/or corrective actions, new operational checks or the definition of environmental improvement targets, as applicable. We therefore take into account the level of adaptation, which expresses the Rate of approximation between the magnitude or value of the indicator of the aspects to be assessed, with regard to the levels considered acceptable, limits or references that are not to be exceeded. During the assessment of the aspects that was carried out in 2018 related with the actions that took place in 2017, no significant new impact was detected associated with atypical situations. Neither have any significant impacts been observed with regard to indirect aspects.

ILUSTRATION 7. SIGNIFICANT ASPECTS RELATED WITH THE ACTIVITIES CARRIED OUT IN 2017 AND ASSESSED IN 2018

Olesa de Montserrat Centre

Impact	Aspect	Polluting substance/ parameter	Area	Code
Water pollution	Waste water	Phosphorous	Waste water treatment plant	AR-32
		1,4 Dioxane		AR-353
Water and soil contamination	Groundwater	Toluene	General	AS-115
		1,4 Dichlorobenzene		AS-177
Resources	Waste	Sludge	Waste water treatment plant	RE-46
		Contaminated glass		Production
		Reagents	Laboratory	RE-131
Noise pollution	Noise	Ambient noise	General	RU-G

Mollet del Vallès Centre

Impact	Aspect	Polluting substance/ parameter	Area	Code
Water pollution	Waste water	Phenols	Waste water treatment plant	AR-31
		Phosphorous		AR-32
		Nitrogen		AR-36
Water and soil contamination	Groundwater	Phenols	General	AS-31
		Barium		AS-37
		Copper		AS-48
		Lead		AS-50
		Fluoranthene		AS-110
		Molybdenum		AS-144
		Vanadium		AS-146
		Phenanthrene		AS-252

Barberà del Vallès Centre

Impact	Aspect	Polluting substance/ parameter	Area	Code
Water and soil contamination	Groundwater	Barium	General	AS-37
		Molybdenum		AS-144
Soil contamination	Waste	Non-hazardous waste from the kitchen	Canteen	RE-116
		Maintenance water	Maintenance	RE-133

Source: Evaluation database aspects.

⁵ Rounded to the unit
(Example 10,2 ≈ 10; 10,5 ≈ 11).

⁶ Change versus
acceptable level = $\frac{\text{Current value} - \text{Acceptable level value}}{\text{Level value} - \text{Acceptable level}} \times 100$

1-OBSERVATION:
AR-32: Significant impact because one of the samples exceeds the maximum DUCA value. Taking into account the history of the values, currently we do not consider that any additional actions need to be taken other than monitoring the values obtained in the samples that are taken.

2-OBSERVATION:
AR-353: Aspect incorporated in

the renewal of the Integrated Environmental Authorisation. Since this is a new addition, the magnitude criterion is higher than the current one.

Action: It is included in the samples programme defined in PGDG-306 Water Management (frequency: internal, weekly and external, quarterly).

3-OBSERVATION: AS-115: Concentrations

mi: ⁵	Change versus acceptable level ⁶	
170	-43%	1
54	-46%	2
54	>200%	3
55	40%	4
1409	>200%	5
56	17%	6
50	9%	7
60	11%	8

mi: ⁵	Change versus acceptable level ⁶	
>200	>200%	1
193	200%	2
68	-30%	3
54	150%	5
81	>200%	5
81	18%	5
81	16%	5
54	184%	4
81	115%	5
81	>200%	5
81	>200%	4

mi: ⁵	Change versus acceptable level ⁶	
52	42%	1
87	-72%	2
54	0%	3
62	43%	4

are detected in Pz-1 and Pz-13. In no case shall the detected historical maximums be exceeded; the concentrations of this campaign are values similar to previous campaigns (the values obtained last year were exceptionally lower).

Action: Conduct an external follow-up annually and additionally, carry out an internal assessment quarterly.

4-OBSERVATION: AS-

177: Concentrations are detected in Pz-1 and Pz-13. In this case it is the historical maximum.

Action: Carry out an external follow-up annually and based on the results, increase the periodicity of the assessment to determine its progress.

5-OBSERVATION: RE-46: The high generation of sludge that has taken place is the result of an exceptional situation.

Maintenance will be carried out during the August stoppage period to replace the biological aeration system. This requires fully draining the pool.

6-OBSERVATION: RE-73: Follow-up.
Action: Assess whether we can reduce the number of samples to be taken and/or the volume of each sample.

7-OBSERVATION: RE-131: In 2016, the manager has indicated that 3 of the dispatches weighed 100 kg but the rest were less than 16 kg.

Action: Carry out a control of the weight of the sacks that are removed from the aluminium containers.

8-OBSERVATION: RU-G: Measure the ambient noise once again and compare it to the noise levels in the different equipment/ installations. Based on the results that are obtained, define the action plan to decrease the noise pollution that is generated.

Action: In 2018, an official measurement was carried out of the ambient noise that detected low frequencies when these had not been detected previously. For this reason, the cogeneration silencer was replaced in 2018 and a study of the ambient noise was carried out to identify noise sources.

1-OBSERVATION: AR-31: It is detected in the last sample

analysed; in the previous samples it had been lower than the detected limit.

Action: If detected again, increase the monitoring frequency (quarterly or monthly). Using the piezometer, conduct an analysis of this contaminant upstream from the installation.

2-OBSERVATION: AR-32: The DUCA value has been exceeded for this parameter.

Action: A new DUCA is presented with modification of the limits meeting the characteristics of the current dump. Monitor the values.

3-OBSERVATION: AR-36

Action: Maintain the existing monitoring frequency.

4-OBSERVATION: AS-110/252: The value detected in Pz-1 had already been previously detected; however, Pz-3, Pz-5, Pz-6 and Pz-8 were detected in well 5 where it had never been detected before. In the well water that was analysed (quarterly/ annually) the value had always been lower than 0.05 g/l and 1 g/l.

Action: Follow-up annually and based on the result, carry out an analysis.

5-OBSERVATION: AS-144/146/37/48/50: No historical values are available and an analysis has only been conducted in the 3 new probes (Pz-10, Pz-11

and Pz-12).

Action: During the next campaign, request an analysis be conducted on all the piezometers and conduct a follow-up.

1-OBSERVATION: AS-37: Similar values to those obtained in previous campaigns.
Action: Follow-up annually.

2-OBSERVATION: AS-144: The average and maximum values obtained are lower than the historical maximums (2009) and lower than those taken in 2015. In 2016 it was not analysed in all the samples.

Action: Follow-up annually.

3-OBSERVATION: RE-116: The collection frequency and the final destination (dump) are two factors that worsen the impact. In fact, the magnitude of this aspect has not changed significantly in 2016 with respect to previous years.

Action: Call for bids for managing the organic fraction. Modify the indicator by calculating the magnitude criteria by services (menus) provided.

4-OBSERVATION: RE-133: The current production needs (greater variability of products to be produced) requires that the equipment be cleaned more frequently and therefore a higher generation of waste.
Acción: Follow-up.

4.1.3 INDIRECT ENVIRONMENTAL ASPECTS

Indirect environmental aspects are those aspects that cannot be directly managed, despite their potentially negative impact on the environment. We can highlight the following:

Transportation of finished products

The transport of finished products to numerous national and international destinations generates gas emissions through the combustion of diesel, as well as particulates and other minority pollutants, such as the tropospheric ozone.

In 2018, the tenth estimated assessment of CO₂ generated through transportation of finished products to each destination was carried out for the year 2017.

The calculation compares the annual evolution of emissions from transport and assesses the results that could stem from future changes. Although the absolute value is not highly accurate, it will be enough to detect relative changes.

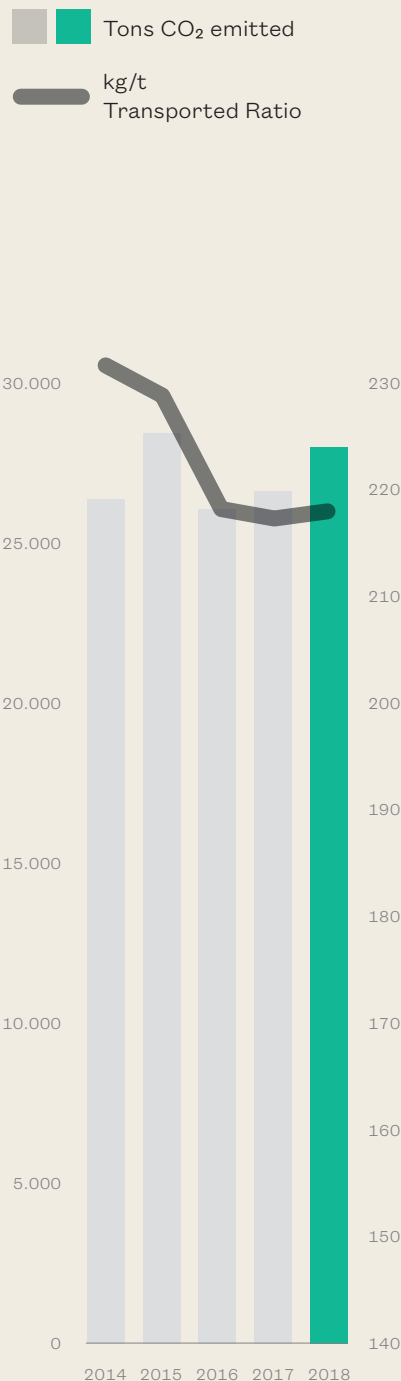
The assessment of this indirect environmental aspect concludes that it is not significant.

In spite of this, we are carrying out actions to reduce these emissions such as the intermodal transport in those shipments where this is possible, (*Illustration 8*).

In 2017, the rate (kilograms of CO₂ emitted per transported ton) has decreased for the second

ILLUSTRATION 8. EVOLUTION OF CO₂ EMISSIONS IN TRANSPORT

The calculation has been performed taking into consideration the CO₂ emissions of the EU Transport White Paper:
 —0.26 kg CO₂ per tonne and kilometre by road
 —0.02 kg CO₂ per tonne and kilometre by ship



consecutive year. This is due to the product mix sold by country and because the shipping via road-railway-road and road-sea-road have increased.

In 2018, this trend of a decreasing rate is reversed.





Distribution of packaged products

The end product is packaged in a range of recipients made from different materials (metals, plastic), often selected by the customers for product presentation purposes, and therefore considered to be an indirect aspect.

These enter the market through to the end of their service life, when they are recycled or removed as waste. The internal management and sales actions included in the Corporate Container Prevention Plan (PEPE) are targeted at decreasing the Kr/Kp rate, where:

- Kr: weight of container
- Kp: weight of product in container

In 2017 we continued applying those actions resulting from the study conducted by the work team, which involves changing the type of container for those products that allow this and the use of recovered pallets has been extended.

In 2018, the rate worsens worldwide; this is due to a decrease in the amount sent in bulk and to an increase in the amount of product in sacks. Nationally, the rate improves with respect to the previous year. Regardless of this situation, the environmental aspect continues to be significant.




2017
Kr/Kp=
0,0304



2018
Kr/Kp=
0,0308



 Difference between
2017-2018 Kr/Kp = **+0,0004**

- OLESA DE MONSERRAT
- MOLLET DEL VALLÈS
- BARBERÀ DEL VALLÈS
- KAO CORPORATION, S.A.

TABLE 1.

	● Centre 1	● Centre 2	● Centre 3	● Total achievement %
Objective	3% reducció			-
Reached objective	0%	1,2%	4,3%	-
% achieved	0	$\frac{1,2 \times 100}{3} = 40$	100	$\frac{0+40+100}{3} = 46,67$



4.2 ENVIRONMENTAL OBJECTIVES

4.2.1 FORMULATION OF ENVIRONMENTAL TARGETS

Kao Corporation, S.A. sets environmental targets each year according to the situation at that time (improvement strategies and analysis of priorities, internal requirements, external requirements, etc.), the development and enforcement of which enable the organisation’s environmental behaviour to be constantly improved. Since 2017 and by reason of the effort to adapt the new requirements to the new edition of ISO 14001, the analysis process prior to the establishing of objectives has been completed and improved, which in addition to taking into account the annual review that Management carries out of the efficiency of the management system and the determining of the conformity with the obtained results, the following aspects are also taken into account:

- The results of the assessment of the internal and external context of the company.
- The results of the risk assessment and opportunities
- The results of the assessing of the needs and expectations of the internal as well as external interested parties of the company.

Finally, it is worth taking into account that the introduction of

the “eco together” programme has involved defining corporate objectives for three environmental aspects (water, waste and energy). These are long term corporate objectives to be reached by 2020. The year 2010 was taken as the year of commencement and we are seeking to achieve a 30% reduction by 2020 with regard to the indicator defined for each aspect, equating to an annual reduction of 3%.

4.2.2 IMPLEMENTED ENVIRONMENTAL IMPROVEMENT TARGETS





The following are current targets, which include those from previous years still pending resolution and exclude those that have been considered technically unfeasible because of their funding or execution. The achieved objective⁷ is calculated as the mean achievement reached by each one of the centres, (table 1). The table⁸ (table 2) below lists the value of the year used as a reference (2010) to calculate the degree in which the objectives are reached. The value and rate for the year may be seen in the indicators table of the applicable vector. The achievement reached by a centre in a year is calculated as: (Rate 2010 - Rate year_i) / Rate 2010.

⁷ 100%: Equal to or higher than the target value defined. 0%: No action performed or results below the starting value.

⁸ Barberà’s production expressed as a:

$$\text{Production rate} = \frac{\text{Final production year}_i}{\text{Final production 2005}} \times 100$$

TABLE 2. VALUES AND RATIOS OF THE YEAR OF REFERENCE (2010)

				
Production (t)	62.267	41.636	80,8	-
Water consumption (m ³) [CA-G]	199.297	262.156	30.474	491.927
Rate (m ³ /t)	3,20	6,30	17,62	4,66
Electrical consumption (MWh) [CE-G]	17.699	14.243	14.607	46.548
Rate (MWh/t)	0,28	0,34	8,44	0,44
Generation of waste (t) [RE-]	4.103	3.444	541	8.088
Rate (t/t)	0,07	0,08	0,31	0,08

Source: maestro.xlsx

ILUSTRATION 9. OBJECTIVES DEVELOPED IN 2018


ASSOCIATED ASPECT: WATER CONSUMPTION [CA-G]
Reduction of **24%** in water consumption as compared to 2010.

The decrease achieved by each centre is as follows:


 OLESA DE MONTSERRAT
31,0%

ACTIONS:
The usage of treated water for preparing lime slurry is still in the study/test phase.


Daily monitoring of the consumptions.

 MOLLET DEL VALLÈS
59,1%

ACTIONS:
Recovery of condensates (Kaizen MO-17-009).

 BARBERÀ DEL VALLÈS
79,3%

ACTIONS:
Control of the irrigation systems and daily monitoring of the consumptions.

 TOTAL KAO CORPORATION, S.A.
48,6%

ACHIEVED
100%



The achievement is due to the actions taken during previous years (installation of reverse osmosis plants, recovery of condensates, etc.) and to a strict control and daily monitoring of the water consumption generated by the different uses.

REFERENCE
MA-01

ACHIEVED
100%



Structured corporate scope objective in two phases:
Phase 1: Replacement of virgin paper (white) with recycled paper. In 2017, virgin paper was replaced with recycled paper for the printers/ photocopiers. In 2018, recycled paper was widely used for all pre-printed materials.
Phase 2: Reduction of printed copies (10% by 2020).

The following actions were taken in 2018:
— Disseminating the objective throughout the organisation
— Analysis of the available information to define the starting point and assess the level of achievement that has been reached
— Defining of the follow-up indicators and the method for calculating them
— Determining of the possible actions to be carried out for reducing printed material to be added to the annual programme.

Specifically:
— The main print areas have been identified
— Changes have been made to the configuration of the raw material control plans to remove sheets that were not being used and if different operations are carried out, these are printed on a single sheet (previously, a sheet was used for each operation). This results in a 36.2% reduction in this area.

REFERENCE
MA-05

ASSOCIATED ASPECT: ENERGY SAVING [CE-G]
 Decrease of energy consumption (electricity) by **24%** as compared to 2010.

The decrease achieved by each centre is as follows:

OLESA DE MONTSERRAT
11,6%

ACTIONS:
 Replacement of conventional light fixtures with LED light fixtures in different areas.

Reduction of energy loss in steam generators through the installation of an automatic purge system.

Reduction of electrical consumption in the aeration of the WWTP.

Efficient management of air compressors.

FB-3300.

Replacement of conventional light fixtures with LED light fixtures.

Automation of the purging of RW from the Aroma-II vacuum pumps by controlling the temperature.

Improves the conversion rate of osmosis plant RO1.

Recovery of energy from the condensates of Aromas I, II and III in boiler FB-3300.

Regulation of the combustion system of boiler FB-3300 by measuring the oxygen.

Efficient management of the air compressors.

BARBERÀ DEL VALLÈS
7,3%

ACTIONS:
 Reduction in the operating time of the air conditioning equipment for the Toner laboratory.

The replacements of conventional lamps with LED lamps in the Central Building and the production warehouse.

Improvement of line 1 blowers.

TOTAL KAO CORPORATION, S.A.
18,3%

The results of the actions taken since 2010 to reduce the consumption of water, electricity and the generation of waste are shown in the graphs provided below:



ASSOCIATED ASPECT: ENERGY SAVINGS [AI-]
 Calculate the CO₂ emissions as a result of transporting KOSA products so the Group can establish a reduction target by 2030.

ACHIEVED
75%

An action plan is established every year and is included in the Sustainability Plan.

REFERENCE MA-02

ACHIEVED
100%

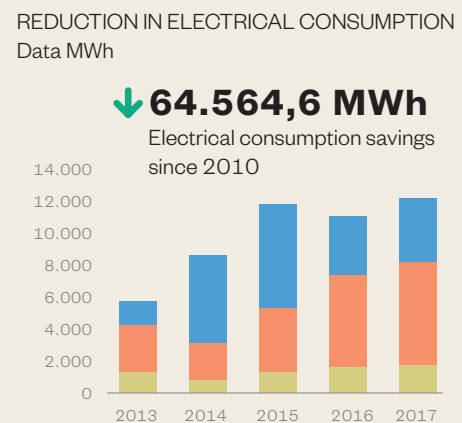
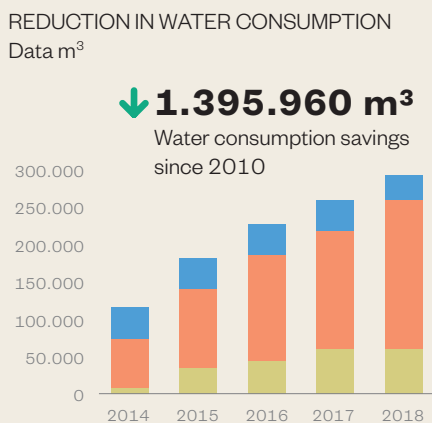
Corporate scope objective required for defining a long term goal aimed at minimising the environmental impact worldwide by reducing the CO₂ emissions related with transporting the products distributed by the group.

— The following actions were taken:
 — Analysis of the transport flows of KOSA product and the degree of available information
 — Creation of basic systems for collecting the data required for calculating the emissions (distances, dispatches, etc.)
 — Filling out the group's form with the data for the year.

— Based on the method and calculation factors used by the Group, Kao Corporation, S.A. has emitted 8252 tons of CO₂ for transporting finished product and 5267 tons of CO₂ for transporting raw materials.

REFERENCE MA-06

ILUSTRATION 10. PROGRESS OF THE ACHIEVEMENTS REACHED



ASSOCIATED ASPECT: WASTE [RE-]

Reduction of **24%** in waste generation as compared to 2010.

The decrease achieved by each centre is as follows:

<p>OLESA DE MONTSERRAT 12,5% 12,8%⁹</p> <p>ACTIONS: Internal handling of aqueous waste.</p> <p>Increasing the performance as the conditions of the process are adjusted has allowed decreasing the Waste oil and generating less water.</p> <p>Improvements in the Ambroxan process have decreased alumina waste.</p>	<p>MOLLET DEL VALLÈS 16,5% 25,6%⁹</p> <p>ACTIONS: Recovery of plastic drums that are used for products that do not meet specifications.</p> <p>Reuse of defective drums for packaging aldehyde.</p> <p>Storage of ALC C10 in a tank instead of containers.</p> <p>Reduction in the amount of lactone condensates by:</p> <p>Changing the catalyst. Improves the performance of aldehyde C10</p> <p>Recover benzaldehyde of the HCA precut</p> <p>Use of different concentrations of acrylic acid to improve the performance of the undecalactone and thus reduce the</p>
---	--

amount of water from aromas and condensates.

BARBERÀ DEL VALLÈS
47,5%

ACTIONS:
Actions carried out in previous years (recovery of fines and reduction of fines during the transport in line 4).

TOTAL KAO CORPORATION, S.A.
15,9% 20,3%⁹

ACHIEVED⁹
84%

The achieving of the objective has been reached in one of the three centres; however, it is worth indicating that the Mollet del Vallès centre has also reached the objective if we do not take into account the waste generated by the scrapping of plant N4D. As we can see in Illustration 6 below, the Olesa de Montserrat centre has notably improved with respect to previous years. Main factors that negatively contribute to achieving the objective:

- Scrapping of installations: 13 tons at Olesa de

Montserrat and 399 tons at Mollet del Vallès.

- Modification of the production mix. The aromas business has grown with respect to the surfactants sector. The first has a larger Rate; in other words, it generates a larger amount of waste per ton produced. In this business sector (the production of aromas has increased 62.6% since 2010) the production of aromas specifically has the most unfavourable rate. This production has doubled since 2010. This, in addition to the fact that the production of surfactants has decreased, is the

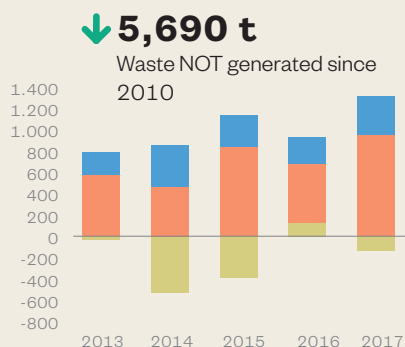
⁹ Ratio without considering extraordinary waste resulting from decommissioning of productive plants.

main reason why we have still not reached the objective even though actions have been taken.

- Another reason associated with the production of aromas is the higher generation of Waste oil that cannot be completely absorbed with the selling of a derivative used in the formulation, which requires managing this substance as waste.

REFERENCE MA-03

REDUCTION IN WASTE GENERATION
Data t



4.2.3 PLANNING OF NEW TARGETS FOR 2019

The targets for 2019 must be determined using the described method and among other aspects must include the actions related with the “eco together” programme, which is focussed on improving the impact of the environmental aspects: energy, water and waste.

This programme has been established worldwide for the

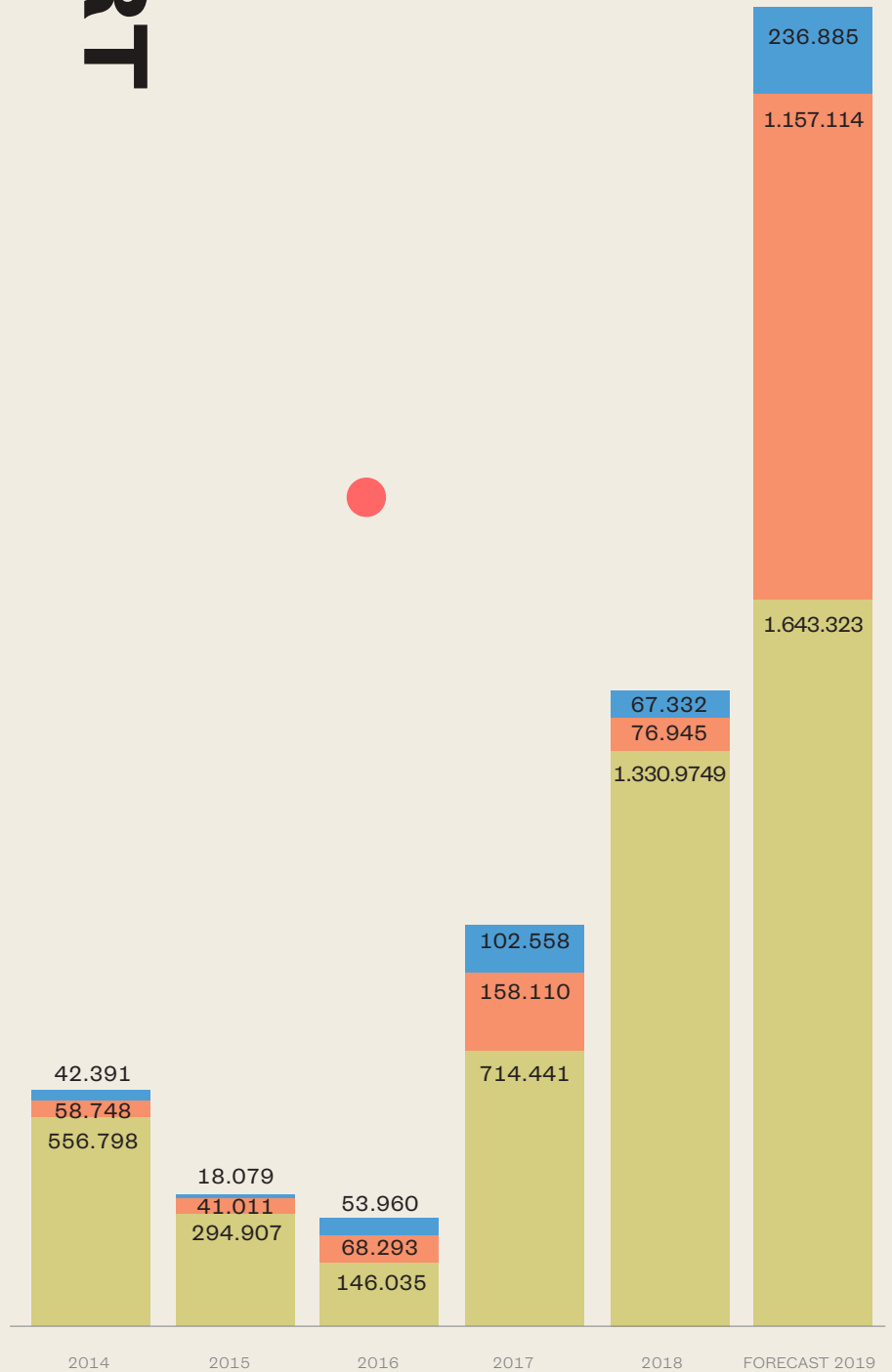
purpose of reducing the number of printed copies by 10% by 2020 as well as to improve biodiversity management at all its facilities. Another line of work that includes a schedule of actions apart from the regular objectives continues to be the promoting of the environmental aspect of Corporate Social Responsibility.

5. SUPPORT

- OLESA DE MONSERRAT
- MOLLET DEL VALLÈS
- BARBERÀ DEL VALLÈS

ILUSTRATION 11.
ANNUAL EVOLUTION
OF ENVIRONMENTAL
INVESTMENTS MAD

TOTALS	2017
2014	975.109
657.938	2018
2015	1.475.252
353.996	FORECAST 2019
2016	3.037.322
268.288	





For maintenance and continuously improving the environmental management system, Kao Corporation, S.A has the support of the Kao group, which incorporates the necessary economic resources for making the necessary investments for improving existing technologies or implementing new technologies as well as the necessary human resources for sharing the experiences, concerns and initiatives of all the subsidiaries.

5.1 RESOURCES

The group's main resource is their employees, who every day, through their commitment and hard work, achieve and maintain the high standards that are set by the group.

Kao Corporation, S.A. considers environmental investments to be an essential part of sustainable business development, and gives such investments the same value and importance as other corporate areas.

Since 2015 the company has implemented a method that allows carrying out a detailed quantification and analysis of the environmental costs and investments. This method can be used to determine the environmental costs associated with personnel, the operation of pollution mitigation facilities -waste water treatment, gas washer or scrubbers, etc.-, investments or waste management among others.



5.2 TRAINING IN SAFETY AND THE ENVIRONMENT

The training and instruction of employees continues to be an essential issue for the company. Throughout 2018 Kao Corporation gave 295 hours of training in safety and the environment, with an overall impact of 3,029 effective hours (8 hours of training* attendees). In 2018, training has been given related with the identification of environmental aspects and its impacts.

In the years to come we expect to increase environmental training for the purpose of raising the environmental awareness of employees so they can recognise the main environmental aspects of their positions and work centres as well as determine how they can have an effect on these.

We also expect to progressively improve the process of evaluating the efficiency of the training, which is a complex task due to the difficulty of establishing indicators that are reliable and objective.



5.3 INTERNAL COMMUNICATION AND PARTICIPATION

The management system for risks prevention includes a wide range of systems targeted at encouraging internal communication. These systems try to ensure that all company personnel receive health and environmental information and in turn can pass on this information. The systems available include multiple channels and groups, but they all share the fact that these are corporate purpose-built channels.

There are many channels, ranging from the classic meetings or committees through to the use of new technologies such as intranets or interactive portals. The meetings that are systematically held by each work team are referred to as **waterfall committees** (183 in 2018). These meetings have a prearranged agenda, with set items to be dealt with such as changes dealt with in the area, achievements in safety and the environment of the area and programmes and procedures. The first waterfall committee is called the **Corporate HSE Committee**, and it receives the most relevant information from the company's waterfall committees and vice versa. This committee defines the policy, reviews the system every year and sets the company's targets. It also regularly visits the work centres, applying the Japanese principle of "genba-ism", viz., proximity to the customer.

The Safety and Health Committee and the Self-protection Committee are also kept active in case issues arise related with the environment.



CUIDA'T
COS + MENT

Other communication systems are the **safety and environment intranet**, the employee portal (Kaonet HR) the QA web (Quality Assurance), the financial

department and KOMPASS (corporate intranet shared by all the subsidiaries of the group). All these enable corporate information to be obtained without any kind of distortion and to interact with this information in multiple ways, from making suggestions to taking self-teaching courses.

Internally the comprehensive **health promotion** project is worth mentioning, which is derived from a new line of action for the company that is focussed primarily on promoting health from a prevention perspective. This line is called “CUIDA’T” and was scheduled to run for 3 years. The first year (2017) it focussed on cardiovascular health, the second year on the musculoskeletal system and the third year on mental health.

Parallel to this and throughout the last few years, management has been promoting training groups comprised of personnel from different centres and areas. Prior to configuring the group, training is imparted to its members to improve their team management and leadership skills and once this training is completed, the group is assigned a very specific task. An example of these are the **“action learning”** groups created for reviewing and improving procedures, improving environmental aspects or promoting sustainability in a certain area. Other examples are the **“change facilitators”** or **“change management”** groups, which are focussed on improving the results of the safety indicators at a centre or managing maintenance and the **“BPM”** groups focussed on management by processes.



5.4 EXTERNAL COMMUNICATION

Also as a result of the emerging **implementation** of the new version of ISO 14001, Management has explicitly identified the interested parties of the company in terms of all the RPMS (Risk Prevention Management System) areas. For each of the interested parties that have been identified, we have analysed their expectations and needs and have assessed the measure in which these expectations and needs are satisfied by the company. Some of the tools that are most widely used for external communication in terms of the environmental aspects are provided below:

5.4.1 KAO GROUP

Until now, the Kao group used three communication tools to

report its corporate activities to its stakeholders -or interested parties-: the Kao Group Profile, the Sustainability Report and the Annual Report.

The Kao Group Profile describes the corporate philosophy, business development and specific initiatives targeted at making “full satisfaction and enrichment of people’s lives” possible.

The Sustainability Report provides detailed information on the group’s activities, both those that help towards creating a sustainable society as well as business-based ones.

The Annual Report provides information on the group’s management vision, strategies and financial situation.

In 2017 the group modified the communication system (<http://www.kao.com/>):

— Kao Overview that describes



the corporate philosophy, the business performance and the specific initiatives to enable “unconditionally satisfying and enriching the lives of people around the world”.

— Kao Integrated Report: presents the activities that create value with their financial and non-financial information.

— Kao Sustainability Data Book: This report introduces the different activities of the Kao Group in terms of “profitable growth” as well as “contributing to the sustainability of the world” by means of solving social problems.

5.4.2 KAO CORPORATION, S.A. Moreover, Kao Corporation, S.A. publishes information on its policies, products, events and indicators on the Kao Chemicals website (<http://www.kaochemicals-eu.com/>) and through this Environmental Declaration. Each year the organisation promotes a series of projects that are in line with the principles of the Sustainability and Risk Prevention Policy and aimed at improving the impact of the company on its surrounding

environment as well as contributing to society.

Of the different activities carried out in 2016, the organising of the first Sustainability Conference at the facilities of Barberà del Vallès with the collaboration of Ecomundis is worth mentioning, with the participation of a speaker who relayed his experience in implementing and maintaining a Risk Prevention Management System. Among other activities, this aspect of RSC promotes the voluntary participation of personnel from Kao Corporation, S.A. in activities organised by the cities they are present in; for example, the annual planting of trees at Mollet del Vallès, which the company has participated in for the fourth year in a row.

The company has continued its collaboration with the ANDA organisation of Abrera in a three-year project related with the recovery of the banks of the Llobregat river by removing an invading species of American cane. This project began in 2017, it continued with this effort (remove

the cane) in 2018 and will begin planting trees in 2019.

We have also contacted with l'Associació Amics de Santiga for the purpose of carrying out actions near Barberà del Vallès so that its companies can collaborate in circular economy projects.

In 2018 the company participated in the Nature Getaway (Riera de Santiga) organised by l'Associació d'Amics of Santiga.

On the other hand, Kao Corporation, S.A. replies to all requests for information or complaints from the neighbours of the cities where it carry out its business.

In 2018 the City of Mollet del Vallès contacted with Kao Corporation, S.A. because a foul smell was perceived by a person from the city. It was determined that the issue was not related with the business activity of Kao Corporation, S.A.; however, a dialogue is maintained with the City to monitor the situation. In 2018 a visit was made to the facilities of Tallers Jeroni Moragas, an entity with which Kao Corporation, S.A. collaborates.



5.4.3 SPECIALISED ASSOCIATIONS AND ENTERPRISES

Kao Corporation, S.A. actively participates with different organisations, enterprises and workgroups within the sphere of safety and the environment. The main organisations of which it is an active member are:



— FEDEQUIM, Federation of Chemical Companies of Catalonia, which in turn is a direct member of FEIQUE, the employers' organisation of the chemical sector and which organises multiple specific commissions in the areas of safety and the environment.

— AEPSAT, Spanish Association of Producers of Substances for Surfactant Applications founded in 1993.

— Since 1985, it has been a member of COASHIQ, the Independent Commission for Health and Safety at Work in the Chemical Industry. As part of this organisation, Kao Corporation, S.A. forms part of the governing board and has been coordinating one of its Committee for 29 years now.

Furthermore, as a member of FEIQUE, Kao Corporation, S.A. has adhered to the Responsible Care programme since it was introduced in Spain in 1993.





5.4.4 SCHOOLS AND TRAINING CENTRES

On the other hand, the company regularly collaborates with different learning centres where the HSE Dept. tutors the internships and projects required by its study plan or by participating as speakers at conferences or briefings. In 2018, the Olesa de Montserrat centre was visited by the attendees of the Company Fireman School.

5.4.5 ADMINISTRATIONS

Since 2008, Kao Corporation, S.A. has been a member of the Serious Accidents working group constituted by the Industrial Safety Sub-department to handle the different issues that arise in this area: from regulatory proposals, changes in the regulation, drafting guidelines and defining criteria for properly applying the existing regulations and conducting investigations. Likewise, Kao Corporation, S.A.,

as member of the working group created in the environmental area of FEDEQUIM, has participated in drafting the document issued to the General Environmental Quality Department with the aim of improving the environmental inspection efforts that are carried out in the wake of the implementation of the comprehensive environmental inspection plan of Catalonia; as well as the regulatory proposal on waste management and atmospheric emissions instruction.

In 2018 different visits were made to the City Halls of the three municipalities where the Kao group centres are located and meetings were also held with competent authorities on water, waste and the atmosphere to talk about issues of interest related with the activity carried out by Kao Corporation, S.A. as well as with the Unified Environmental Management Office and with ACCIÓ: Catalonia Trade & Investment.



5.4.6 THE MEDIA

In 2018 there have been no requests for information submitted by the media.

5.4.7 SUPPLIERS AND CLIENTS

Communicating with suppliers is an essential element to achieve the environmental objectives. Kao maintains different systems that facilitate a proper exchange of information and documents. At the corporate level, a supplier evaluation system that considers various scopes is being promoted, the main ones of which are respect for human rights, safety management, the environment and product safety. Therefore, software that has been extensively implemented in the chemical sector is used, called SEDEX. This does not detract from the corporate value, Yoki-Monozukuri¹⁰ and the principle of genba-ism¹¹, which defines the importance of observing things on site, at their real location and in their real environment.

Suppliers are audited and visited annually. This is done to increase our understanding of commercial operations to the utmost and to optimize performance. For these purposes, the waste managers are providers. Annually, a visit/audit is carried out of at least one of them and reported to the group (2 in 2018). Regarding communications with customers, these are based on providing the Safety Data Sheets and technical information on each product prior to the first delivery and in the event of any updates. On the other hand, the Customer Service Department continues to receive numerous customer surveys, thereby requesting data on safety and the environment, among other data. It is worth mentioning that, just like Kao when it is acting in this capacity, clients are increasingly requesting information via structured software such as Sedex or Ecovadis, which determine the company's score based on their responses. In 2018, KCSA's

indicators have been updated in SEDEX.

In the case of Ecovadis, in 2016 KCSA obtained the "gold recognition level", which placed it among the top 5% of companies evaluated by this organisation.



¹⁰ Yoki means good/excellent while Monozukuri means development/manufacturing of products.

¹¹ Genba means a real place.

6. OPERATION

6.1 OPERATIONAL CONTROL

Kao Corporation, S.A. uses management procedures, standard operational safety instructions, operating procedures, basic safety rules and other documents to define how the processes must be carried out, what must be controlled, how and with what frequency.

This prompts certain records that are document proof of how certain actions have been carried out or of their results.

This documentation is used to meet the different requirements of the organisation such as this environmental declaration, which is drafted based on the indicators obtained from the records that are generated by the system.

6.2 EMERGENCY PREPARATION AND RESPONSE

Kao Corporation, S.A. has two facilities affected by the regulations governing the prevention of serious accidents (Royal Decree 840/2015) at the highest level, more specifically the facilities at Olesa de Montserrat and Mollet del Vallès. This entails extremely high levels of safety, already laid down in the policy, both with regard to the organisation as well as the part that refers to installations and the entire sphere of human behaviour. As laid down in the regulations, each establishment has to prepare the "Serious Accidents Safety Report" (SR), which is submitted to Management together with the Assessment Report drawn up by the authorised organisation. These reports are submitted every five years, providing no substantial





changes have taken place in the interim period.

Currently the Administration is in charge of the SR assessment once the owner registers the document and pays the applicable fees.

In 2013, the company submitted the assessment report of the Mollet del Vallès SR, as well as the Quantitative Risk Analysis (QRA) of the same centre, which is required by the Administration.

Upon request by the Administration, the QRA for the Olesa de Montserrat centre was submitted in 2014.

The SR for the Olesa de Montserrat centre was submitted and reviewed in 2016 and the SR for the Mollet del Vallès centre was submitted and reviewed in 2017.

Crisis communication

Since 2012 Kao Corporation, S.A. has a manual for communicating in a crisis, which has been updated based on the lessons learned during drills as well as real events. In 2018 there has been no reason to activate the committee.

Once a crisis situation is under





control, we must always conduct an assessment to determine ways to improve our actions in future situations. All these lessons learned have been compiled in the third edition of the manual approved in 2018.

Collaboration with other companies of the group: SHEEP group

Since 2014, the Kao group has been encouraging companies that are part of Kao Chemicals Europe to meet periodically for the purpose of exchanging experiences and knowledge related with safety and the environment. Executives and technicians from Kao Chimigraph (located in Spain), Kao Chemicals Germany (located in Germany) and Quimikao (located in Mexico) as well representatives

from Kao Japan and Kao Corporation, S.A. participate in this forum.

Acronym SHEEP stands for “safety, health, environment, engineering & production” and

its purpose is to register all the subjects that are discussed at the different meetings.

Apart from the meetings held via video-conferencing, local visits are also made to the different





centres. Among other aspects, the measures adopted after a high potential accident will be reviewed. A meeting was held in Germany in 2016 and meetings were held in Spain in 2017 and 2018.

Action in the case of an emergency

Kao Corporation, S.A. has a Self-protection Plan for each of its centres (3); these are kept up-to-date and reviewed every three years.

In accordance with Decree 30/2015 d'Autoprotecció (rescinded by previous D 82/2010), the Self-protection Plans of the Olesa de Montserrat and Mollet del Vallès centres must be submitted to the Civil Protection Agency for certification through the Hermes platform.

TABLE 3. ACCIDENT SCENARIOS OF THE DRILLS CONDUCTED

- OLESA DE MONTSERRAT CENTRE
 - Spill on fire in the MDJ tank area.
- MOLLET DEL VALLÈS CENTRE
 - DTBPO spill.
- BARBERÀ DEL VALLÈS CENTRE
 - Placement of 4 backpacks with explosives (Central Building).
 - Fire in an unknown area, inside or outside, with the possibility of an injured person (Toner Plant).

Both have been submitted and certified by the aforementioned administration.

In order to check that the different plans are appropriate and the degree of training for those in charge of carrying out actions, the company conducts 16 drills every year. In 2018 these were based on the following accident scenarios and hypotheses, (*Table 3*).

Kao Corporation, S.A. has a crew of Company Fire Fighters, some of them with an advanced level of qualification, and personnel trained in administering first aid, ensuring a minimum of two qualified personnel are present on each shift. Each facility has an AED unit.

7. EVALUATION OF PERFORMANCE

- OLESA DE MONSERRAT
- MOLLET DEL VALLÈS
- BARBERÀ DEL VALLÈS
- KAO CORPORATION, S.A.



7.1 ENVIRONMENTAL BEHAVIOUR

7.1.1 ENVIRONMENTAL INDICATORS

The environmental declaration of 2011 modifies the rate calculation criteria. Since then, instead of considering total protection, which includes the intermediate products, the rate is calculated in tons of final product; in other words, product for sale. Beginning in 2017, all indicators related with the Mollet del Vallès centre include the activity carried out by Kao Chimigraf at the facilities of said centre since this activity has been added to the Comprehensive Environmental Authorisation of Kao Corporation, S.A.

7.1.1.1 ENERGY EFFICIENT INDICATORS

All the energy consumed is purchased in cases where the Olesa de Montserrat centre has a cogeneration plant. The following table shows consumption of energy at the three production centres, where:

- Total consumption: The sum of electricity consumption and heat consumption.
- Natural gas consumption: In the overall consumption of gas, viz., the amount consumed in the steam and thermal oil boilers as well as the amount consumed in cogeneration for electricity production. Since 2017, all the electricity produced is sold and the necessary electricity is purchased.
- Heat consumption: This is the consumption of Natural gas used in the steam and thermal oil boilers.
- In 2018, the negotiation was completed and the contracts signed to ensure that the purchased energy for the periods 2019-2020 originates from 100% renewable energy sources.

NOTES FOR INTERPRETING THE EVOLUTION OF INDICATORS:

At the Olesa de Montserrat centre, the actions taken to reduce the electrical consumption have had a positive impact as the rate has improved; however, the same has not occurred at the Barberà del Vallès centre where the actions taken do not compensate for the change in the product mix that was produced. The current demands of the market require a toner with a smaller particle size and this requires a greater energy consumption in order to reach the desired atomization. The environmental objectives paragraph (4.2.2) lists the actions taken at each centre.

In the case of gas, no aspects or actions are worth mentioning. The business activity of Kao Chimigraf does not require this supply or thermal energy (except air conditioning).

In terms of electrical consumption, the business activity of Kao Chimigraf has consumed 3.7% of the centre's consumption.

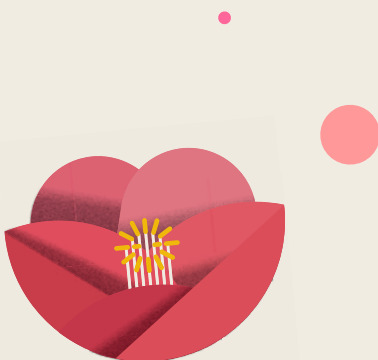


TABLE 4. BASIC ENERGY EFFICIENCY INDICATORS

	2014	2015	2016	2017	2018
OLESA DE MONTSERRAT CENTRE					
Total consumption (MWh)	95.849	96.437	95.895	98.674	99.172
Total consumption / Final production (MWh / t)	1,59	1,57	1,51	1,53	1,49
Electrical consumption (MWh)	16.618	16.273	16.505	16.619	16.703
Consumption of purchased electricity (%)	8,67	5,26	7,05	100,00	100,00
Electrical consumption / Final production (MWh / t)	0,27	0,26	0,26	0,26	0,25
Natural gas consumption (GJ)	451.664	464.469	450.744	463.910	464.346
Natural gas consumption / Final production (GJ / t)	7,47	7,54	7,11	7,21	6,99
Heat consumption (MWh)	79.231	80.164	79.390	82.055	82.470
Heat consumption / Final production (MWh / t)	1,31	1,30	1,25	1,28	1,24
MOLLET DEL VALLÈS CENTRE					
Total consumption (MWh)	128.263	129.385	82.516	87.543	88.372
Total consumption / Final production (MWh / t)	2,64	2,46	1,65	1,63	1,67
Electrical consumption (MWh)	14.551	13.966	11.068	11.564	11.483
Consumption of purchased electricity (%)	2,58	2,86	100,00	100,00	100,00
Consumo eléctrico / Producción final (MWh / t)	0,30	0,27	0,22	0,21	0,22
Natural gas consumption (GJ)	554.938	553.651	204.969	221.997	224.192
Natural gas consumption / Final production (GJ / t)	11,41	10,53	4,11	4,12	4,23
Heat consumption (MWh)	113.712	115.419	71.448	75.979	76.889
Heat consumption / Final production (MWh / t)	2,34	2,20	1,43	1,41	1,45
BARBERÀ DEL VALLÈS CENTRE					
Total consumption (MWh)	17.511	14.239	15.690	15.680	15.659
Total consumption / Final production (MWh / t)	6,35	5,81	6,97	6,97	7,87
Electrical consumption (MWh)	17.511	14.165	15.601	15.593	15.567
Consumption of purchased electricity (%)	100,00	100,00	100,00	100,00	100,00
Electrical consumption / Final production (MWh / t)	6,35	5,78	6,93	6,93	7,83
Natural gas consumption (GJ)	350	269	322	313	332
Natural gas consumption/Final production (GJ / t)	0,13	0,11	0,14	0,14	0,17
TOTAL KAO CORPORATION, S.A.					
Total consumption (MWh)	241.623	240.061	194.102	201.897	203.202
Total consumption / Final production (MWh / t)	2,16	2,06	1,68	1,68	1,67
Electrical consumption (MWh)	48.680	44.403	43.174	43.776	43.752
Consumption of purchased electricity (%)	39,70	34,73	64,47	100,00	100,00
Electrical consumption / Final production (MWh / t)	0,44	0,38	0,37	0,36	0,36
Natural gas consumption (GJ)	1.006.952	1.018.388	656.035	686.220	688.870
Natural gas consumption / Final production (GJ / t)	9,00	8,73	5,68	5,70	5,67
Heat consumption (MWh)	192.942	195.583	150.838	158.034	159.358
Heat consumption / Final production (MWh / t)	1,72	1,68	1,31	1,31	1,31

Source: EE bills-Gas bills-Cogeneration Centre




7.1.1.2 MATERIAL CONSUMPTION INDICATORS

This indicator has been calculated considering both the purchases of raw materials as well as auxiliary and materials representative of each production process, excluding energy products and water.

Of the purchases of representative materials, the three most representative of each centre are specified, except for the Barberà del Vallès Centre, where grounds of confidentiality preclude such disclosure.

It is worth mentioning that the consumption of the Mollet del Vallès centre incorporates the raw materials used by Kao Chimigraf in its business and represents 3% of the total raw material consumption.

TABLE 5.
BASIC MATERIALS CONSUMPTION INDICATORS

	2014	2015	2016	2017	2018
 OLESA DE MONTSERRAT CENTRE					
Fatty acids (t)	8.162	9.327	11.872	11.552	5.044
Alcohols (t)	3.602	3.697	3.02	4.030	4.121
Ethylene oxide / Propylene (t)	3.799	3.595	5.430	5.728	6.061
Materials (t)	39.163	40.956	45.283	46.221	40.804
Materials / Final production (t/t)	0,65	0,66	0,71	0,72	0,61
 MOLLET DEL VALLÈS CENTRE					
Alcohols (t)	5.221	5.859	5.764	6.093	6.199
Aldehydes (t)	1.185	1.202	1.138	1.223	1.053
Fatty acids (t)	14.293	10.455	18.951	18.286	19.697
Materials (t)	38.721	38.513	46.794	48.473	48.272
Materials / Final production (t / t)	0,80	0,73	0,94	0,90	0,91
 BARBERÀ DEL VALLÈS CENTRE					
Materials (t)	2.690	1.919	2.254	2.191	1.931
Materials / Final production (t / t)	0,98	0,78	1,00	0,97	0,97
 TOTAL KAO CORPORATION, S.A.					
Materials (t)	80.574	81.388	94.331	96.884	91.007
Materials / Final production (t / t)	0,72	0,70	0,82	0,80	0,75

Source: Annual waste declaration. Purchasing Result (GR basis)



7.1.1.3 WATER INDICATORS

TABLE 6. BASIC INDICATORS ON WATER CONSUMPTION

	2014	2015	2016	2017	2018
OLESA DE MONTSERRAT CENTRE					
Consumption (m ³)	185.699	156.746	157.600	146.656	146.658
Consumption / Final production (m ³ / t)	3,07	2,54	2,49	2,28	2,21
Network supply (%)	94,81	94,06	94,27	94,88	92,91
MOLLET DEL VALLÈS CENTRE					
Consumption (m ³)	227.463	219.120	159.519	166.276	136.714
Consumption / Final production (m ³ / t)	4,68	4,17	3,20	3,09	2,58
Network supply (%)	0,70	1,11	0,94	1,13	1,43
BARBERÀ DEL VALLÈS CENTRE					
Consumption (m ³)	24.624	12.333	11.648	11.234	7.240
Consumption / Final production (m ³ / t)	8,93	5,03	5,17	4,99	3,64
Network supply (%)	100,00	100,00	100,00	100,00	100,00
TOTAL KAO CORPORATION, S.A.					
Consumption (m ³)	437.786	388.199	328.767	324.166	290.612
Consumption / Final production (m ³ / t)	3,91	3,33	2,85	2,69	2,39
Network supply (%)	46,21	41,78	49,19	46,97	50,06

Source: PRTR Declaration – ACA Quarterly Declaration (B6)

TABLE 7.
INDICATORS ON THE IMPACT OF DUMPING

	2014	2015	2016	2017	2018
OLESA DE MONTSERRAT CENTRE					
Dump (m ³)	92.850	78.373	76.480	65.925	78.030
Dump / Final production (m ³ / t)	1,54	1,27	1,21	1,02	1,17
TOC: Total Organic Carbon = DQO/3 (kg)	7.740	8.971	6.981	7.080	6.086
TOC / Final production (kg / t)	0,13	0,15	0,11	0,11	0,09
SM: Suspended Matter (kg)	6.170	4.102	3.139	3.322	3.829
SM / Final production (kg / t)	0,10	0,07	0,05	0,05	0,06
N: Total nitrogen (kg)	1.352	1.570	1.656	785	1.021
N / Final production (kg / t)	0,02	0,03	0,03	0,01	0,02
P: Phosphorous total (kg)	115	40	13	113	125
P / Final production (kg / t)	0,00	0,00	0,00	0,00	0,00

MOLLET DEL VALLÈS CENTRE

Dump (m ³)	159.224	153.384	120.533	125.979	108.466
Dump / Final production (m ³ / t)	3,27	2,92	2,41	2,34	2,04
TOC: Total Organic Carbon = DQO/3 (kg)	23.223	22.447	8.381	7.796	11.784
TOC / Final production (kg / t)	0,48	0,43	0,17	0,14	0,22
SM: Suspended Matter (kg)	6.380	6.267	3.729	5.764	7.936
SM / Final production (kg / t)	0,13	0,12	0,07	0,11	0,15
N: Total nitrogen (kg)	2.715	2.608	1.660	2.197	2.992
N / Final production (kg / t)	0,06	0,05	0,03	0,04	0,06
P: Phosphorous total (kg)	138	675	199	1.290	886
P / Final production (kg / t)	0,00	0,00	0,00	0,00	0,00

Improves consumption and the dump per ton of final product

NOTES FOR INTERPRETING THE EVOLUTION OF INDICATORS:

The daily monitoring of the consumptions is reflected in the consumption rate of each one of the centres, which improves compared to previous years and maintains this downward trend. In terms of the dump rate, the trend is also maintained; however, this cannot be easily seen at the Olesa de Montserrat and Barberà del Vallès centres due to the heavy rain that fell during the last quarter of the year. The quality of the dump is maintained at the Barberà

del Vallès centre and has decreased at the Mollet del Vallès and Olesa de Montserrat centres; however, the quality of all the control parameters have not decreased. This is understandable under these circumstances since the decrease in the volume dumped results in a higher concentration.

At the Olesa de Montserrat and Mollet del Vallès centres we have been able to treat more quantity of waste water originating from the aroma plants, which in previous years had been managed as waste. This has also contributed

to creating a higher polluting load.

The good results that are obtained are a reflection of the efforts made during previous years and the rigorous control and monitoring that is carried out.

In spite of this, other actions are being assessed that allow further reducing the consumptions without compromising the processes or the quality of the dump. At the Mollet del Vallès centre, the water consumption generated by the business activity of Kao Chimigraf is negligible (<0,5%).

	2014	2015	2016	2017	2018
● BARBERÀ DEL VALLÈS CENTRE					
Dump (m ³)	19.699	9.866	6.764	4.722	5.254
Dump / Final production (m ³ / t)	7,14	4,03	3,00	2,10	2,64
TOC: Total Organic Carbon = DQO/3 (kg)	693	264	330	209	180
TOC / Final production (kg / t)	0,25	0,11	0,15	0,09	0,09
SM: Suspended Matter (kg)	734	481	442	291	269
SM / Final production (kg / t)	0,27	0,20	0,20	0,13	0,14
N: Total nitrogen (kg)	165	60	47	41	113
N / Final production (kg / t)	0,06	0,02	0,02	0,02	0,06
P: Phosphorous total (kg)	109	53	23	24	29
P / Final production (kg / t)	0,04	0,02	0,01	0,01	0,01

● TOTAL KAO CORPORATION, S.A.

Dump (m ³)	271.773	241.623	203.776	196.626	191.750
Dump / Final production (m ³ / t)	2,43	2,07	1,76	1,63	1,58
TOC: Total Organic Carbon = DQO/3 (kg)	31.656	31.682	15.693	15.084	18.051
TOC / Final production (kg / t)	0,28	0,27	0,14	0,13	0,15
SM: Suspended Matter (kg)	13.284	10.850	7.310	9.377	12.034
SM / Final production (kg / t)	0,12	0,09	0,06	0,08	0,10
N: Total nitrogen (kg)	4.232	4.237	3.363	3.023	4.126
N / Final production (kg / t)	0,04	0,04	0,03	0,03	0,03
P: Phosphorous total (kg)	361	768	235	1.427	1.040
P / Final production (kg / t)	0,00	0,01	0,00	0,01	0,01

Source: PRTR Declaration - Monthly report [centre]



7.1.1.4 WASTE INDICATORS


The data on waste production have been adjusted over time due to the introduction of legal provisions governing the classification and coding of waste (Regional, National and European codes).


Waste from all activities is generated at the Kao Corporation, S.A. centres:

- Household waste: Paper, cardboard, plastic, batteries, fluorescent tubes, toner cartridges, beakers, drink cans and common waste.
- Industrial waste, characteristic of the industrial process, including the following: Sludge from the treatment of waste water, liquid waste from the aroma production plant, solid waste from the surfactant plants, toner and resins.



TABLE 8. BASIC INDICATORS ON WASTE TYPE

	2014	2015	2016	2017	2018
 OLESA DE MONTSERRAT CENTRE					
Non-hazardous waste (t)					
07 From organic chemical processes	750,54	784,83	821,48	720,97	794,65
Rate (kg / t)	12,42	12,16	13,28	11,20	11,96
16 Catalysts	31,94	35,16	22,77	18,42	28,42
Rate (kg / t)	0,53	0,57	0,37	0,29	0,43
17 From construction and demolition			4,86	0,00	0,00
Rate (kg / t)			0,08	0,00	0,00
20 Similar to municipal waste	144,56	205,34	133,76	147,53	169,58
Rate (kg / t)	2,39	3,33	2,16	2,29	2,55
Hazardous waste (t)					
07 From organic chemical processes	1.841,76	2.473,31	2.706,36	3.253,97	2.569,55
Rate (kg / t)	30,47	40,15	43,76	50,57	38,67
13 From oils and liquid fuels	0,60	0,63	0,00	7,35	4,84
Rate (kg / t)	0,01	0,01	0,00	0,11	0,07
14 From solvents	1.450,01	642,94	78,88	0,00	0,00
Rate (kg / t)	23,99	10,44	1,28	0,00	0,00
15 From containers, absorbents, cleaning cloths	295,53	272,09	285,34	321,50	261,42
Rate (kg / t)	4,89	4,42	4,61	5,00	3,93
16 Not specified in other list chapters	6,01	25,67	30,24	20,30	3,88
Rate (kg / t)	0,10	0,42	0,49	0,32	0,06
17 From construction and demolition	0,00	2,80	0,00	0,00	0,00
Rate (kg / t)	0,00	0,05	0,00	0,00	0,00
20 Similar to municipal waste	0,17	0,14	0,02	0,16	0,10
Rate (kg / t)	0,00	0,00	0,00	0,00	0,00

	2014	2015	2016	2017	2018
 MOLLET DEL VALLÈS CENTRE					
Non-hazardous waste (t)					
06 From inorganic chemical processes Rate (kg / t)	0,00 0,00	0,00 0,00	0,00 0,00	0,00 0,00	0,00 0,00
07 From organic chemical processes Rate (kg / t)	403,98 8,31	172,54 3,28	255,02 5,11	156,20 2,90	195,90 3,69
16 Catalysts Rate (kg / t)	0,00 0,00	0,00 0,00	0,00 0,00	0,00 0,00	0,00 0,00
17 From construction and demolition Rate (kg / t)	0,00 0,00	5,95 0,11	0,00 0,00	0,00 0,00	221,24 4,17
19 Exchange resins and active carbon Rate (kg / t)	16,03 0,33	11,57 0,22	0,00 0,00	0,00 0,00	0,00 0,00
20 Similar to municipal waste Rate (kg / t)	129,35 2,66	184,20 3,50	418,07 8,38	118,59 2,20	253,89 4,79
Hazardous waste (t)					
06 From inorganic chemical processes Rate (kg / t)				51,22 0,95	0,00 0,00
07 From organic chemical processes Rate (kg / t)	2.829,15 58,16	2.952,03 56,14	2.788,50 55,86	2.872,28 53,33	2.825,39 53,26
08 Ink Rate (kg / t)				46,16 0,86	74,01 1,39
13 From oils and liquid fuels Rate (kg / t)	10,14 0,21	2,42 0,05	2,94 0,06	1,80 0,03	1,00 0,02
14 From solvents Rate (kg / t)	0,28 0,01	0,27 0,01	0,30 0,01	0,38 0,01	0,30 0,01
15 From containers, absorbents, cleaning cloths Rate (kg / t)	148,71 3,06	114,94 2,19	101,38 2,03	132,91 2,47	102,63 1,93
16 Not specified in other list chapters Rate (kg / t)	10,64 0,22	4,86 0,09	53,95 1,08	27,63 0,51	0,00 0,00
17 From construction and demolition Rate (kg / t)	0,90 0,02	10,40 0,20	6,60 0,13	0,00 0,00	0,00 0,00
20 Similar to municipal waste Rate (kg / t)	0,21 0,00	0,29 0,01	0,03 0,00	0,12 0,00	0,12 0,00


	2014	2015	2016	2017	2018
BARBERÀ DEL VALLÈS CENTRE					
Non-hazardous waste (t)					
08 From processes	159,84	91,22	122,91	119,11	113,96
Rate (kg / t)	57,97	37,24	54,58	52,94	57,29
15 From containers	1,34	1,76	1,42	0,70	0,80
Rate (kg / t)	0,49	0,72	0,63	0,31	0,40
17 Cables			0,26	0,00	0,58
Rate (kg / t)			0,12	0,00	0,29
20 Similar to municipal waste	288,33	284,55	278,85	273,27	194,89
Rate (kg / t)	104,56	116,16	123,83	121,45	97,97
Hazardous waste (t)					
07 From organic chemical processes	16,23	23,32	11,96	5,94	3,88
Rate (kg / t)	5,89	9,52	5,31	2,64	1,95
08 Ink	0,00	0,24	0,18	0,09	0,00
Rate (kg / t)	0,00	0,10	0,08	0,04	0,00
13 From oils and liquid fuels	0,72	0,36	0,27	0,45	0,63
Rate (kg / t)	0,26	0,15	0,12	0,20	0,32
14 From solvents	0,00	0,12	0,10	0,40	0,28
Rate (kg / t)	0,00	0,05	0,04	0,18	0,14
15 From containers, absorbents, cleaning cloths	0,60	0,80	0,69	1,43	1,24
Rate (kg / t)	0,22	0,33	0,31	0,63	0,62
16 Not specified in other list chapters	11,20	10,10	12,14	7,63	9,40
Rate (kg / t)	4,06	4,12	5,39	3,39	4,72
18 From the medical service	0,01	0,03	0,02	0,00	0,01
Rate (kg / t)	0,00	0,01	0,01	0,00	0,01
20 Similar to municipal waste	0,04	0,15	0,54	0,84	1,01
Rate (kg / t)	0,01	0,06	0,24	0,37	0,51





	2014	2015	2016	2017	2018
● TOTAL KAO CORPORATION, S.A.					
Non-hazardous waste (t)					
06 From inorganic chemical processes Rate (kg / t)	0,00 0,00	0,00 0,00	0,00 0,00	0,00 0,00	0,00 0,00
07 From organic chemical processes Rate (kg / t)	1.154,52 10,32	921,37 7,90	1.076,50 9,44	877,17 7,28	990,55 8,15
08 From processes Rate (kg / t)	159,84 1,43	91,22 0,78	122,91 1,08	119,11 0,99	114,02 0,94
15 From containers Rate (kg / t)	1,34 0,01	1,76 0,02	1,42 0,01	0,70 0,01	0,80 0,01
16 Catalysts Rate (kg / t)	31,94 0,29	35,16 0,30	22,77 0,20	18,42 0,15	28,42 0,23
17 Insulation materials Rate (kg / t)	0,00 0,00	5,95 0,05	5,12 0,04	6,50 0,05	221,82 1,83
19 Exchange resins and active carbon Rate (kg / t)	16,03 0,14	11,57 0,10	0,00 0,00	0,00 0,00	0,00 0,00
20 Similar to municipal waste Rate (kg / t)	562,24 5,03	674,09 5,78	830,67 7,29	539,39 4,48	618,36 5,09
Hazardous waste (t)					
07 From organic chemical processes Rate (kg / t)	4.687,15 41,91	5.448,65 46,72	5.506,82 48,30	6.132,19 50,91	5.398,82 44,44
08 Ink Rate (kg / t)	0,00 0,00	0,24 0,00	0,18 0,00	46,25 0,38	74,01 0,61
13 From oils and liquid fuels Rate (kg / t)	11,46 0,10	3,41 0,03	3,21 0,03	9,60 0,08	6,47 0,05
14 From solvents Rate (kg / t)	1.450,29 12,97	643,33 5,52	79,28 0,70	0,78 0,01	0,58 0,00
15 From containers, absorbents, cleaning cloths Rate (kg / t)	444,84 3,98	387,84 3,33	387,41 3,40	455,83 3,78	365,29 3,01
16 Not specified in other list chapters Rate (kg / t)	27,85 0,25	40,13 0,34	96,34 0,84	55,56 0,46	13,28 0,11
17 From construction and demolition Rate (kg / t)	0,90 0,01	13,20 0,11	6,60 0,06	0,00 0,00	0,00 0,00
18 From the medical service Rate (kg / t)	0,01 0,00	0,03 0,00	0,02 0,00	0,00 0,00	0,01 0,00
20 Similar to municipal waste Rate (kg / t)	0,42 0,00	0,58 0,00	0,59 0,01	1,12 0,01	1,23 0,01


Source: Annual waste declaration [centre]. SIMA database

TABLE 9.
BASIC INDICATORS ON WASTE

	2014	2015	2016	2017	2018
 OLESA DE MONTSERRAT CENTRE					
Generated (t)	4.521	4.407	4.084	4.497	3.832
Generated / Final production (t / t)	0,07	0,07	0,06	0,07	0,06
Non-hazardous (t)	927	989	983	893	993
Generated Non-hazardous / Final production (t / t)	0,02	0,02	0,02	0,01	0,01
Hazardous (t)	3.594	3.418	3.101	3.603	2.840
Generated hazardous / Final production (t / t)	0,06	0,06	0,05	0,06	0,04
Generated hazardous / Total generated (%)	79,5	77,6	75,9	80,1	74,1

 MOLLET DEL VALLÈS CENTRE					
Generated (t)	3.549	3.459	3.627	3.407	3.675
Generated / Final production (t / t)	0,07	0,07	0,07	0,06	0,07
Non-hazardous (t)	549	374	673	275	671
Generated Non-hazardous / Final production (t / t)	0,01	0,01	0,01	0,01	0,01
Hazardous (t)	3.000	3.085	2.954	3.132	3.003
Generated hazardous / Final production (t / t)	0,06	0,06	0,06	0,06	0,06
Generated hazardous / Total generated (%)	84,5	89,2	81,4	91,9	81,7

 BARBERÀ DEL VALLÈS CENTRE					
Generated (t)	478	413	429	410	327
Generated / Final production (t / t)	0,17	0,17	0,19	0,18	0,16
Non-hazardous (t)	450	378	403	393	310
Generated Non-hazardous / Final production (t / t)	0,16	0,15	0,18	0,17	0,16
Hazardous (t)	29	35	26	17	16
Generated hazardous / Final production (t / t)	0,01	0,01	0,01	0,01	0,01
Generated hazardous / Total generated (%)	6,0	8,5	6,0	4,1	5,0

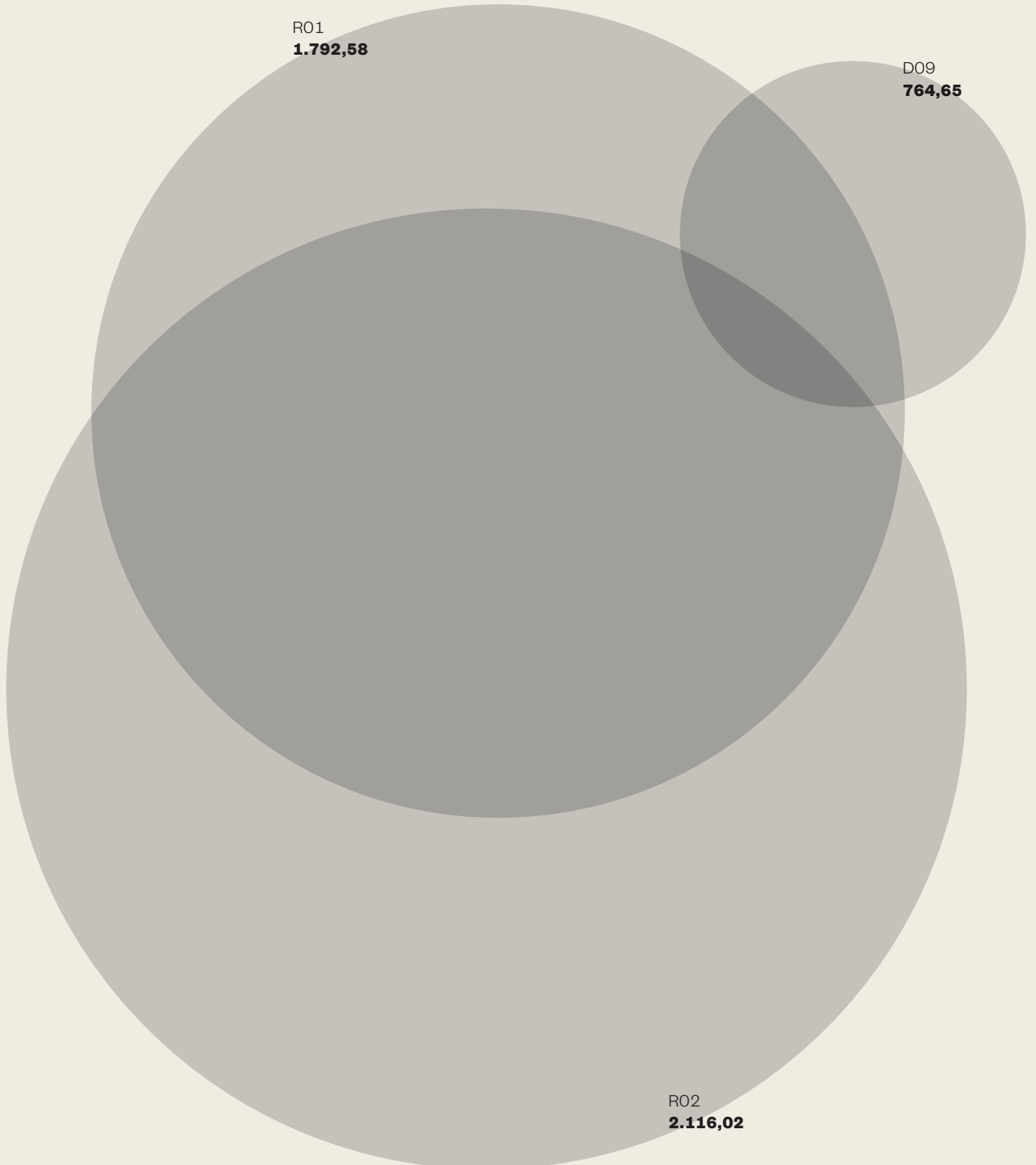
 TOTAL KAO CORPORATION, S.A.					
Generated (t)	8.549	8.279	8.140	8.314	7.834
Generated / Final production (t / t)	0,08	0,07	0,07	0,07	0,06
Non-hazardous (t)	1.926	1.741	2.059	1.561	1.974
Generated Non-hazardous / Final production (t / t)	0,02	0,01	0,02	0,01	0,02
Hazardous (t)	6.623	6.538	6.080	6.753	5.860
Generated hazardous / Final production (t / t)	0,06	0,06	0,05	0,06	0,05
Generated hazardous / Total generated (%)	77,5	79,0	74,7	81,2	74,8

Source: Annual waste declaration [centre]. SIMA database

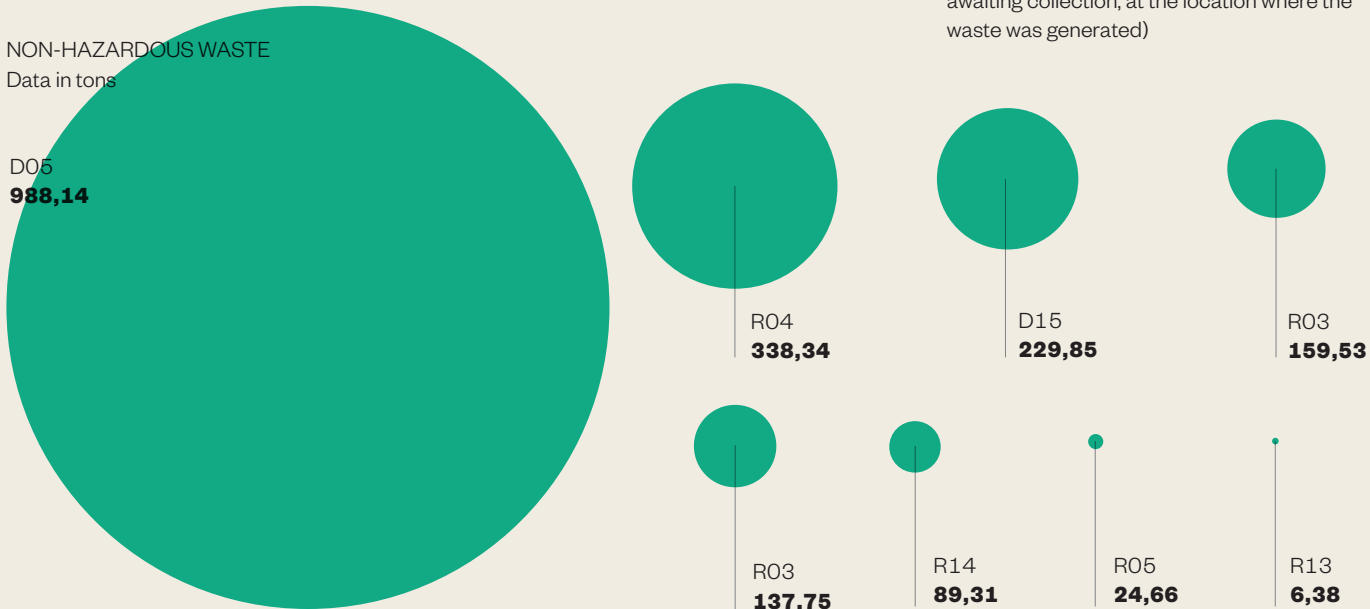
The amount of waste generated in accordance with destination is shown below. 68% of waste generated is reused (14% non-hazardous waste and 86% hazardous waste).

ILUSTRATION 12. DESTINATION OF THE WASTE IN 2018

HAZARDOUS WASTE
Data in tons





Recovery of 38% of the non-hazardous waste and 78% of the hazardous waste





- R01 Primary use as fuel or other method of producing energy
- R02 Recovery or regeneration of solvents
- R03 Recycling or recovery of organic substances that are not used as solvents (including compost and other biological transformation processes)
- R04 Recycling and recovery of metals and metallic compounds
- R05 Recycling and recovery of other inorganic matter
- R12 Exchange of waste to subject it to any of the operations between R1 and R11
- R13 Storage of waste that is waiting to be subjected to any of the operations from R1 to R12 (excluding temporary storage, awaiting collection, at the location where the waste was generated)
- R14 Preparation for reusen
- D05 Controlled depositing at especially designed locations (for example, placing in separate cells that are watertight, covered and isolated from each other and the environment)
- D09 TPhysical-chemical treatment not specified in any other section of this annex and which as a result, produces compounds or mixtures that are eliminated using one of the procedures from D1 to D12 (for example, evaporation, drying, calcination, etc.)
- D10 Incineration in soil
- D15 Storage of waste that is waiting to be subjected to any of the operations from D1 to D14 (excluding temporary storage, awaiting collection, at the location where the waste was generated)

TABLE 10. INDICATORS ON HAZARDOUS WASTE (SPECIAL)

	2014	2015	2016	2017	2018
 OLESA DE MONTSERRAT CENTRE					
Recovered (t)	2.283	1.917	1.682	2.114	1.868
Recovered / Final production (t / t)	0,04	0,03	0,03	0,03	0,03
Removed (t)	1.311	1.501	1.419	1.490	972
Removed / Final production (t / t)	0,02	0,02	0,02	0,02	0,01

 MOLLET DEL VALLÈS CENTRE					
Recovered (t)	2.528	2.698	2.559	2.757	2.695
Recovered / Final production (t / t)	0,05	0,05	0,05	0,05	0,05
Removed (t)	472	387	395	375	309
Removed / Final production (t / t)	0,01	0,01	0,01	0,01	0,01

 BARBERÀ DEL VALLÈS CENTRE					
Recovered (t)	1	2	2	1	3
Recovered / Final production (t / t)	0,00	0,00	0,00	0,00	0,00
Removed (t)	28	33	24	16	14
Removed / Final production (t / t)	0,01	0,01	0,01	0,01	0,01

 TOTAL KAO CORPORATION, S.A.					
Recovered (t)	4.812	4.617	4.235	4.872	4.566
Recovered / Final production (t / t)	0,04	0,04	0,04	0,04	0,04
Removed (t)	1.811	1.921	1.846	1.881	1.294
Removed / Final production (t / t)	0,02	0,02	0,02	0,02	0,01

Source: Annual waste declaration [centre]. SIMA database

7.1.1.5 INDICATORS ON BIODIVERSITY



NOTES FOR INTERPRETING THE EVOLUTION OF INDICATORS:

The rate of generated waste has decreased overall and by centre except in the case of Mollet del Vallès, which has increased due to the scrapping of installations. The objectives paragraph (4.2.2) lists the actions taken; the main actions are listed below:

- Suspension of specific sales of products with a formula that uses fractions resulting from the production of aromas. These must be handled as waste.
- Removal of waste related with sporadic maintenance actions and or scrapping such as construction waste generated during the scrapping of the facility N4D (399 tons) only in the Mollet del Vallès centre.

As indicated in the environmental actions section, a working group has been created to study alternatives to the measures that have been considered and implemented to date and related with innovation for the purpose of defining strategies that allow achieving the desired goals.

The indicator introduced in the environmental declaration is global and although the indicator is representative, certain clarifications are provided such as:

- The type of waste that is generated at the company's installations are diverse and not all of it is directly related with production.
- The production of specific products favours the rate (provides weight with less generation of waste) and by the contrary, the production of other products it hampers the rate (little weight produced with more generation of waste as is the case of aromas).

Olesa de Montserrat is the largest production centre and also the one that generates more waste; therefore, any deviation has a representative impact on the company's indicators.

Although at lower quantities, the Mollet del Vallès Centre has continued managing the water originating from the aroma plants in order to guarantee the quality of the waters processed at the centre's treatment plant.

The waste generated by the business activity of Kao Chimigraf represents 3.4% of the centre's total consumption.

TABLE 11. BASIC INDICATORS ON BIODIVERSITY

	SOLAR TOTAL	LAND OCCUPATION	OCCUPATION %
OLESA DE MONTSERRAT CENTRE			
Surface area (m ²)	103.303	22.498	22
MOLLET DEL VALLÈS CENTRE			
Surface area (m ²)	38.302	14.091	36
BARBERÀ DEL VALLÈS CENTRE			
Surface area (m ²)	43.899	15.180	35

Source: Environmental authorisation/licence

7.1.1.6 INDICATORS ON ATMOSPHERIC EMISSIONS



TABLE 12. BASIC INDICATORS ON EMISSIONS OF CO₂





	2014	2015	2016	2017	2018
OLESA DE MONTSERRAT CENTRE					
Assigned emissions (t)	11.296	10.387	9.505	8.650	7.819
Emissions (t)	25.302	26.019	25.287	26.026	26.190
Emissions / Final production (t CO ₂ /t)	0,42	0,42	0,40	0,40	0,39
MOLLET DEL VALLÈS CENTRE					
Assigned emissions (t)	18.780	17.724	-	-	-
Emissions (t)	31.089	31.017	11.500	12.457	12.646
Emissions / Final production (t CO ₂ /t)	0,64	0,59	0,23	0,23	0,24
BARBERÀ DEL VALLÈS CENTRE					
Emissions (t)	20	16	18	17	18
Emissions / Final production (t CO ₂ /t)	0,01	0,01	0,01	0,01	0,01
TOTAL KAO CORPORATION, S.A.					
Assigned emissions (t)	30.076	28.111	9.505	8.650	7.819
Emissions (t)	56.411	57.052	36.806	38.500	38.854
Emissions / Final production (t CO ₂ /t)	0,50	0,49	0,319	0,320	0,32

Source: Verified GHG report - PRTR Declaration

In 2016 the Mollet del Vallès centre received a resolution revoking the greenhouse gas emissions authorisation as a result of the stoppage of the cogeneration plant and the fatty acids process. For this reason, emissions are no longer assigned for the remaining 2013-2020 period.







TABLE 13. BASIC INDICATORS ON EMISSIONS OF CO

	2014	2015	2016	2017	2018
 OLESA DE MONTSERRAT CENTRE					
Emissions (kg)	4.517	4.645	4.507	4.639	4.643
Emissions / Final production (kg CO / t)	0,07	0,08	0,07	0,07	0,07
 MOLLET DEL VALLÈS CENTRE					
Emissions (kg)	5.549	5.537	2.050	2.220	2.242
Emissions / Final production (kg CO / t)	0,11	0,11	0,04	0,04	0,04
 BARBERÀ DEL VALLÈS CENTRE					
Emissions (kg)	4	3	3	3	3
Emissions / Final production (kg CO / t)	0,00	0,00	0,00	0,00	0,00
 TOTAL KAO CORPORATION, S.A.					
Emissions (kg)	10.070	10.184	6.560	6.862	6.889
Emissions / Final production (kg CO / t)	0,09	0,09	0,06	0,06	0,06

Source: Verified GHG Report - PRTR Declaration

The atmospheric emissions of each one of combustion units are below the legal limit.

TABLE 14. BASIC INDICATORS ON EMISSIONS OF NO_x

	2014	2015	2016	2017	2018
 OLESA DE MONTSERRAT CENTRE					
Emissions (kg)	72.266	28.797	27.946	28.762	28.789
Emissions / Final production (kg NO _x / t)	1,20	0,47	0,44	0,45	0,43
 MOLLET DEL VALLÈS CENTRE					
Emissions (kg)	88.790	34.326	12.708	13.764	13.900
Emissions / Final production (kg NO _x / t)	1,83	0,65	0,25	0,26	0,26
 BARBERÀ DEL VALLÈS CENTRE					
Emissions (kg)	57	17	20	19	21
Emissions / Final production (kg NO _x / t)	0,02	0,01	0,01	0,01	0,01
 TOTAL KAO CORPORATION, S.A.					
Emissions (kg)	161.113	63.141	40.674	42.546	42.710
Emissions / Final production (kg NO _x / t)	1,44	0,54	0,35	0,35	0,35

Source: Verified GHG Report - PRTR Declaration

**NOTES FOR INTERPRETING
THE EVOLUTION OF INDICATORS:**

The atmospheric emissions of all combustion units are below the legal limit. They are below 100 mg/Nm³ for CO and below 450 mg/Nm³ for NO_x.

The emission of ethylene oxide is expressed as '< value' given that the accuracy of the measuring equipment does not enable the emission to be detected and, consequently, it is calculated based on the detection value of the measuring equipment used.

The overall duration of each of the three sources of emission of this pollutant is below 5% of the plant operation time.

At the Olesa de Montserrat centre, the reduction in emissions is due to a lower concentration of TOCs detected during the measurements that were taken (in 5 of the measured sources).




At the Mollet del Vallès centre, the reduction that is observed is primarily due to the actions taken by Kao Chimigraf's ink manufacturing unit, which has reduced diffuse emissions by confining them and applying good practices. This activity generates a significant amount of emissions and by adopting these measures we have been able to reduce emissions by 69%

with respect to the previous year.

At the Barberà del Vallès centre, the amount of particles generated is maintained constant since no significant changes have been made in terms of the operating hours or the productions of the different lines.




A regenerative thermal oxidation centre is going to be installed at the Olesa de Montserrat centre to reduce the concentration and mass emission of VOCs (For more information refer to paragraph 7.2.2).

TABLE 15. BASIC INDICATORS ON OTHER EMISSIONS

	2014	2015	2016	2017	2018
 OLESA DE MONTSERRAT CENTRE					
COVs emissions (kg)	44.153	29.629	27.268	12.675	12.800
COVs Emissions (kg COVs / 1000 t Final production)	730,38	481,04	430,32	196,99	192,64
Dimethyl sulphate emissions (kg/1000 t Line production)			0,002	0,002	
Ethylene oxide emissions (kg / 1000 t Final production)	<0,01	<0,01	<0,01	<0,01	<0,01
 CENTRO DE MOLLET DEL VALLÈS CENTRE					
COVs emissions (kg)	2.215	6.436	6.358	33.254	11.463
COVs Emissions (kg COVs / 1000 t Final production)	45,53	122,40	127,36	617,39	216,07
 CENTRO DE BARBERÀ DEL VALLÈS CENTRE					
PM10 emissions (kg)	767	593	734	711	667
PM10 emissions (kg / t Final production)	0,28	0,24	0,33	0,32	0,34

7.1.1.7 ACOUSTIC EMISSION IMPACT INDICATORS

TABLE 16.
INDICATOR ON THE LEVEL
OF NOISE EMITTED
TO THE OUTSIDE¹²

	2014	2015	2016	2017	2018
 OLESA DE MONTSERRAT CENTRE					
Immission (dBA)	43	43	45	50	44
 MOLLET DEL VALLÈS CENTRE					
Immission (dBA)	47	43	42	46	39
 BARBERÀ DEL VALLÈS CENTRE					
Immission (dBA)	58	63	60	53	68

Source: Periodic checks of environmental authorisations/licences – External company report

NOTES FOR INTERPRETING THE
EVOLUTION OF THE INDICATOR:

The values shown in the table correspond to the measuring point with the highest level of immission, applying the most restrictive correction factors as per Law 16/2002. At the Barberà del Vallès centre, the values correspond to measurements taken in low sensitivity areas for which the immission limits are: 65 dBA during the day and 55 dBA at night. On making calculations for sensitive areas (day 55 dBA and night 45 dBA) pursuant to the ISO 9613-1:1993 standard, the results in sound pressure level is below 40 dBA. In 2018 the Olesa centre replaced the cogeneration silencer and the refrigeration facilities of MDJ were soundproofed to lower the noise level and avoid low frequency penalties.

¹² Measurements made at night time.

7.1.2 ENVIRONMENTAL PERFORMANCE INDICATORS

The environmental performance indicators are the reference values that provide an overall view of the organisation’s environmental behaviour with regard to a reference period.

Modifications to the facilities, the products, processes and/or associated activities demonstrate the high level of productive dynamism and adaptation to market requirements and legislation, which cause annual fluctuations in these indicators. All rates are calculated using end production, which does not consider the production of intermediate products.

The indicators for 2018 are provided below, together with a comparison with the values obtained the previous year.



TABLE 17. PERFORMANCE INDICATORS

		2017	↑↓	2018
● OLESA DE MONTSERRAT CENTRE				
Electrical consumption	Consumption / Final production (MWh / t)	0,26	↓	0,25
Gas consumption	Consumption / Final production (GJ / t)	7,15	↓	6,99
Water consumption	Consumption / Final production (m ³ / t)	2,27	↓	2,21
Total Organic Carbon (TOC) Dump	TOC / Final production (kg / t)	0,11	↓	0,09
Suspended Matter (SM) Dump	SM / Final production (kg / t)	0,05	↑	0,06
Non-hazardous waste	Generated / Final production (t / t)	0,01	↔	0,01
Hazardous waste	Generated / Final production (t / t)	0,06	↓	0,04
CO ₂ emissions	Emissions / Final production (t CO ₂ / t)	0,40	↓	0,39

● MOLLET DEL VALLÈS CENTRE				
Electrical consumption	Consumption / Final production (MWh / t)	0,20	↑	0,22
Gas consumption	Consumption / Final production (GJ / t)	4,20	↑	4,23
Water consumption	Consumption / Final production (m ³ / t)	3,17	↓	2,58
Total Organic Carbon (TOC) Dump	TOC / Final production (kg / t)	0,15	↑	0,22
Suspended Matter (SM) Dump	SM / Final production (kg / t)	0,11	↑	0,15
Non-hazardous waste	Generated / Final production (t / t)	0,01	↔	0,01
Hazardous waste	Generated / Final production (t / t)	0,06	↔	0,06
CO ₂ emissions	Emissions / Final production (t CO ₂ / t)	0,24	↔	0,24

● BARBERÀ DEL VALLÈS CENTRE				
Electrical consumption	Consumption / Final production (MWh / t)	6,93	↑	7,83
Gas consumption	Consumption / Final production (GJ / t)	0,14	↑	0,17
Water consumption	Consumption / Final production (m ³ / t)	4,99	↓	3,64
Total Organic Carbon (TOC) Dump	TOC / Final production (kg / t)	0,09	↓	0,08
Suspended Matter (SM) Dump	SM / Final production (kg / t)	0,13	↓	0,12
Non-hazardous waste	Generated / Final production (t / t)	0,17	↓	0,16
Hazardous waste	Generated / Final production (t / t)	0,01	↔	0,01
CO ₂ emissions	Emissions / Final production (t CO ₂ / t)	0,01	↔	0,01

● TOTAL KAO CORPORATION, S.A.				
Electrical consumption	Consumption / Final production (MWh / t)	0,36	↔	0,36
Gas consumption	Consumption / Final production (GJ / t)	5,72	↓	5,67
Water consumption	Consumption / Final production (m ³ / t)	2,72	↓	2,39
Total Organic Carbon (TOC) Dump	TOC / Final production (kg / t)	0,13	↑	0,15
Suspended Matter (SM) Dump	SM / Final production (kg / t)	0,08	↑	0,10
Non-hazardous waste	Generated / Final production (t / t)	0,01	↑	0,02
Hazardous waste	Generated / Final production (t / t)	0,06	↓	0,05
CO ₂ emissions	Emissions / Final production (t CO ₂ / t)	0,32	↔	0,32



¹³ On January 2, 2019, notification of the resolution proposal is received; allegations are presented on January 31. Awaiting response to them, at the date of preparation of this environmental statement.

¹⁴ Resolution TES/517/2017, of 10 February, which makes public the Resolution approved as part of the Comprehensive Environmental Inspection Plan of Catalonia for the 2017-2019 time frame.

TABLE 18.
ENVIRONMENTAL AUTHORISATION/LICENCES

	APPLICATION NO.	DATE OF RULING
● OLESA DE MONTSERRAT CENTRE		
Initial	BA20010008	17/06/2002
Substantial change: MDJ and OTB Plant	BA20030121	18/01/2005
Substantial change: HTR and C plant	BA20070072	23/10/2007
Renewal	B1RP140700	31/03/2017
● MOLLET DEL VALLÈS CENTRE		
Initial	BA20000018	3/04/2002
Renewal	BA20090126	9/12/2010
Substantial change: Lactones 4	B1CS170639	Pending ¹³
● BARBERÀ DEL VALLÈS CENTRE		
Initial	UAL A000005	
Substantial change: Line 4 and gas washer pilot plant	UAL A050002	17/01/2007

7.2 EVALUATION OF LEGAL COMPLIANCE

Kao Corporation, S.A. regularly analyses all legal provisions and published regulations, which it accesses through a variety of means, and with the Infosald application as the main source. Based on this, the company makes a summary of all new legal provisions and publishes the appropriate legal requirement sheet on the HSE Intranet. This application also enables monitoring and assessment of the degree of compliance with applicable legal requirements. The facilities of Kao Corporation, S.A. have been legalised in accordance with industrial safety regulations (high and low voltage, storage of hazardous chemical products, pressurised equipment, refrigerating facilities, etc.) and the periodic mandatory inspections are conducted.

7.2.1 ENVIRONMENTAL AUTHORISATIONS

Kao Corporation, S.A. holds all the necessary environmental authorisations and licences for its three work centres and, since 2002, has adapted to Law 3/1998 on Integrated Pollution Prevention and Control (IPPC), currently repealed by Law 20/2009, governing Prevention and Environmental Control of Activities. Under the control of Official Environmental Agencies, our organisation demonstrates its adaptation to the environmental prevention, control and authorisation requirements at local, regional, state and European levels. The following table shows the status of environmental authorisations and licences, substantial changes and renewals submitted, (tabla 18). Based on the changes to the regulations of 2013, the facilities of Mollet del Vallès and Olesa de

Montserrat are subjected to initial and periodic biannual checks and are subject to the comprehensive environmental inspection plan of Catalonia.

Therefore, beginning in March 2014, the periodic inspections are carried out based on the annual programme that is drafted by the DGQACC¹⁴, which establishes the dates when these inspections must be carried out.

The resulting reports are public and are posted on the Territory and Sustainability Department’s Website.

7.2.2 ANALYSIS OF LEGAL COMPLIANCE

The assessment, from different operational spheres, of legal requirements that apply to Kao Corporation S.A. has been performed by the company’s own specialists as well as by the competent authorities. The environmental authorisations and licences of the three centres remain updated together with the

Kao Corporation, S.A. has submitted all the required environmental declarations in all areas: water, emissions, waste, containers.



BEFORE

changes introduced. In 2017, the following is carried out:

- Comprehensive environmental inspection at:
 - Mollet del Vallès centre: With satisfactory results, a slightly relevant non-compliance is detected in terms of the atmospheric emissions, which prompted inspecting the laboratory hood (Record book NR-011682-P). This source is recorded in the substantial change to the lactones plant.
 - Olesa de Montserrat Centre: A relevant non-compliance is detected in terms of noise (the night time noise immission level is exceeded). Actions were quickly implemented to identify the low frequency generation sources in order to implement measures aimed at reaching past immission levels.
 - As mentioned in paragraph 7.1.1.7, some of the proposed measures were implemented in 2018 such as the renewal of a silencer unit that was located at



NOW

the cogeneration plant, which has demonstrated that the resulting noise level is within the immission limits at all times of the day.

- In spite of this, we are moving forward with the action plan for the next few years.
- Periodic environmental control of the Barberà del Vallès centre. The latter with satisfactory results.
- In 2018, the Olesa de Montserrat centre was once again subjected to a comprehensive environmental inspection. The result of this inspection was unsatisfactory indicating that “Proper compliance with the conditions stipulated in the comprehensive environmental authorisation is not guaranteed”. The scope of this non-compliance is administrative in nature as indicated in the final inspection report. Three systematic emission sources associated with the quality control laboratory display cabinets have been identified and even though these sources have record books, these are not

included in the environmental authorisation.

In this regard, Kao Corporation, S.A. alleged that no changes had taken place since the comprehensive environmental authorisation was renewed and that they were planning on correcting the situation as soon as possible.

In view that the allegation would be dismissed, a non-substantial change record was submitted to include the 3 sources in the comprehensive environmental authorisation. Resolution dated November 9, 2018 set the emission limit values at 50 mgC/Nm³ or mass emission equal of lower than 0.5 kg/h and a one month period to prove compliance. Both requirements are satisfied on time. At the Olesa de Montserrat centre, in terms of the project that was presented related with the installation of a thermal oxidation for treating gaseous effluents at the MDJ plant (Non substantial change B1CNS170689), the acquired commitments were to submit the change project to the Administration before January 1, 2018 (completed) and to ensure the installation was operational by June 2018.

The latter is pending because it isn't until April 8, 2019 when the City is planning on issuing the Construction License (submittal process initiated on the same date as the non-substantial change request (ref. B1CNS170689). In view of the delay in obtaining the Construction License, Kao Corporation, S.A. reported this

issue to the Unified Environmental Management Office and requested an extension of the deadlines provided in the non-substantial change request as well as maintaining the limit value until the installation is built.

Currently the installation is being built and its construction is expected to be completed in the month of August of 2019.

On the other hand, in March of 2016 we received a sanctioning administrative proceedings letter (Ref. G0918/2016/26) related with the non-compliance detected during the 2015 environmental inspection of the Olesa de Montserrat centre considering that the waterproof tarpaulin that was used to cover the box containing the waste -are

positioned closed and horizontally staggered (see the attached photo) - is not a cover. Currently containers are deposited in the same box that in turn has been placed under a fixed cover.

The allegations submitted to the sanctioning proceedings were dismissed in the resolution proposal that was received in December of 2016. Finally, in March 2017 we received the resolution notification with a penalty of € 5001. Kao Corporation, S.A. filed an appeal to this decision. A decision on the appeal has not been received yet.

On July 27, 2018 we received a notification of dismissal of the Appeal and the penalty was paid. In 2018, no other deviations were identified that gave rise to internal objectives and non-conformities, and neither do these represent public health or environmental hazards.

A response has also been given to all of the undertakings acquired by Kao Corporation, S.A., and the company has also given all declarations required in all areas (water, emissions, waste, soils, etc.).

WATER

Kao Corporation, S.A. has permits to capture its own sources of water both for the Mollet del Vallès centre as well as the Olesa de Montserrat centre (Decision of 16 November 2006 and Decision of 29 October 2004, respectively). The water extraction that takes place does not exceed the authorized limits.

As far as consumption of tap water is concerned, this is below the levels granted in the respective environmental authorisations and licences.

Kao Corporation, S.A. also has the corresponding dumping permits for each centre. The Mollet del Vallès centre submitted a dump permit renewal request in February of 2018 as a result of a substantial change related with the construction of the lactones plant 4 (Ref. B1CS170639). The permit renewal was granted in Resolution G-2018/772/174 (File number 2014/525) with a validity period of 4 years.

The Barberà del Vallès centre submitted a dump permit renewal request in April of 2016, which was approved in June of that same year (with a validity period of 6 years). The Olesa de Montserrat centre's permit was renewed by the Comprehensive Environmental Authorisation Resolution

QUALITY OF THE DUMPED WATER (Decree 130/2003)

The analytical parameters of dumped waters comply with the limits laid down in each environmental authorisation and licence, although the following situations have been occasionally detected where the established limits have been exceeded:

— Mollet del Vallès centre: One of the analyses conducted exceeds (0.07%) the conductivity limit value (5000 µS/cm).

The rest of parameters have all been below the legal limit. Any time a parameter exceeds the legal limit, the water is diverted to the safety pool until the dump meets specifications and the reasons causing the diversion are investigated, (*table 19*).

The declaration given in the Pollutant Release and Transfer Register (PRTR) (Royal Decree 508/2007) concerning emissions

¹⁵ Value: Average value / Maximum value.

Legal limits: Olesa de Montserrat: Regulation of the public sewerage services Decree 130/2003, Mollet del Vallès: Regulatory regulation of waste water discharges of the Consortium for the defense of the Besòs and Barberà del Vallès river: Metropolitan regulation of waste water discharges.

* The Regulatory Regulation for waste water discharges of the "Consorcio per a la defensa del riu Besòs" does not establish a limit value for organic and ammonia nitrogen, so it applies the value of Decree 130/2003.

TABLE 19. DUMPING PARAMETERS IN 2017¹⁵

		● OLESA DE MONTSERRA CENTRE	● MOLLET DEL VALLÈS CENTRE	● BARBERÀ DEL VALLÈS CENTRE
pH	Legal limit	6 - 10	6 - 10	6 - 10
	Value	7,5 / 8,3	7,3 / 8,7	7,3 / 7,7
COD: Chemical oxygen demand (mg / l)	Legal limit	1.500	1.500	1.500
	Value	234 / 650	326 / 1.371	103 / 309
SM: Suspended Matter (mg / l)	Legal limit	500	750	750
	Value	49 / 276	73 / 257	51 / 112,2
N: Organic and ammoniacal nitrogen (mg / l)	Legal limit	90	90*	90
	Value	13 / 64	28 / 88	22 / 52
IM: Inhibitor Matter (Equitox / m ³)	Legal limit	25	50	25
	Value	1,1 / 2	5,9 / 33	0 / 0
Chlorides (mg / l)	Legal limit	2.500	2.000	2.500
	Value	994 / 1.530	8,5 / 1.784	156 / 256,5
Conductivity (µS / cm)	Legal limit	6.000	5.000	6.000
	Value	4.453 / 6.166	2.776 / 5.500	899 / 1.175
P: Phosphorous (mg / l)	Legal limit	50	50	50
	Value	1,6 / 2,7	8,2 / 25	5,6 / 7,2
Anionic surfactants (mg / l LSS)	Legal limit	6	5	6
	Value	0,01 / 2	0,66 / 2,98	0,15 / 0,15
Nonylphenol (mg / l)	Legal limit	1	-	1
	Value	0	0	0

Source: Aspects evaluation database. Monthly report [centre]

TABLE 20.
NUMBER OF PIEZOMETERS

● OLESA DE MONTSERRAT CENTRE

14

● MOLLET DEL VALLÈS CENTRE

13 and **2** wells

● BARBERÀ DEL VALLÈS CENTRE

6

of waste water pollutants of the Olesa de Montserrat and Mollet del Vallès centres reveals that both centres are below the established thresholds.

GROUNDWATER

(Royal Decree 1514/2009)

Each centre has a series of piezometers, strategically located, which enable us to assess the degree of pollution of groundwater and, therefore, detect whether the subsoil is affected.

In 2009 we increased the number of piezometers at the Olesa de Montserrat centre (2) and at the Mollet del Vallès centre (2). Two piezometers were installed at Barberà del Vallès in 2010, and

another one was added in 2012.

In 2015, as a result of the Basic Soil Report for the Olesa de Montserrat centre, 4 piezometers were added to the centre's inventory.

In 2016, the Olesa de Montserrat network is upgraded with the addition of two more piezometers. In 2017, the Mollet del Vallès centre network is upgraded with the addition of 3 more piezometers. In 2018, the Mollet del Vallès centre network is upgraded with an additional piezometer, (table 20).

In 2006 we set up the Quantitative Assessment Plan of the risk associated to the subsoil being affected. This is an annual plan that remains in force.



The sampling and analyses carried out in 2018 at each centre show that:

— **Olesa de Montserrat Centre:**

- The groundwater level is very similar to that of previous campaigns.
- Piezometer 1 detects odour and the presence of foam is detected. The presence of hydrocarbons (TPH's) has remained constant compared to the previous campaign and remains below the historical maximum.
- The concentrations of halogenated solvents detected are also similar to that of the previous campaign and the upward trend is maintained.
- Regarding the concentrations of industrial solvents, a decrease in the concentration is noticed in the case of acetone (137.9 µg/l) and methyl ethyl ketone (160.4 µg/l) and an increase in the concentration is noticed in the case of toluene (299.6 µg/l), for which reference levels have been established.

- Piezometer 2 detects that the evolution of the concentrations of all the parameters are satisfactory and in all cases have been lower than the detection limit.
- Piezometer 3 detects cis-1.2 Dichloroethane and Trichloroethane in concentrations similar to that of previous campaigns.
- Piezometer 13 detects significant concentrations of acetone (332.1 µg/l), methyl ethyl ketone (55.6 µg/l) and toluene (where 307 µg/l is the historical maximum) and in a lesser measure, of xylenes and dichlorobenzenes.
- In conclusion, it is worth mentioning that none of the parameters analysed exceeds the GILs.

— **Mollet del Vallès centre:**

- The groundwater level remains constant with respect to the previous campaign.
- Presence of volatile

petroleum-based hydrocarbons with a concentration of 1300 µg/l at the south east end of the installations. In addition to this, slight concentration of xylenes have been detected which in no case exceed the levels stipulated in the QUASAR Project.

- Marginally relevant concentrations of petroleum-based hydrocarbons C10-C40 in two of the existing devices at the plant (in the middle and south east end of the installations) and in Well-3, where the maximum concentration has been detected (120 µg/l).




- All the samples analysed except the sample taken from Well-6 had very low concentrations of volatile halogenated compounds. None of the concentrations detected exceeded the acceptable values stipulated in the regulation.
- Regarding the organic compounds analysed, only concentrations that are slightly above the laboratory detection level have been detected.

Regarding previous campaigns, we observed a larger presence of petroleum hydrocarbons in some of the samples (Pz-3, Pz-10 and Well-3) and an increase in the concentrations of halogenated solvents (tetrachloroethylene, trichloroethane, cis-1.2-Dichloroethylene) in practically all the samples.

Three new probes were carried out in 2018. One of them with the piezometer installation after the scrapping of the N4D plant.

- The presence of TPHs in concentrations below the limit stipulated in RD 9/2005 were

TABLE 21. NUMBER OF SOURCES / CAPCA GROUP

	 OLESA DE MONTSERRAT CENTRE **	 MOLLET DEL VALLÈS CENTRE *	 BARBERÀ DEL VALLÈS CENTRE
Industrial processes	20/14A, 2B, 2C y 2-	13/8B, 1B, 1C y 3-	19/19-
Combustion installations	7/2B, 3C y 2-	7/2B, 3C y 2-	2/2-
TOTAL	27/14A, 4B, 5C y 4-	20/8A, 3B, 4C y 5-	21/21-

* Including the sources of KCHI's business activity.

** The source applicable to the DMS tank (scrubber CV-454), even though it belongs to the CAPCA group "-", measurements must be carried out every 5 years as required by the renewal resolution provided by the AAI.

detected in two of the probes and methanol was detected in one of the probes carried out and for which defined limit values have not been stipulated.

- Substances of little significance have been detected in the water sample, which in no case exceed the values stipulated by the QUASAR project, if any are present.

The ARC has requested additional information to that provided in 2017 in the BSR. Therefore, a new edition of the BSR has been presented that includes the actions taken in 2018 and incorporates the additional information that is required.

- **Barberà del Vallès centre:**
 - Stabilisation of the piezometric levels with respect to the previous campaign except of the piezometers located in the southern area (6 and 9), which continue to be difficult to

recover.

- Values obtained below the GIL (Generic Intervention Level) but metal concentrations are detected above the GNRL (Generic No Risk Level) (Ba, Cr VI, Mo, Se, Sn and V) in accordance with the Dutch guide. The concentration in Pz-5 stands out with respect to the previously detected values.
- Piezometer 8 (Pz-8: Near the Toner waste water pumping well): In this campaign, the sum of the respective concentrations of Trichloroethylene, 1,1-Dichloroethylene and Tetrachloroethylene has been 28.88 µg/l, exceeding 10 µg/l of the GNRL. This is due to the concentration of the first two and basically that of the Trichloroethylene.
- This value is higher than that of the previous campaign (16.27 µg/l) and lower than the historical maximum.

- TPHs and pentachlorophenol are detected slightly above the GNRL of the Dutch guide.
- Piezometer 9 (Pz-9: Autopista street, near the finished product warehouse's emergency exit): Detection of cresols above the GNRL of the Dutch guide.
- In the rest of parameters analysed, the obtained values are lower than the GNRL.

Based on the results obtained and since the observations remain constant, a Quantitative Risk Assessment is carried out. The assessment concludes that there is no risk to the groundwater and surface water receptors or to humans. An annual follow-up is scheduled to be carried out and if high concentrations are obtained, then the frequency of the samples will be increased in 2019.

TABLE 22. EMISSION OF ATMOSPHERIC POLLUTANTS ¹⁶

		● OLESA DE MONTSERRAT CENTRE	● MOLLET DEL VALLÈS CENTRE	● BARBERÀ DEL VALLÈS CENTRE
VOCs (expressed as TOCs) (kg / h)	Legal limit	50 mgC / Nm ³ if emission mass $\geq 0,5$ kg / h ¹⁷	50 mgC / Nm ³ or mass emission 0,5 kg / h	-
	Value	0,12 / 0,55	0,09 / 0,26	-
CO (mg / Nm ³)	Legal limit	100 mg / Nm ³	100 mg / Nm ³	100 mg / Nm ³
	Value	15,83 / 29,20	11,91 / 19,90	40,00 / 40,00 ppm
NOx (mg / Nm ³)	Legal limit	450 mg / Nm ³	450 mg / Nm ³	450 mg / Nm ³
	Value	155,97 / 232,40	148,52 / 231,70	92 / 92 ppm
Solid particulates (mg / Nm ³)	Legal limit	50 mg / Nm ³	-	50 mg / Nm ³
	Value	2,25 / 4,10	-	6,41 / 25,80
Dimethyl sulphate (DMS) (g / h)	Legal limit	2 mgC / Nm ³ if mass emission ≥ 10 Kg/h	2 mgC / Nm ³ if mass emission ≥ 10 kg/h	-
	Value	< 0,01	< 0,02	-

WASTE

Kao Corporation, S.A. is registered as a producer of waste at each centre and uses authorised managers to handle its waste in accordance with Decree 93/1999, Law 22/2011 and Decree 152/2017.

ATMOSPHERIC EMISSIONS

Based on Autonomous Law 22/1983 and Law 34/2007 and the supplementary regulations implemented by these laws, Kao Corporation, S.A. has a Record Book for each one of its emitting sources where the results of the checks that are carried out are recorded. In 2015, a remote recording was carried out of these emitting sources.

A table is provided with the types of emitting sources that are located at each centre, which provides the periodicity with which each source must be subjected to an external control (group A every two years, B every 3 years, C every 5 years and “-”

not required), (*table 21, previous page*).

The checks are performed with the regulatory frequency. These checks were conducted at Barberà del Vallès in 2011, and the latest checks at the Olesa de Montserrat and Mollet del Vallès centres were performed in 2018.

Measurements of the sources were performed in 2018 by their applicable CAPCA code. That is, 5 process sources and 3 combustion sources at the Olesa de Montserrat centre and 1 process source and 2 combustion sources at the Mollet del Vallès centre.

The measurements of the emissions have been performed in accordance with the technical instructions published by el Servei de Vigilància i Control de l'Aire. The main development of these measurements with respect to previous measurements is the use of vane probes instead of Pitot probes to determine the flows of sources where, due to their characteristics, differential

pressure could not be detected using a Pitot probe.




In 2 process sources - 1 at Mollet de Vallès and another one at Olesa de Montserrat (CV-179) - the emitting speed is lower than 1 m/s. The results of the checks carried out revealed full compliance. The following table shows the latest results obtained from the sources in operation during the last official measurements taken at each one of the sources, (*table 22*).

NOISE EMISSIONS

Every year, we conduct a noise check inside the facility to verify that sound levels are within the legal limit and to be able to detect an increase in environmental noise and consequently adopt preventive or corrective measures in the shortest possible time, (*table 23*)

The level of noise emitted by each centre is below the level required in the Municipal By-law corresponding to the municipality

TABLE 23. IMMISSION LIMIT (LAR IN DBA) DAY / NIGHT IN RESIDENTIAL AREA

	 OLESA DE MONTSERRAT CENTRE ¹⁸	 MOLLET DEL VALLÈS CENTRE	 BARBERÀ DEL VALLÈS CENTRE
Law 16/2002	55 / 45	55 / 45	65 / 55
Municipal By-law	70 / 60	60 / 50	65 / 60

in which the centre is located and the level given in Law 16/2002 (refer to paragraph 7.1.1.7).

SOILS

In 2004, Kao Corporation, S.A. evaluated the level of industrial soil contamination at its three centres. The limit concentrations obtained were correct, in accordance with the provisional soil quality criteria applicable in Catalonia for industrial soils. By the same token, the “Soil Status Report” is available in accordance with the Royal Decree 9/2005 and with the requirements of the Agència de Residus de Catalunya.

There are regular actions to prevent soil contamination, such as re-asphalting of roads, renewing tanks and ensuring that the production plants are paved properly.

The “Basic Soil Report” for the Olesa de Montserrat centre was submitted in 2015 in accordance with Law 5/2013 and the one for the Mollet del Vallès centre was submitted in 2017.

The soils Periodic Situation Report (PSR) for the Olesa de Montserrat centre was submitted in 2016 and the one for the Mollet del Vallès centre was submitted in 2017.

7.3 INTERNAL AUDITS

Since 1993, Kao has been affiliated to the Responsible Care programme, which undertakes to develop an audit system based on six codes laid down in the programme. Since 2015 it has been upgraded with the Security code.

During this financial year, an Environmental internal audit was performed in different areas and centres in accordance with the 2018 Annual Audit Plan. The main aim of this audit was to check the adaptation of the Risk Prevention Management System (RPMS) to the Responsible Care Environmental Management Module.

In the energy area, an external company has been hired to perform the internal audit. During the audit process, the great effort carried out by all personnel associated with the audited departments and areas is worth mentioning.

¹⁶ Value: Average value of all the sources/ Maximum value.

¹⁷ Except for the CV-1591 focus that maintains the 150 mgC / Nm³ limit if mass emission ≥ 3 kg / h until June 2018, when the thermal oxidation installation will have to be operational; focus on which the largest mass emission is detected.

¹⁸ The limits defined in the Municipal Ordinance of Esparraguera are: Day 60 dBA and night 50 dBA.

8. IMPROVEMENT

Environmental actions can often be masked when highly complex industrial facilities are evaluated, with their various processes and products submitted to constant changes in growth and adaptation, because the Rates and other indicators are usually tied to productive processes.

Kao Corporation, S.A. has developed indicators associated to environmental aspects in order to define specific improvement plans. The result of this action has included the reduction of hundreds of tonnes of waste and major reductions in the pollutant loads dumped into water which, in the absence of said plans, would have meant an environmental impact far in excess of that currently under consideration.

The following are some examples of preventive actions that have allowed our organisation to reduce its environmental impact.

ENERGY CONSUMPTION

Natural gas is the main energy resource used by Kao Corporation, S.A. It is a clean fuel that allows to efficiently generate electricity and produce steam. Therefore, we generate the cleanest electrical energy, not based on oil derivatives, and feed this into the public power distribution grid.

The energy efficiency is also thanks to the use of high performance turbines, the optimisation of resources and the appropriate maintenance of the installations (recovery of condensates, improved thermal insulation, economizers, etc.).

As part of its commitment to the

environment, and in line with the “eco together” objectives, Kao Corporation, S.A.

introduced another line of work in 2012, which focuses on improving energy efficiency. The line begins by performing an initial audit to identify areas of improvement. The actions required for implementing a management system in accordance with standard UNE-EN ISO 50.001 is continued in 2013 and concluded with its certification in the first quarter of 2014.

The implementation of ISO 50.001 is a further reflection of Kao Corporation, S.A.’s commitment and with this we expect to further improve the results obtained to date. The actions for improvement that were proposed in the initial audit report are included in the Sustainability Plan of each centre.

WASTE WATER

Most of the waste water generated in the chemical plant processes (Olesa de Montserrat and Mollet del Vallès) is previously treated at the company’s own treatment plants, which include physical-chemical and biological treatment technologies, before being sent to municipal treatment plants.

The pollutant loads present in waste water have varied substantially in recent years, depending on the activities conducted by the productive plants and vary based on the actions taken to reduce its polluting load.

WASTE

One of the company's permanent targets focuses on the continuous improvement of its waste management, not only from the point of view of trying to reduce or appropriately process said waste, but also by researching new forms of management. The progressive development of minimisation plans is one of the most important challenges with regards to both environmental and economic impacts. New strategies, such as the reduction of sludge treatment and the reuse of water, will make it possible to significantly minimise the volume of generated waste. A multidisciplinary working group has been convened to focus on production waste generation prevention.

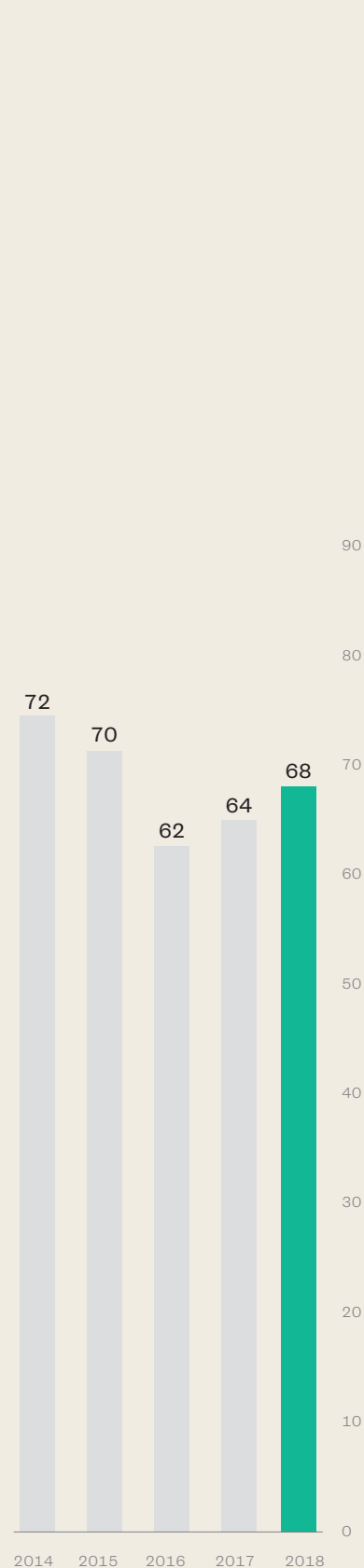
WASTE RECOVERY

The effort made by Kao Corporation, S.A. to search for other companies that can use our waste as raw materials or energy in their processes, i.e. to obtain value from a waste product, is evident in the increased percentage of recovered waste, exceeding 50% since 2005, with the exception of 2009. Part of the fluctuations in the amounts of recovered waste is due to sludge treatment at the cement factories.

The decrease in waste recovery that is observed in 2016 is a result of the cement factory refusing to manage the sludge due to the organic load it contains which is greater than 0.5% of the specified TOCs, (Illustration 13).

ILLUSTRATION 13. EVOLUTION OF THE WASTE RECOVERY PERCENTAGE

Data in %

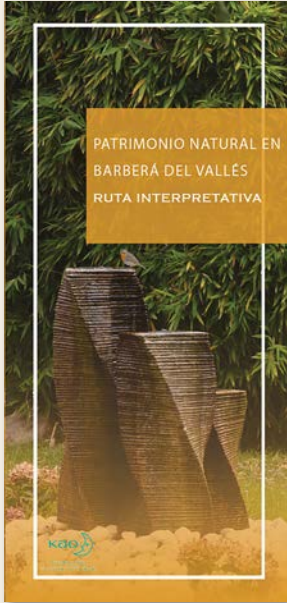


ATMOSPHERIC EMISSIONS

Analytical control of atmospheric emission sources at the three industrial centres has gradually increased by means of Monitoring and Inspection Bodies. In the past, significant reductions have been achieved in the amount of emissions, with actions such as the following:

- The closure of the sulphation plants of the Olesa de Montserrat centre and, consequently, reduction of SO₂ emissions.
- Replacement of the fuel used in the boilers (fuel oil) for Natural gas, which is less polluting.
- Installation of an ammonia recovery plant at the Mollet del Vallès centre to reduce emissions of NH₃. The amines production business that generated these emissions ceased at the end of 2008.

From an environmental viewpoint, the constant actions performed to optimise resources and investments significantly contribute to reducing CO₂ emissions. A FID analyser was purchased in 2016 to measure the TOCs for the purpose of determining if they have an effect on any changes in the process conditions and if so, in what measure. The thermal oxidation facility that is located at the Olesa de Montserrat centre for treating the gas emissions generated by the sources (3) of the aroma processes is scheduled to become operational in 2018.



BIODIVERSITY

Greater knowledge, awareness and sensitivity regarding environmental aspects involves expanding the scope of the environmental actions that are taken, including conservation and the promotion of biodiversity. In this regard, the Kao Group has developed a methodology based on standard of use of the earth developed by JBIB¹⁹ to understand the situation of biodiversity and evaluate the progress of conservation at each facility in the world.

Along this line, in 2017 the group provided all the subsidiaries with a form for evaluating progress on the conservation of biodiversity. In 2018, an inventory of both animal and plant species was taken at each facility, informative material was prepared, and the form was completed so that it could serve as the starting point for being able to assess advances in this area. In turn, some short-, medium- and

long-term objectives have been defined for improving biodiversity, in line with the drafted biodiversity policy, the publication and distribution of which is expected for 2019.

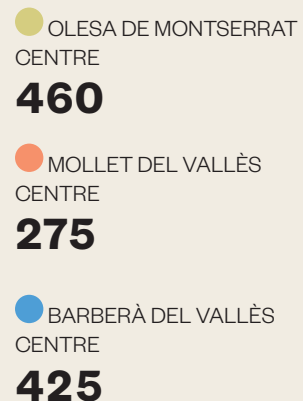
Regarding the group as a whole, the long-term objective (2030) is for the total score of all facilities to reach 460 points. The result obtained for the 3 facilities of Kao Corporation, S.A. in 2018 is provided in the table below, (table 23).





In 2018, disseminating materials such as posters, leaflets and pamphlets are used for the different visits made by the group's Managers and biodiversity routes have been organised with employees at the centres of Barberà del Vallès and Olesa de Montserrat.

Thanks to the good acceptance that these types of events have had, we expect to extend these so that all employees can participate.



TABLE 23. POINTS BY CENTERS



 KAIZEN SHEET Ref. MO-17-009	Impacto Impact						Sostenibilidad Sustainability					Periodo de evaluación Evaluation period MARZO 2018
	Facility improve.	Operations	Health & Safety	Quality	Energy	Order Cleaning	Electricity	Gas	Water	Waste	CO ₂	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	27.181 kWh	0 kWh	14.658 m ³	0 kg	0 Ton	<input type="checkbox"/>
Título de la idea /Idea Name	Instalación de válvula de 3 vías en alimentación de agua de condensados a torres de refrigeración						Objetivo /Target	Reducir el consumo de agua y energía				
Centro /Plant	Mollet	Solicitante /Applicant		Raúl Manzano		Fecha de solicitud /Date of application	30/01/2017					
Área /Workplace	Mantenimiento	Turno /Shift				Responsable aprobación /Proposal check	Raúl Manzano					
Sección /Section	Eléctrico	Responsable de Turno /Shift Responsible				Fecha de aprobación /Date of approval	12/03/2018					
Situación actual /Current issue			Propuesta de mejora/contramedidas /Proposal				Detalle de situación inicial /Before improvement (detail)					
La torre de refrigeración de Ácidos Grasos tenía una pequeña purga por reboso debido a la recuperación de los condensados de vapor, y esta agua iba a depuradora, mientras que la torre de refrigeración de Aromas consumía 16 m ³ /día de tank water y 32 m ³ /día de agua osmotada.			Instalar una válvula de 3 vías que permita, en caso de que sea necesario por nivel en la torre de Aromas, el envío de parte de los condensados.									
Análisis /Analysis / Beneficio esperado /Expected Effect			Resultados obtenidos /Results				Detalle de la mejora /After improvement (detail)					
Reducción de agua: - Osmotada = 11.200 m ³ /año - Tank Water = 2.450 m ³ /año Reducción consumo eléctrico = 27.181 kWh/año Reducción envío agua a depuradora = 1.008 m ³ /año Reducción de costes = 17.269 Euros/año			Los esperados inicialmente (ver apartado de análisis). Desde la modificación, la torre de AG ya no rebosa y ha elevado su conductividad de 330 a 880 microS, y la de Aromas está en valores similares, evitando que purgue por conductividad. 									
Equipo análisis /Team members	Raúl Manzano		Fecha inicio implementación /Start Date	12/03/2018		Cuantificación de resultados/Ahorro /Results/savings						
Lider del equipo /Team leader	Raúl Manzano		Fecha de Finalización /Finish Date	12/03/2018		27.181 kWh/año - 14.658 m ³ /año - 17.269 Euros/año						
Estado de la medida: <input checked="" type="checkbox"/> Aceptación <input checked="" type="checkbox"/> Evaluación <input checked="" type="checkbox"/> Implementación <input checked="" type="checkbox"/> Verificación												

OTHERS

KAIZEN

Kaizen's philosophy is fully aligned with the "eco together" programme. This term is of Japanese origin and means "change for the better" or "improvement", however, it is commonly translated as "continuous improvement". It is a quality management method that is highly known around the industrial world that develops culture and enables all workers to participate and which intention is for the company and their employees to always seek to achieve better results by optimising the processes and identifying activities that can be carried out more efficiently; its focus is on eliminating waste and misuse in production systems. The phrase: *short steps to travel a long distance*, sums up the meaning of Kaizen.

All we have to do is go to the work locations (genba), observe what

is happening there, recognise and take the necessary actions. Time can also be managed to ensure it is optimised just like any of the organisation's tangible assets. One of Kaizen's actions in 2018 for each of Kao Corporation, S.A.'s facilities is described below.

It is worth mentioning that some of these actions were awarded and the President of the company recognised its authors at the annual Christmas ceremony. All these reasons show that the company has made a clear effort to continuously improve the adaptation and efficiency of the RPMS to improve performance in safety and the environment. In the short term, the main improvements that are expected to be introduced in the RPMS are closely related with the new version of the reference standard, ISO 14001:2015 and ISO 50001:2018 and basically consists of focusing the RPMS

on management by processes, on further increasing employee participation and promoting the concept of the processes with a life cycle analysis vision.

To accomplish this the company has provided training in BPM (Business Process Management) to certain employees.

We hope to show the progress of all of this in the next Environmental Declarations.

¹⁹ JBIB (Japan Business Initiative for Biodiversity) is an organization of numerous businesses from various types of industries, which are committed to the conservation of biodiversity. Kao has participated in JBIB since its founding in 2008.

9. REFERENCES

- EC Regulation 1221/2009 of the European Parliament and of the Council of 25 November 2009, whereby organisations are allowed to participate on a voluntary basis in a Community Environmental Management and Audit System (EMAS).
- PROGRESS UNDERTAKING. Environmental Code of Practices. FEIQUÉ. European Commission guide of environmental related indicators.
- ISO 14031 (2013). Environmental management: Environmental performance assessment. General guidelines.
- ISO 14001 (2015). Environmental management systems. Requirements with guidance for use.
- Directives on the Environmental Declarations of the EMAS. Ministry of the Environment. Official Publications Office of the European Communities (ISBN 92-894-1603).
- National Institute of Statistics (INE): Population census.
- Department of the Environment of Generalitat de Catalunya: Distances to aquifers and PEIN areas (remote cartography).

GLOSSARY

- ACA: Agència Catalana de l'Aigua
- BPM: Business Process Management
- CAPCA: Catalogue of Potentially Contaminating Activities of the Atmosphere
- CEO: Chief Executive Officer
- CO: Carbon monoxide
- CO₂: Carbon dioxide
- TOC: Total Organic Carbon
- EE: Electrical Energy
- FEIQUÉ: Federation of the Spanish Chemical Industry
- GHG: Greenhouse gases
- HSE Dept.: Health, Safety & Environment department
- BSR: Basic Soil report
- SR: Safety Report (Serious Accidents)
- SM: Suspended Matter
- IM: Inhibitor Matter
- mi: Magnitude of the impact
- NO_x: Nitrogen oxide
- PM₁₀: Particulates up to the size of 10 µm
- PRTR: Pollutant Release and Transfer Register
- PLASEQCAT: Pla d'Emergència Exterior del Sector Químic de Catalunya
- SGPR: Risk Prevention Management System
- GIL: Generic Intervention Level
- GNRL: Generic No-Risk Level

10. PUBLICATION OF THE DECLARATION

This Environmental Declaration has been prepared by the HSE Dept. of Kao Corporation, S.A., to publish the environmental management results for 2018 and monitor the favourable evolution of the historically obtained figures, indicators and improvements. It also provides clear and concise information that is useful for the external audit and verification of the environmental management carried out by the Organisation in accordance with EC Regulation 1221/2009 (EMAS).

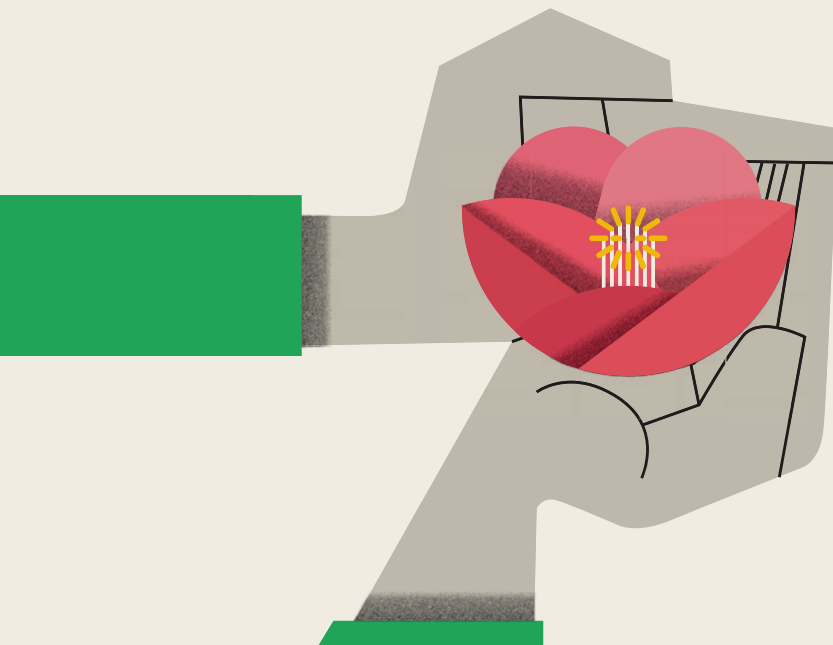
The information given in this Declaration is extracted from other official documents, developed broadly and specifically for each area of action:

Annual waste declarations submitted to:

- Agència de Residus de Catalunya. Departament de Territori i Sostenibilitat. Generalitat de Catalunya. Declaracions de l'ús i la contaminació de l'aigua (water use and pollution declarations), presented to:
 - Agència Catalana de l'Aigua (daily analysis data for factories and external laboratories approved by the ACA). Departament de Territori i Sostenibilitat. Generalitat de Catalunya.

Official pollutant emission controls submitted to:

- Direcció General de Qualitat Ambiental i Canvi Climàtic. Departament de Territori i Sostenibilitat. Generalitat de Catalunya.



Kao Corporation S.A. has been making this Environmental Declaration since 2003 as an essential part of its internal and external communication with stakeholders and other interested parties, seeking ongoing improvements based on the indicators and targets provided herein.

This Environmental Declaration can be consulted at:
http://mediambient.gencat.cat/ca/05_ambits_dactuacio/empresa_i_produccio_sostenible/sistemas_de_gestio/sistemas_de_gestio_ambiental_iso_14001_i_emas/emas/Organitzacions-registrades-i-declaracionsambientals/index.html

<http://www.kaochemicals-eu.com/environmental-declaration>

11. SEAL OF APPROVAL FROM THE VERIFICATION AGENCY

This document has been drawn up and approved by:



M^a José Bermejo
 President of Kao Corporation, S.A.

Verified the system and validated this Environmental Declaration by:

DECLARACIÓN MEDIOAMBIENTAL VALIDADA POR

AENOR

DE ACUERDO CON EL REGLAMENTO (CE) Nº 1221/2009
 modificado según REGLAMENTO (UE) 2017/1505

Nº DE ACREDITACIÓN COMO VERIFICADOR MEDIOAMBIENTAL
 ES-V-0001
 014-V-EMAS-R

Fecha de Validación :

